School of Management and Marketing

How Naturalness and Sustainability Affect Consumers Decision-Making Processes Toward Food Products? A Multi-Method Consumer Research

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DECLARATION BY AUTHOR

To the best of my knowledge and belief, this thesis contains no material previously published by any other person except where due acknowledgment has been made.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

The research presented and reported in this thesis was conducted in accordance with the National Health and Medical Research Council National Statement on Ethical Conduct in Human Research (2007) – updated in March 2014. The proposed research study received human research ethics approval from the Curtin University Human Research Ethics Committee (EC00262).

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We acknowledge that Curtin University works across hundreds of traditional lands and custodial groups in Australia, and with First Nations people around the globe. We wish to pay our deepest respects to their ancestors and members of their communities, past, present, and to their emerging leaders. Our passion and commitment to work with all Australians and peoples from across the world, including our First Nations peoples are at the core of the work we do, reflective of our institutions' values and commitment to our role as leaders in the Reconciliation space in Australia.

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Your journey is not made only by yourself but by other people around you.

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Vietnamese (to my mom) below

Tới Mẹ, cảm ơn Mẹ đã đem lại cho con tình yêu thương, tự do, và nhiều đặc ân. Con sẽ không bao giờ có thể theo đuổi con đường riêng của mình nếu Mẹ không phải là Mẹ của con (và vì thế, con mãi mãi biết ơn). Con chưa bao giờ thể hiện tình yêu thương dành cho Mẹ (cái này chắc con học từ Mẹ), nhưng Mẹ nên biết là con không thể đòi hỏi thêm gì từ Mẹ, và con mong là Mẹ sẽ tự hào khi nhìn thấy những dòng này.

RESEARCH OUTPUTS

Journal Publications: Each Chapter in this thesis is presented as individual journal manuscripts, which have been published (x 2) and are currently under review (x 2).

Incorporated as Chapter 2:

Duong, C., Sung, B., Lee, S., & Easton, J. (under review). Assessing Australian Consumers' Judgement Process for Abalone Products: A Best-Worst Approach on 46 Attributes. *British Food Journal.*

ABDC: A (2022 Ranking); SJR Q1; IF: 4.799; SJR: .8; Google H5-Index: 61

	Conception and Design	Acquisition of Data and Method	Data Conditioning and Manipulation	Analysis and Statistical method	Interpretation and Discussion
Co-author 1: Billy Sung	12%	0%	0%	10%	12%
Co-author 1 acknowledgement: I acknowledge that these represent my contribution to the above research output and I have approved the final version Signed:					
Co-author 2: Sean Lee	6%	0%	0%	0%	6%
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Co-author 3: Julia Easton	2%	0%	0%	0%	2%
Co-author 3 acknowledgement: I acknowledge that these represent my contribution to the above research output and I have approved the final version Signed:					

Incorporated as Chapter 3:

Duong, C., Sung, B., Lee, S., & Easton, J. (2023). The Effect of Shopping Channel (Online vs. Offline) on Message Framing of Naturalness. *Journal of Consumer Behaviour*.

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	Conception and Design	Acquisition of Data and Method	Data Conditioning and Manipulation	Analysis and Statistical method	Interpretation and Discussion
Co-author 1: Billy Sung	12%	0%	0%	10%	12%
Co-author 1 acknowledgement: I acknowledge that these represent my contribution to the above research output and I have approved the final version Signed:					
Co-author 2: Sean Lee	6%	0%	0%	0%	6%
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Co-author 3: Julia Easton	2%	0%	0%	0%	2%
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	Conception and Design	Acquisition of Data and Method	Data Conditioning and Manipulation	Analysis and Statistical method	Interpretation and Discussion
Co-author 1: Billy Sung	12%	0%	0%	10%	12%
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Co-author 2: Sean Lee	6%	0%	0%	0%	6%
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Co-author 3: Julia Easton	2%	0%	0%	0%	2%
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	Conception and Design	Acquisition of Data and Method	Data Conditioning and Manipulation	Analysis and Statistical method	Interpretation and Discussion
Co-author 1: Billy Sung	12%	0%	0%	10%	12%
Co-author 1 acknowledgement: I acknowledge that these represent my contribution to the above research output and I have approved the final version Signed:					
Co-author 2: Sean Lee	6%	0%	0%	0%	6%
Co-author 2 acknowledgement: I acknowledge that these represent my contribution to the above research output and I have approved the final version Signed:					
Co-author 3: Julia Easton	2%	0%	0%	0%	2%
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ABSTRACT

Food-related decision-making is conventionally thought to be a simple and rational process. However, existing literature suggests otherwise and demonstrates that food-related decision-making is a complex behaviour that is influenced by various factors, such as the individuals, the situation and the food itself. Understanding food-related decision-making has been a central line of enquiry across various research disciplines, including biology, sociology, economics, psychology and marketing. Each discipline aims to answer the following questions: 'Why do people eat what they eat? When, where and how can what they eat be influenced?'

This thesis aims to extend the current understanding of consumers' food-related decision-making processes through a multidisciplinary lens. It focuses on the three major determinants of food choices: (a) the food itself, (b) the individuals and (c) the situations. The thesis explores how those factors interact and influence food-related decision-making processes and choices. It begins with a review of the relevant literature on the three main determinants of food choices (Chapter 1). Across the subsequent four Chapters (i.e., Chapters 2–5 comprising manuscripts prepared or accepted for publication), the thesis will examine two different product categories (i.e., fresh pork and abalone) in two phases. The first phase will explore the food itself and aim to understand what makes consumers choose a specific food option. The second phase will explore the interaction between the food itself, individuals and situations.

The first phase will draw on the total food quality model and cue utilisation theory. Specifically, Chapters 2 and 4 will explore the relevance and predictive value of various product cues in determining consumer choices related to fresh pork and abalone. Applying the best–worst scaling method (i.e., economic modelling), Chapter 2 finds that naturalness is the most important attribute of abalone, while Chapter 4 shows that consumers emphasise animal welfare when buying fresh pork. These findings serve as the basis for the second phase of this thesis, in which different individual and situational factors and how they could be used to enhance the effectiveness of naturalness and animal welfare claims are investigated. Chapters 2 and 4 contribute to the product development domain by offering granular insights on the salient cues used by consumers to evaluate abalone and fresh pork.

Chapter 3 tests and finds that naturalness cues could be most effectively communicated using concrete framing, especially when consumers shop inside the store. It offers implications to the advertising and consumer psychology literature by examining how the psychological mechanisms of individuals as well as shopping situations, can interact with the food itself and influence consumer perceptions and choices. Chapter 5 synthesises literature from a 20-year period (2002–2022) and demonstrates that consumers subjectively perceive natural farming to possess higher animal welfare standards. Chapter 5 extends various research domains and offers explanations and propositions to guide future research on animal welfare.

Across the four Chapters, the thesis demonstrates the complexity of food-related decision making and choices. While a determination of the important product attributes is necessary, it is imperative that research should be extended to how other individual and situational factors may affect consumer interpretations of those attributes. Furthermore, the thesis illustrates the significance of adopting a multidisciplinary approach to an examination of food choices. While cue utilisation theory offers a useful framework for identifying salient product attributes, other psychological

theories (e.g., construal level theory) allow researchers to understand how individual and situational factors may influence consumer decision making. Taken together, the findings of the present thesis form part of a significant endeavour in different disciplines to answer a complicated question on "why do people eat what they eat? When, where, and how could it be influenced?" and offer many valuable implications for both theory and practice.

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TABLES AND FIGURES

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1 CHAPTER 1: GENERAL INTRODUCTION

Choosing food is among the most common and frequent human behaviours. Every day, an individual may face an average of 200 food-related choices (Contento, 2007; Monteleone et al., 2017). Although the food choices of individuals are driven by their personal desires (e.g., Papies, 2020), their decisions may have a major impact on the environment, public health, society and the economy (Notarnicola et al., 2017; Woods & D'Alessio, 2008). For instance, eating energy-dense and nutrient-poor food (i.e., fat and sugar-rich foods) may result in long-term health issues (i.e., obesity) and negative economic costs (e.g., Commonwealth of Australia, 2022). In addition, heavy reliance on farmed meat, which is mostly produced in intensive livestock farms, may result in negative societal and environmental impacts, such as greenhouse gas emissions (Allen & Hof, 2019), water pollution (Farchi et al., 2017) and animal suffering (Rubio et al., 2020). As a result, the United Nations, partly through its sustainable development goals (i.e., Goals 2, 3 and 12), seeks to address major health (e.g., obesity and nutritional deficiency), environmental and societal challenges via healthier and more responsible food choices (United Nations, n.d.).

The significance of food consumption can also be observed on a smaller scale in various individual countries. For instance, Australia's food and beverage industry adds approximately $400 billion to the gross domestic product (GDP) and generates more than one million jobs per year (Australian Bureau of Statistics, 2021, 2022). The Australian Government seeks to grow the industry twofold in value by 2030 through a strategic focus on innovation and consumer insights (Commonwealth of Australia, 2021). However, they expect to be met with many challenges, especially the lack of consumer insights and rapidly changing market conditions and demands (Food Innovation Australia, 2020). An understanding of consumers' food-related decision-

making and choices significantly contributes to national economies, the environment and society.

The study of food choices and their determinants, therefore, continues to be of great interest to scientists, businesses, and governments alike. As indicated earlier, a better understanding of the factors driving food preferences could be beneficial to product development, marketing and communication in the agri-food industry. Concomitantly, governmental bodies or public health services can also leverage such insights to devise interventions to encourage healthy eating. From a future research point of view, a comprehensive understanding of individuals' food choices could lead to the knowledge of how different aspects, such as psychological, social, cultural, economic, and biological characteristics, interact and shape their food-related behaviours (e.g., Chen & Antonelli, 2020; Fischler, 1988; Meiselman, 1996; Rozin, 1980).

Food choice is conventionally thought to be simple, but it is rather complex. Food choices are not solely determined by an individual's biological needs (i.e., hunger and nutritional demands) but also by economic, environmental, social and psychological factors (e.g., Köster, 2009). Food preferences and choices are constantly evolving, and individual choices are becoming more complex with an increasing emphasis on many different aspects of food, such as health and safety (e.g., Smith et al., 1999; Verbeke, 2006), quality and popularity (e.g., Gandhi & Zhou, 2014; Ishida et al., 2003), nutritional value (e.g., Gouel & Guimbard, 2019; Kastner et al., 2012), ethics in production (e.g., European Commission, 2020) and naturalness (e.g., Chryssohoidis & Krystallis, 2005; Roman et al., 2017). This evidence further highlights the challenges faced by stakeholders in the food sector, often characterised by high switching intentions and low profit margins (Carter, 2019).

Meiselman (1996) offered a more contemporary view of food-related decision-making and choice. They proposed three major determinants of food choices, including the individual (e.g., genetics, gender and culture), the situation (e.g., availability, shopping channels and eating at home vs. outside the home) and the food itself (e.g., sensory quality, brand and price). These determinants have been at the heart of food-related decision-making literature across various research disciplines, including biology, sociology, economics, psychology and marketing. Each research discipline attempts to answer the questions: 'Why do people eat what they eat? When, where and how can what they eat be influenced?' Moreover, each discipline approaches this broad and important question with its own unique theories and methods.

Biology researchers seek to understand how genetic factors, biological sex and energy demands influence an individual's diet and nutritional intake (e.g., Hoppert et al., 2012; Keim et al., 2012; Vella et al., 2014). Psychology researchers explore affective and cognitive drivers of individual choices (e.g., Hollands et al., 2011; Renner et al., 2012). In marketing, food consumption is commonly studied in correlation with attitude, beliefs and branding effects (e.g., Ackermann & Palmer, 2014; Carroll & Vallen, 2014). Meanwhile, food science is particularly interested in a food's sensory properties and how they impact food choice and experience. Each research discipline has its merits and contributes to the literature on individual food-related decision-making and choice. However, there has been limited progress in expanding knowledge of food-related decision-making by means of a multidisciplinary approach. This is largely driven by the discipline-specific orientation of research and an associated lack of emphasis on the interaction between various elements (i.e., the food itself, the individual and the situation).

This thesis seeks to offer a multidisciplinary understanding of consumer decision-making processes in various food-related contexts. The thesis will provide a more comprehensive investigation of food choices using a combination of theories from economics, marketing and psychology, providing evidence regarding these key questions 'Why do people eat what they eat? When, where and how can this be influenced?' The contribution of this thesis is two-fold. First, it obtains evidence-based consumer insights that support the Australian Government's Food and Agribusiness Sector Competitiveness Plan (i.e., National Farmer's Federation, 2030 Roadmap). Second, it aims to align with the UN's Sustainable Development Goals in seeking to promote healthier and more responsible food choices (i.e., Goals 2, 3 and 12).

The thesis will extend what is known about consumer food-related decision-making by integrating theories and methods from fields such as economics, marketing and psychology. The thesis investigates the three key determinants of food choice: (a) the food itself, (b) the situation and (c) the individual, and how they interact to influence perceived food quality. Consumer research has historically documented the direct relationship between perceived food quality and purchase intention (Carman, 1990; Boulding et al., 1993; Zeithaml et al., 1996). Understanding what factors positively drive consumers' perceived quality has been central to academic and industry research. As a result, drawing from the total food quality model (Grunert et al., 1996) and cue utilisation theory (Cox, 1967), the thesis proposes a multi-method approach to explore two important questions: (1) What information do consumers rely on to infer product quality at the point of purchase and inform their purchase intention? (2) How do marketing interventions (e.g., communication and education), individual differences and the situation interplay and influence product quality assessment?

1.1 Determinants of Food Choice: The Food Itself

There has been a long tradition of cross-disciplinary research into the relationship between food quality perception and choice. In consumer research, the crucial factor determining food choice is thought to be the food itself and its expected quality (Boulding et al., 1993; Carman, 1990; Grunert et al., 1996; Zeithaml et al., 1996). Expected food quality refers to the consumers' subjective evaluation of the food products' excellence at the point of purchase (Zeithaml, 1988). Researchers put forth the notion that consumers determine the product's expected quality based on available attributes and how they perceive them (Brunsø et al., 2002; see Figure 1.1 for details). Specifically, product attributes presented or perceived through the product itself, its packaging or its advertisement, enable consumers to form expectations or evaluate the product during their decision-making (Olson & Jacoby, 1972; Roininen et al., 1999; Steenkamp, 1989). These attributes include but are not limited to taste and pleasure (Roininen et al., 1999), healthiness (Verbeke, 2006) and safety (Brunsø et al., 2002).

Consumers often find it difficult to directly and objectively assess product attributes (i.e., taste, healthiness and safety). As a result, they generally make indirect and subjective assessments based on available quality indicators, which are commonly referred to as product cues (Cox, 1967). Cue utilisation theory was first introduced by Cox (1967), and it describes the process of acquiring the relevant cues to assess product quality. Olson and Jacoby (1972) proposed that a product comprises a collection of cues, such as colour, shape, size, brand name and price. They also suggested that the cues that make up a product determine consumer impressions of that product (Cox, 1962; Jacoby et al., 1971). In other words, consumers use a selective number of cues as quality indicators (e.g., Darwar & Parker, 1994; Richardson et al.,

1994; Zeithaml, 1988) to guide their decisions (e.g., Chewning & Harrell, 1990; Cox, 1967; Olson & Jacoby, 1972).

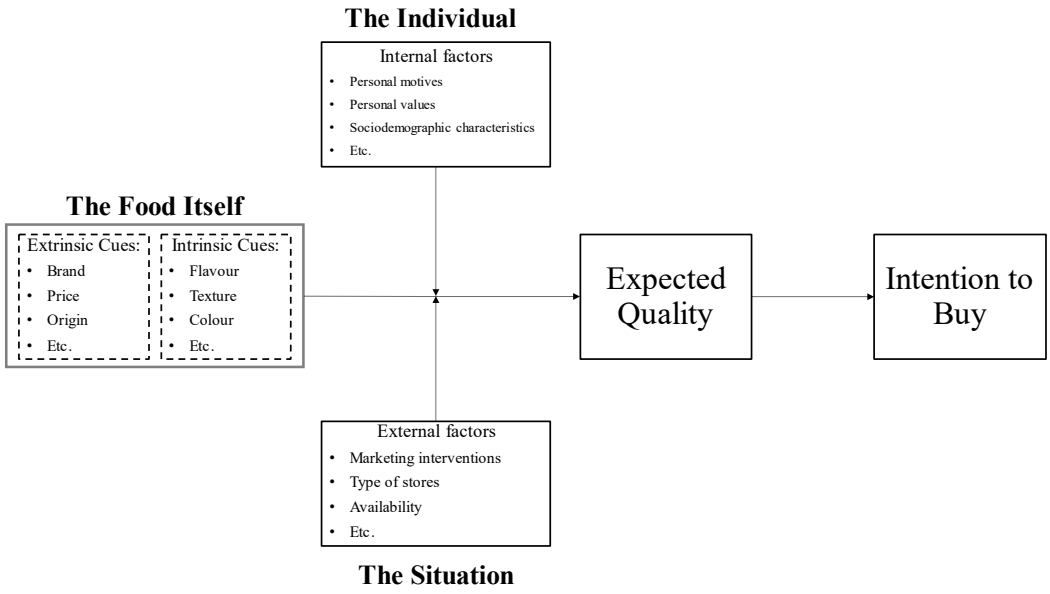

Figure 1-1: Expected Food Quality Model (adapted from Brunsø et al., 2002)

Product cues can be classified as either intrinsic or extrinsic. Intrinsic cues refer to a product's inherent properties; that is, properties that are not changeable without changing production methods (e.g., Olsen, 1977; Olsen & Jacoby, 1972). Intrinsic cues include but are not limited to colour, shape, size and aroma. Extrinsic cues refer to those product-related cues that are not part of the physical product itself, such as price, brand name, place of origin and packaging (e.g., Banovic et al., 2010; Liu et al., 2013; Teas & Agarwal, 2000). Research has repeatedly demonstrated the importance of both intrinsic and extrinsic cues in consumer's food-related decision making. For instance, Brunsø et al. (2005) revealed that consumers repeatedly relied on colour, amount of fat and the cut of the meat to form their perception of the quality of beef. Consumers can also rely on extrinsic cues to inform their decisions, such as country of origin (e.g.,

Acebron & Dopico, 2000; Banović et al., 2010; Hoffmann, 2000), brand names (e.g., Banović et al., 2010; Bredahl, 2004) and certifications (e.g., Abrams et al., 2010; D'Souza et al., 2017).

Although product cues have been central to consumer research on food-related decision making and choice, past research has often focused only on a limited number of intrinsic and extrinsic cues. For instance, previous research studying intrinsic cues has often focused on a small number of major cues, such as aroma, colour, fat content and size (e.g., Grunert et al., 2015; Lawley et al., 2021; Murray et al., 2017). Studies examining extrinsic cues are also frequently limited to a few cues, such as country of origin, production systems, safety standards, quality gradings, branding and pricing (e.g., Ankamah-Yeboah et al., 2016; Christian et al., 2013). Another challenge in the food literature is that the importance of product cues for one food product may not be applicable to other food products due to the differences in how consumers prioritise different cues depending on the products or species. For instance, studies on fish consumption have reported that consumers often rely on size to choose tilapia (e.g., Darko et al., 2016); however, they rely more on colour and aroma to choose barramundi (e.g., Lawley et al., 2021).

A comprehensive examination of a variety of individual products could provide much value to the overall understanding of individuals' food-related decision-making and choices. Therefore, the thesis involves two streams of research to examine two products from a cue utilisation perspective: one deemed hedonic and unfamiliar, and one deemed a commodity that is familiar to the consumer in its respective category (see Figure 1.2 for details). Abalone was chosen as the context for the hedonic stream as the product is considered one of the most luxurious fisheries and aquaculture products (Hernández-Casas et al., 2023). Fresh pork was selected for the commodity

stream as it is the second most consumed meat globally (OECD, 2023) and in Australia (ABARES, 2023c).

In the hedonic stream, salient cues employed by consumers to evaluate abalone products are identified (Chapter 2). In the commodity stream, fresh pork is examined (Chapter 4). Both Chapters 2 and 4 will be accompanied by narrative reviews of product cues informed by the literature and actual food products. The reviews reveal that a product can differentiate itself from alternatives across 80 to 100 cues. In contrast, the current literature review examined altogether only a few intrinsic and extrinsic cues (i.e., 5 to 25) across different food products or only the cues related to one single attribute, such as level of traceability (e.g., Wu et al., 2016) or animal welfare standards (e.g., Chen et al., 2021). As a result, in Chapters 2 and 4, an exhaustive list of cues (up to 46) relevant to the decision-making process related to abalone and fresh pork are compared.

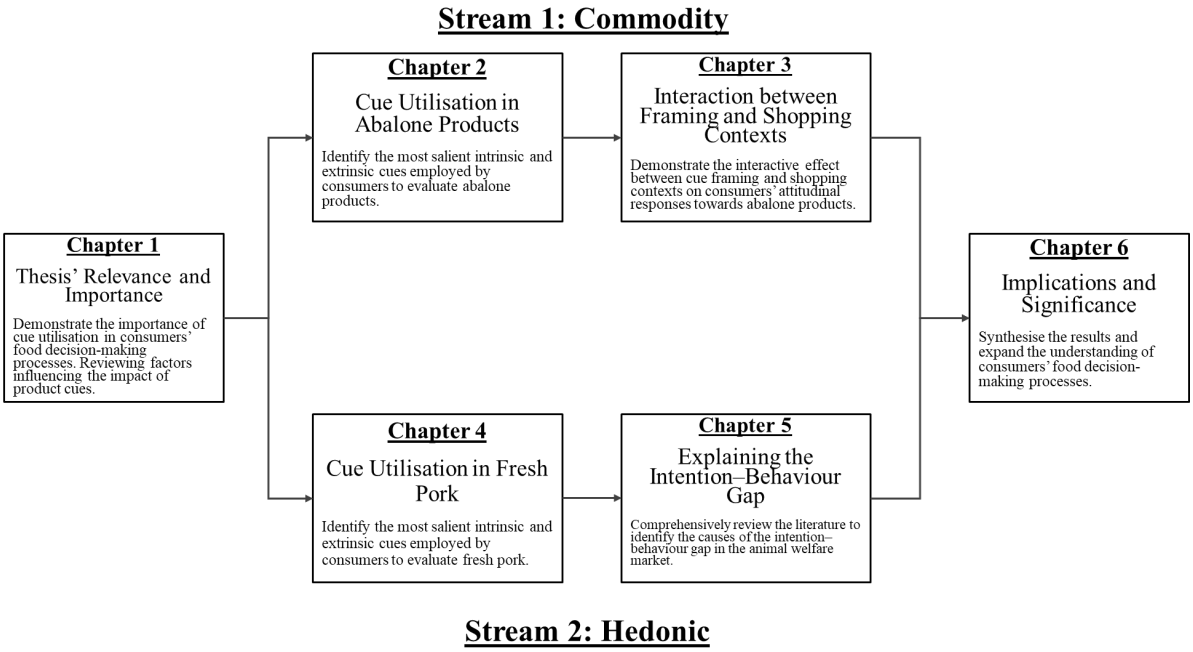

Figure 1-2: Flow diagram showing the research topics and purpose of each Chapter.

1.2 Determinants of Food Choice: The Individual

Individual factors are significant determinants of food-related decision-making and choices. Extending beyond biological factors (e.g., hunger, appetite and taste), studies have proposed that personal differences (e.g., cultural differences, dietary habits and personal values) often contribute to a consumer's choice of cues for evaluating products (e.g., Beverland & Farrelly, 2010; Peng-Li et al., 2020; Wang et al., 2021). This notion has been regularly observed in many different countries. For instance, Lawley et al. (2021) indicated that Australian consumers often rely on aroma and texture to evaluate finfish, while Canadian consumers primarily rely on overall appearance, such as colour and defects (Murray et al., 2017). However, there is limited research that investigates in-market heterogeneity and how it affects a consumer's selection of cues related to fresh pork and abalone. Furthermore, past studies of within-culture heterogeneity have tended to focus on macro-market factors, such as sociodemographic characteristics, lifestyle and habits (e.g., Wang & Somogyi, 2020; Wang et al., 2018a; Zheng et al., 2018). As such, in this thesis, both commodity and hedonic streams of research will account for the role of personal differences in determining the salience of cues.

Chapters 2 and 4 use behavioural data (i.e., perceived cue importance) to determine how personal differences influence the selection of cues and to infer the unique drivers and motivations behind the selection. To acquire the behavioural data (i.e., perceived cue importance), best–worst scaling is adopted (i.e., a discrete choice experiment) to identify the most salient cues in consumer decision-making regarding abalone products. At the same time, this approach will advance the methodological progress in marketing research on food-related decision making. In the past, marketing

research on the importance of cues has often used conventional ranking or Likert rating scales. However, these methods are susceptible to many biases, including social desirability bias, acquiescence bias and extreme response bias (e.g., Cohen & Neira, 2003; Cohen & Orme, 2004; Jaeger et al., 2008). These methods also lack discriminatory performance to scale the importance of cues (Jaeger et al., 2008). As a result, studies have offered mixed evidence on the impact of the same cues. For instance, several studies have determined that country of origin positively impacts consumer perceptions in the context of meat consumption (Acebron & Dopico, 2000; Banovic et al., 2010; Hoffmann, 2000); however, Grunert (1997) found no evidence supporting this notion.

Best–worst scaling (BWS) is a form of discrete choice modelling introduced by Finn and Louviere (1992) that aims to elicit the relative importance of cues based on their utility scores (e.g., Cohen, 2003). This is done by forcing consumers to decide between various product cues (i.e., intrinsic and extrinsic cues) and select the best (most) and worst (least) important cues to evaluate a product (e.g., Laureiro & Dominguez Arcos, 2012). Through a series of forced choices, BWS elicits a complete ranking of all cues based on the frequency of a cue being selected as best or worst. This method allows researchers to minimise biases found in traditional ranking/Likert rating scales and increase the discrimination between the importance of different cues (e.g., Cohen & Neira, 2003; Cohen & Orme, 2004; Jaeger et al., 2008). Using BWS, this thesis offers more granular and robust results regarding the importance of cues.

This, in turn, will be followed by a series of clustering analyses (i.e., hierarchical and *k*-means) to classify the Australian consumers into segments with unique values and demands (in Chapters 2 and 4). Compared to the conventional approach in segmenting the market based on socio-demographic characteristics, this thesis's

approach offers significant methodological and practical advantages. The extant literature on consumer research has long documented that segmentation based on socio-demographic characteristics does not reliably predict the segments' unique demands and preferences. Therefore, the present thesis will classify the typologies of Australian consumers on the basis of their cue preferences, allowing a more reliable and steady prediction of what each segment uniquely seeks to fulfil their demands (Aaker, 1995; Onwezen *et al*., 2012; Wedel & Kamakura, 1999).

1.3 Determinants of Food Choice: The Situation

The last determinant of food choice that will be examined is the situation, although known as the external factors. The relevant literature proposes that marketing interventions (i.e., the presentation and communication of a cue) may impact individual interpretations and perceptions. Underpinned by prospect theory (Kahneman & Tversky, 2013; Tversky & Kahneman, 1992), attribute/cue framing is a common marketing technique that is used to present the benefit in different ways while value outcomes remain the same. A classic example is the negative vs. positive framing of fat content (25% fat vs. 75% lean). Levin and Gaeth (1988) demonstrated that consumers preferred the 75% lean beef over the 25% fat beef. Other framing techniques include: (1) percent vs. actual dollar value (e.g., DelVecchio et al., 2007); (2) self-benefit vs. social benefit (e.g., White & Peloza, 2009); (3) now vs. future (Shu & Gneezy, 2010); and (4) concrete vs. abstract (e.g., Freling et al., 2014). Therefore, Chapters 3 and 5 examine how different marketing strategies could be utilised to effectively communicate the salient product cues identified in Chapters 2 and 4.

The focus of Chapter 3 is on experimenting with different communication strategies (i.e., framing techniques) for the most important product cue (i.e., naturalness) from the hedonic product stream (Chapter 2). The purpose of Chapter 3 is to demonstrate how the situation (i.e., the communication of a cue) may impact individual interpretations and perceptions of a product. Chapter 3 also seeks to incorporate another situational factor, that is, shopping location, into the experimental design. The impact of a cue's presentation/framing is postulated to hinge on the shopping conditions or context, especially whether the consumer shops online or offline. Research has indicated that the unique shopping experience provided by online vs. offline platforms often leads consumers to adopt distinct decision-making processes depending on where they shop (e.g., Dai et al., 2014; Liu & Forsythe, 2010; Prasad & Aryasri, 2009). In fact, consumers may emphasise different product characteristics when shopping online vs. offline (Arce-Urriza et al., 2017; Chu et al., 2010; Xu et al., 2021). Such evidence suggests that certain communication strategies may work in offline but not online shopping environments.

Drawing from past psychological research (i.e., construal level theory; Liberman & Trope, 1998), it is proposed that consumers experience different psychological distances during their online vs. offline shopping. Online shopping is characterised as a psychologically far-away experience due to the lack of touch and social interaction. In contrast, offline shopping is more likely to be construed as a psychologically proximal experience (Xu et al., 2021). Such a difference changes how consumers mentally represent their shopping, influencing their interpretations of a cue. This informs the ways in which marketing could enhance the predictive value of salient cues on consumer food-related decision-making and choices in different shopping contexts. Chapter 3, therefore, attempts to examine the interactive effect between

shopping situations and cue framings on consumer perceptions towards abalone products (hedonic stream).

In the commodity stream, Chapter 4 identifies animal welfare as the most important attribute contributing to consumer decision making about the purchase of pork. Similar to the hedonic stream, Chapter 5 explores how the situation (i.e., marketing interventions) affects consumer interpretations of animal welfare-related cues. Chapter 5 starts with a narrative review of how animal welfare communication affects consumer responses. The review indicates that consumers often report a favourable attitude and purchase intention towards welfare-labelled pork. Interestingly, a low market share of animal welfare-labelled pork, as well as other meat products, has been reported by the industry. This evidence indicates an intention–behaviour gap in the animal welfare market; that is, consumers fail to translate their high interest in animal welfare into actual purchase and consumption of improved welfare meat (e.g., Akaichi & Revoredo-Giha, 2016; Clark et al., 2017; Miele, 2010).

A contributor to this intention–behaviour gap is information asymmetry in the food sector, such that consumers are often dissociated and distant from food production, processing and distribution (Zhao et al., 2021). Each stakeholder in the food supply chain (i.e., producers, retailers and consumers) may perceive and interpret a cue differently. For instance, despite being a topic of global concern, animal welfare has no universally accepted definition or conceptualisation (Cornish et al., 2016). Therefore, consumers and producers may differ in their selection of cues (i.e., amenity) to indicate animal welfare (Vanhonacker et al., 2008).

As such, certain animal welfare-related cues, whilst being positive for producers, could be negative for consumers. For example, a farrowing crate is considered

beneficial from the producers' point of view because it reduces piglet mortality rates (Kinane et al., 2021), but this cue evoked disgust and anger among consumers (Sonntag et al., 2019). Such differences in viewpoint and definition of animal welfare might have led to a gap between producers and consumers, where consumers might not understand and/or value the producers' efforts in heightening their animal welfare standards. This, in turn, contributed to the intention-behaviour gap seen in the context of animal welfare.

Understanding what amenities or practices (e.g., farming system, housing conditions and feeding) constitute animal welfare from a consumer perspective could be of value to enhance the food industry's engagement with consumers. Therefore, Chapter 5 explores two questions: (1) What farming practices constitute animal welfare from a consumer perspective? (2) What are the effects of those animal welfare practices on consumers' attitudinal and behavioural responses? This Chapter comprises a comprehensive review of the literature to identify the animal welfare practices that have been studied and how they affect consumers' attitudinal and behavioural responses to fresh pork and other farm meat (i.e., chicken, beef and lamb). A systematic literature review spanning a 20-year period (2002 to 2022) was used to gather empirical evidence on consumers' attitudinal and behavioural responses towards various improved animal welfare practices.

Taken together, two separate series of studies for two different product categories were conducted: hedonic food product (i.e., abalone) vs. commodity food (i.e., pork). This thesis starts by identifying the most salient cues and effective communication methods for abalone products. This approach is then replicated to identify the salient cues in the context of fresh pork. This is followed by a comprehensive review of articles on different animal welfare practices. The thesis contributes to the overall

understanding of consumers' food-related decision making and choices. More specifically, the findings offer significant knowledge of consumer processes for forming perceptions utilising product cues to guide their decisions. Refer to Figure 1.2 for the flow, research topic and purposes of each Chapter.

2 CHAPTER 2: PAPER 1 – ASSESSING AUSTRALIAN CONSUMERS' JUDGEMENT PROCESSES FOR ABALONE PRODUCTS: A BEST–WORST APPROACH ON 46 ATTRIBUTES

2.1 Preface: Total Food Quality and Cue Utilisation

A better understanding of food choices offers many significant contributions. On a smaller scale, this thesis supports the Australian food and beverage industry by offering granular and actionable insights concerning the product cues consumers use to formulate their perceptions and final decisions. On a larger scale, it aligns with the United Nations Sustainable Development Goals in promoting healthier and more responsible food choices. Drawing on cue utilisation theory, the present thesis identifies whether consumers actually desire healthier and ethically responsible food alternatives. The thesis also determines what cues have the highest impact in signalling a product's healthiness and ethical responsibility.

Chapter 2 begins the hedonic product research stream. Abalone was selected as the context, given that abalone contributes approximately AUD 150 million to the Australian economy annually (Australian Bureau of Agricultural and Resource Economics and Sciences, 2021). However, much of this value comes from exports, while the domestic market is largely untapped. Recent reports repeatedly point out a shift in Australian dietary habits, with consistent growth each year in the demand for fishery and aquacultural products, especially for high-value and fresh products. At the same time, there is a lack of insight into what factors or cues consumers, including those from Australia, rely on to formulate their expectations and drive final decisions.

Working with Jade Tiger Abalone, one of the largest Australian abalone producers, the thesis investigates the cue utilisation strategies of Australian consumers when buying abalone products. Chapter 2 is the first to empirically examine numerous

cues (15 intrinsic and 31 extrinsic cues) and to provide insight into how Australians use these cues to evaluate abalone products and make decisions. Chapter 2 also explores Australian market heterogeneity by employing *k*-means and hierarchical clustering techniques based on cue utility scores (i.e., cue importance). The results delineate a number of consumer segments with unique demands and cue utilisation strategies. Together, Chapter 2's findings offer significant value in building the industry's resilience and sustainable growth in the future.

The manuscript reporting this research is currently under review at the International Journal of Market Research:

Duong, C., Sung, B., Lee, S., & Easton, J. (under review). Assessing Australian Consumers' Judgement Process for Abalone Products: A Best-Worst Approach on 46 Attributes. *International Journal of Market Research* (ABDC: A (2022 Ranking); SJR Q2).

2.2 Introduction

Australian consumers' appetite for fisheries and aquacultural products has grown steadily (ABARES, 2023a), an approximate 20% increase from 21 kg of fish and seafood consumed per person annually in 1997 to 25 kg in 2021 (Ritchie & Roser, 2024). This has fueled a push to better understand the market's consumption patterns and motivations when purchasing fisheries and aquacultural products (Christenson et al., 2017). To date, there has been a notable increase in research looking at Australian consumers' overall perception toward seafood (e.g., McManus et al., 2007; Pascoe et al., 2023), drivers and barriers of seafood consumption (e.g., Birch et al., 2012; Christenson et al., 2017) and acceptance of seafood (e.g., Danenberg et al., 2012).

Much research in the context of the Australian fishery and aquaculture market primarily focuses on more everyday-consumption categories such as barramundi, salmon, and tuna (e.g., Lawley et al., 2012; Grieger et al., 2012; Rahmawaty et al., 2013). Meanwhile, the Australian market is experiencing an increasing demand for premium fisheries and aquacultural products, as consumers are switching from processed seafood (e.g., frozen fish fillets or calamari rings) to high-value and fresh seafood (e.g., oysters and salmon; IBIS, 2022). As a result, there is a significant lack of insights into the important factors that influence Australian consumers' premium seafood choices and consumption.

Focusing on this knowledge gap, the current research explores Australian consumers' decision-making process concerning premium fisheries and aquaculture products. Specifically, the present research will empirically examine what product attributes influence consumers' decision-making concerning abalone products. Abalone is a high-value product that accounts for 5 per cent of the fisheries and aquaculture industry and contributes greatly (approximately AUD 150 million

annually) to the Australian economy (ABARES, 2023b). However, 90% of the demand for Australian abalone mostly comes from export markets, such as China, Hong Kong, Japan, and Singapore, while Australian consumers remain indifferent (ABARES, 2023b). This suggests there is a large untapped market for high-value fisheries and aquacultural products domestically in Australia. Furthermore, it remains unclear what product attributes are inherently essential to the Australian consumers' decision-making process related to abalone products. Thus, investigating the attributes influencing Australian consumer decision-making concerning abalone products could be of value for the Australian fisheries and aquaculture industry's resilience and sustainable growth.

Product attributes, in the form of cues, have been widely recognised as essential to consumers' choice and experience with food products (e.g., Bernués et al., 2003; Bredahl, 2004; Grunert et al., 1996; Nocella et al., 2010; Van Loo et al., 2011). However, our literature review reveals limited knowledge of which product cues are salient to evaluating and consuming abalone products. Prior studies of seafood (i.e., salmon, tuna, and lobsters) report more than 80 cues (i.e., flavour, brand, price, and origin) that may affect consumers' decision-making process. This, in turn, creates a challenge for producers to determine which elements of their product should be highlighted and communicated to consumers.

Furthermore, these findings do not necessarily apply to the context of abalone, and we anticipate that Australian consumers would utilise a completely different set of product cues to formulate their preferences and choices. Direct evidence from other studies reveals that consumers' preference for cues also varies depending on the consumers' cultural backgrounds. For instance, Chinese and Japanese value tenderness in abalone (Gao et al., 2002), whilst Taiwanese prefer small-size abalone (Hwang et

al., 1997). Meanwhile, there are limited studies looking at salient abalone product cues (e.g., size, taste, texture, colour, and price), especially in the Australian market.

Against this backdrop, the current study adopts cue utilisation theory as our theoretical underpinning and examines a large number of cues (46 cues in total) to determine the cues that are salient to Australian consumers' judgment of abalone. Determining the product cues' relative importance has been pivotal to understanding consumers' decision-making (Louviere et al., 2000). A relatively simple and popular approach to carrying out such a task is directly acquiring respondents' stated preferences (i.e., rating scale). However, such an approach has been shown to have certain disadvantages, such as homogenous discriminant between alternative attributes, extreme responses and low reliability (see Tavares et al., 2010). As such, indirect methods, such as discrete choice experiments, ranking, and pairwise comparison, were introduced to overcome the aforementioned limitations of direct methods. Among the indirect methods, best-worst scaling (BWS) is an alternative method with many positive implications for the current study. BWS is a type of discrete choice experiment introduced by Finn and Louviere (1992), which indirectly measures consumers' preferences for product features or attributes (e.g., Flynn & Marley, 2014).

The present study, therefore, employs an indirect approach (i.e., best-worst scaling method) to mimic an actual choice process and estimate the product cues' relative importance (i.e., utility score). We then use the cues' utility scores as the basis to conduct a two-stage clustering analysis involving hierarchical and *k*-means clustering techniques. Consumer segmentation allows marketers to classify a heterogeneous market into groups with similar interests, motivations and consumption patterns. Such a tool enables more consumer-centric and personalised product and communication initiatives (Brečić et al., 2017; Jaiswal et al., 2020). Employing both

hierarchical and *k*-means clustering techniques, we can accurately delineate different consumer typologies in the Australian luxury seafood market based on behavioural data rather than simply relying on socio-demographic characteristics.

This study partially aligns with the Australian abalone industry 2018-2023 strategic focus on developing appealing products and extending their market diversity (ACA, 2018). Findings from the research will offer unprecedented insights into the Australian abalone industry's strategic planning and marketing, contributing to the optimisation of products and marketing communication and positively influencing consumers' purchase intention toward seafood products (e.g., Zheng et al., 2018).

2.3 Review of relevant literature

2.3.1 Product quality, cue utilisation and decision-making process

Consumer research often proposes product quality as the main driver of purchase intention (Carman, 1990; Boulding et al., 1993; Zeithaml et al., 1996). Product quality refers to consumers' subjective assessment of a product's competencies, excellences and superiority (Zeithaml, 1988). A central question to academic and industry research is: what do consumers rely on to infer the product quality at the point of purchase and inform their purchase intention? Cue utilisation theory offers a foundation to answer this question. Olson and Jacoby (1972) suggest that a product is made up of an assemblage of cues, such as the product's shape, colour, brand name, packaging and price. These cues serve as bases for consumers to develop their impression of the product (Cox, 1962; Jacoby et al., 1971). In other words, product cues serve as quality indicators (e.g., Darwar & Parker, 1994; Richardson et al., 1994; Zeithaml, 1988) and

guide consumers' decisions (e.g., Chewning & Harrell, 1990; Cox, 1967; Olson & Jacoby, 1972).

Product cues can be classified into intrinsic and extrinsic. Intrinsic cues are the product's properties that cannot be changed without altering the product, whereas extrinsic cues are product-related but not physically part of the product elements (Olson, 1977; Shirai, 2020). Several studies have revealed a wide array of intrinsic and extrinsic cues that are salient to the perceived quality of seafood products. Intrinsically, Lawley et al. (2021) found that aroma, colour and texture were the key quality indicators for finfish, specifically barramundi, among Australian consumers. Similarly, Murray et al. (2017) also indicated that Canadian consumers often associate aroma, texture, and appearance with eating quality. Extrinsically, many cues, including name, price, organic certification, farming practice, and safety standards, are essential in shaping consumers' perceptions of fisheries and aquaculture products (e.g., Ankamah-Yeboah et al., 2016; Christian et al., 2013; Whitmarsh & Palmieri, 2008).

Cue utilisation fundamentally suggests that each cue has its own magnitude of impact and relevancy to consumer usage (e.g., Laroche et al., 2003). Thus, by employing only the relevant cues, firms can heighten consumers' perception of the quality of their products and, in turn, positively influence preferences and choices. Furthermore, by not over-employing irrelevant cues, firms can avoid overloading consumers with information and risk losing their attention (e.g., Chen et al., 2010). To date, there are only a few studies on the relevant cues impacting consumers' purchase decisions of abalone products, such as size and texture (e.g., Gao et al., 2002; Hwang et al., 1997). However, findings from these studies were mostly derived from the perspective of producers and distributors. Hence, our study will look at a wide range

of product cues to offer significant insights into product development, marketing communication, and brand differentiation.

2.3.2 Consumer Preference for Abalone Product Cues

Although the importance of product cues (both intrinsic and extrinsic) in food-related evaluations and decision-making is well-established, research on product cues in premium seafood remains scarce and even more so for the Australian market. Wang et al. (2021) are one of the few looking at intrinsic cues in the context of premium fisheries and aquaculture products. They find that meat content, texture and size are the primary intrinsic cues that significantly impact Chinese consumers' intent to purchase lobsters. In the context of abalone, most studies investigate production methods and treatments to achieve optimal sensory properties and intrinsic cues of abalone. For instance, Sanchez-Brambila et al. (2002) looked at tenderisation treatments and their effect on texture and taste, while Dong et al. (2018) examined the effect of temperature-time treatments on texture. It remains unclear what intrinsic cues, from a consumer perspective (especially Australian consumers), would be salient in their evaluation of abalone products and their preferences.

Concomitantly, there is a paucity of research on Australian consumers' usage of extrinsic cues to evaluate luxury seafood, including abalone products. For instance, Ankamah-Yeboah et al. (2016) found that Danish consumers are willing to pay a 20% premium for organic salmon. Meanwhile, Nguyen et al. (2015) estimated the importance of country of origin, price, and production method across different seafood products (e.g., salmon, cod, and seabream). Additionally, cues such as healthiness and naturalness potentially impact the intention to try new seafood products (e.g., Losada-

Lopez et al., 2021). Therefore, a comprehensive investigation of product cues' saliency (both intrinsic and extrinsic) would provide significant insights for the producers to deliver optimal product profiles, maximise profit, and strengthen competitive advantage.

2.3.3 Determining cue's relative importance: best-worst choice experiment

Compared to monadic ratings (e.g., Likert Scale), BWS offers better reliability and validity (Flynn & Marley, 2014). BWS asks consumers to select the most and least important items (e.g., attributes, features, and profiles) from multiple sets of different items. BWS requires respondents to make trade-offs between the items, thereby increasing the discrimination among the items' importance (e.g., Cohen, 2003), avoiding extreme bias (e.g., Jaeger & Cardello, 2009), and generating more reliable annotations (Kiritchenko & Mohammad, 2017). BWS can examine a large number of items and generate similar insights without overloading respondents' cognition compared to pairwise comparisons (see Tavares et al., 2010). As a result, BWS has been increasingly adopted to study attributes of raw seafood (e.g., Nguyen et al., 2015; Sajiki & Lu, 2022), seabream, and seabass products (e.g., Cantillo et al., 2021). The study adopted a best-worst scaling experimental design in an online survey to study the importance of cues.

2.3.4 Delineate Market Heterogeneity using Product Cues' Utility Scores

The extant food-related consumer research advocates using segmentation analyses to enrich their understanding of consumers' consumption motives. Past studies in the seafood market also point out that there are significant differences in

luxury seafood consumption and preferences driven by socio-demographic characteristics (e.g., income, marital status, education, and occupation), lifestyle, consumption habits, and desired consumption value (e.g., Wang and Somogyi, 2020; Wang et al., 2018; Zheng et al., 2018). However, to our knowledge, no research has looked at the heterogeneity of Australian consumer preferences, especially in the luxury seafood market.

Another limitation in past segmentation analyses is that many of them delineate consumer typologies on the basis of high-level socio-demographic characteristics (for a review, see Cleveland et al., 2011). Those bases could include product knowledge (Rortveit & Olsen, 2007), level of involvement (e.g., Onwezen et al., 2012; Verbeke et al., 2007), consumption habit (Koutsimanis et al., 2012; Verbeke et al., 2007) and food consumption motives (Honkanen & Frewer, 2009; Milošević et al., 2012). For instance, Birch and Lawley (2012) classified Australian consumers based on their consumption frequency and found that irregular fish consumers were more likely to perceive functional, social, and psychological risks compared to regular consumers. Similarly, Wang and Somogyi (2020) segmented luxury seafood consumers based on whether they seek food value (i.e., appetite, health, and novelty) or symbolic value (i.e., status, network, or lifestyle). Despite its merits, such an approach does not warrant a consistent and fullest insight into different consumer groups and their unique motivations and expectations (Aaker, 1995; Onwezen et al., 2012; Wedel & Kamakura, 1999).

Existing industry research on abalone also exhibits this limitation. Recent work from the Australian Abalone Council (2018) only looks at their target's socio-demographic characteristics and lifestyle. Focusing only on socio-demographics and consumption habits limits the current understanding of the determinants of abalone

consumption. Additionally, their existing work does not include the domestic market or Australian consumers' heterogeneity. This evidence warrants an investigation into the Australian abalone market dynamicity via the importance of attributes. Such insights allow producers to align their products and communication with the consumers' demands (e.g., Wedel & Kamakura, 2000).

Recent developments in segmentation applications suggest that segmentation analysis based on the relative importance of product cues is a more reliable approach than relying on socio-demographic characteristics. It can provide steady, consistent, and valuable insights into different consumer segments and what they seek to fulfil or their expectations (Aaker, 1995; Onwezen et al., 2012; Wedel & Kamakura, 1999). As such, our study seeks to utilise the cues' importance to identify different consumer segments existing in Australia. By identifying consumer segments using cues' utility scores (i.e., choice of product cues in the decision-making process), our study can objectively pinpoint each segment's unique drivers for preferences and characteristics. Taken together, the current study seeks to answer the following question:

RQ1: Which, if any, intrinsic cues do Australian consumers consider when purchasing abalone products? And are there different segments in the Australian abalone market based on consumers' use of intrinsic cues?

RQ2: Which, if any, extrinsic cues do Australian consumers consider when purchasing abalone products? And are there different segments in the Australian abalone market based on consumers' use of extrinsic cues?

2.4 Material and methods

2.4.1 Sample recruitment

A total of 200 Australian abalone consumers were recruited via Qualtrics. A stratified sampling technique was employed to recruit the respondents based on the Australian Bureau of Statistics census data (2022) regarding the Australian population's age, gender, income, and prior consumption experience with abalone at a state-by-state level. However, for the study, all participants must live in Australia and have previously purchased abalone products at least once over the past 24 months. Our final sample was relatively balanced in terms of gender (54% female), income (66% respondents with income higher than ~$50,000), and age (M = 39.52, SD = 13.2, range = 19 to 75). In total, 65.5% of our participants identified themselves as Australian, whereas 23.5% identified with Asian origins. Most of our participants were well-educated, with 78.5% holding at least a diploma or higher degree. The majority (i.e., 79.5%) of the respondents resided in metropolitan areas, had at least two people in their household (93%), and had the prime responsibility for purchasing groceries in their household (91.5%).

2.4.2 Research design and procedure

The research procedure comprised three main phases. The first phase involved the selection of abalone product cues for testing. This phase aimed to develop a list of relevant abalone product cues that were informed by prior literature, existing commercial products and industry experts. The second phase involves the development of Best Worse Scaling (BWS) choice sets and procedures. Rstudio was used to generate choice sets for the BWS experiment. Finally, the third phase involved

transferring the choice sets to Qualtrics for data collection and analysis. The following sections will outline our research procedure in detail.

2.4.3 Selection of abalone products cues

Following Sakolwitayanon et al. (2018), we conducted a three-step exploratory study to develop a list of relevant abalone product cues.

2.4.3.1 Review of prior literature

Firstly, prior literature on abalone-related attributes (i.e., product cues) was consulted. However, only a few studies investigated abalone products' cues. Thus, we expanded our search to other seafood and aquaculture products (e.g., seafood, lobster, salmon). Certain keywords were used to identify relevant articles. "Seafood", "attribute", and "cue" must be mentioned in the abstract, whereas "consumption", "quality", "perception", "purchase", and "experience" must be presented in the body.

2.4.3.2 Reviewing existing products

Secondly, we reviewed products (e.g., abalone, lobster, salmon, etc.) that are being sold online and in major Australian supermarkets (e.g., Woolworths, Coles, IGA, and ALDI), which accounted for approximately 82% of market share of grocery retailers in Australia (Statista, 2024). From both reviews (i.e., literature and industry practice), we found a total of 89 abalone product cues (refer to Appendix 2-1).

2.4.3.3 Reducing the number of cues

Thirdly, three researchers and two industry experts reviewed and narrowed the list down to a more manageable list of product cues to be tested. This process involved removing duplication, difficult-to-comprehend cues (e.g., shell pigmentation, metallic taste, and min weight per piece), legally compulsory cues (e.g., HACCP cue), technical-oriented cues, and non-significant cues (refer to Appendix 2-1). We finally

acquired a total of 46 cues that may generate 46, 69, or 138 choice sets in a BIBD design (e.g., Takeuchi, 1962). The 46-choice-sets design contained ten cues in each choice set, which is not appropriate for BWS as four to six items per choice set is the most optimal design (e.g., Cohen, 2009). Meanwhile, the 69-choice-sets and 138-choice-sets designs would put a significant cognitive burden on consumers and negatively affect their response quality. Thus, we decided to examine 15 intrinsic cues and 31 extrinsic cues separately (refer to Table 2-1). All cues were presented in their original form from literature and existing products.

Table 2-1: Abalone product cues (intrinsic and extrinsic) tested in a best-worst scaling experiment of 200 Australian consumers to understand their preferences.

Category	Cues
Intrinsic cues	Umami (e.g., the fifth basic taste that is usually described as pleasant savoury taste)
	Ocean fresh flavour (e.g., the aromatic and taste of fresh seafood)
	Sweetness
	Juiciness
	Texture (e.g., firmness, tenderness, and chewiness)
	Colour of the foot (e.g., black .vs stripes)
	Colour of the meat (e.g., brown .vs white)
	Colour of the lips (e.g., green .vs white)
	Shell appearance (e.g., colour, intactness)
	Shape of the meat
	Species (e.g., Tiger, Greenlip, Brownlip abalone)
	With shell or without shell
	Net weight
	Size and weight per piece (unit)
	Aroma (e.g., odour)
Extrinsic cues	Production methods (e.g., cooked vs raw)
	Product types (e.g., canned/frozen/fresh)
	The brand of the products (e.g., brand name, heritage, and story of the producers)
	Packaging types (e.g., in pouch/ vacuum/ tray/ can)
	Harvest method (Farmed vs Wild-caught)
	Quality grading
	Packed on date
	Best before date
	Retail price
	Promotions (e.g., discount)
	Cooking suggestion
	Nutrition information
	Ingredient list
	Packaged with or without flavour (e.g., in Brine or Soy Sauce)

	Freezing method (e.g., IQF frozen from live)
	Number of pieces per pack/can
	Rich in nutrients (e.g., Protein, Omega-3 fatty acid, minerals, and vitamins)
	Health star ratings
	Antibiotics free
	No artificial additives (colours and flavours)
	No preservatives
	No GMO
	Traceability information (e.g., QR Code to track origin, breed type, feed, logistic, etc.)
	Country of origin (e.g., Australia, China, South Africa)
	Regionality (e.g., Western Australia, South Australia, NSW, or VIC)
	Responsible and sustainable farming
	Organically grown
	Halal approved
	Food awards won
	Grown in pristine water
	Satisfaction guarantee cues

2.4.4 Development of BWS choice sets and procedure

The current study adopted a balanced incomplete block design (BIBD) to develop the BWS experiment. A BIBD allows researchers to avoid over or under-representation of any cues (Lee et al., 2007; Lee et al., 2008; Massey et al., 2015), better control for "context effects" (Lee et al., 2007; Lee et al., 2008) or "demand effects" (Massey et al., 2015; Mori & Tsuge, 2007). That is because there is a fixed number of cues in each choice set, and all cues occur the same number of times.

Employing BIBD, two series of choice sets, with one examining 15 intrinsic cues and the other examining 31 extrinsic cues, were generated. RStudio packages, including "support.BWS" (Aizaki & Fogarty, 2018) and "crossdes" (Sailer, 2015), were used to assist with the development of choice sets and questionnaires. The first series of choice sets (i.e., intrinsic cues) follows a 7 (options) by 15 (choice sets) by 3 (times of presentation) design. In this design, there were 15 choice sets with seven cues in each, and each cue appeared three times randomly across the whole series (see Figure 2.1, for example). The second series of choice sets (i.e., extrinsic cues) follows 6 options by 31 choice sets by 6 times of presentation design.


Considering only these attributes, which is the **LEAST IMPORTANT** and which is the **MOST IMPORTANT** when you purchase abalone products.

Most important		Least important
○	Sweetness	○
○	Juiciness	○
○	Colour of the foot (e.g., black .vs stripes)	○
○	Colour of the meat (e.g., brown .vs white)	○
○	Colour of the lips (e.g., green .vs white)	○
○	Species (e.g., Tiger, Greenlip, Brownlip abalone)	○
○	Size and weight per piece (unit)	○

Figure 2-1: Example of a Balanced Incomplete Block Design (BIBD) Choice Set as used in Qualtrics survey.

2.4.5 Data collection

The choice sets were then transferred to the online survey programmed in Qualtrics. The online survey is comprised of four parts and sent out to respondents in February 2021. The first part filtered participants based on age, gender, income, previous consumption, and location to acquire a representative sample of the average Australian consumers of abalone products. The second and third parts contained two BWS experiments, one for 15 intrinsic and another for 31 extrinsic cues. Participants' socio-demographics and consumption frequency were collected in the fourth part.

2.5 Data analysis

Three steps of data analysis were conducted to determine the cues' importance (refer to Figure 2.2). First, we tested data integrity to ensure there were no design and data processing errors (refer to Appendix 2-2). After ensuring the data integrity, we

calculated each cue's aggregated BWS score, ratioscale, and relative importance (refer to Appendix 2-3a, b, c). Aggregated BWS score determined the ranking of each cue's importance, and the relative importance generated additional insight into the probability nature of each cue's importance (i.e., how important was cue A compared to the others).

Figure 2-2: 3-step data analysis procedure

Hierarchical and *k*-means cluster analyses were conducted twice to identify unique consumer segments based on the importance of intrinsic and extrinsic cues separately. Hierarchical cluster analysis was conducted first using Ward's method (Punj & Stewart, 1983) and squared Euclidian distances (Knezevic et al., 2019) to generate a dendrogram, which then was used to identify the optimal number of clusters (i.e., segments). The optimal number of segments was identified by creating a cut-off point on the dendrogram, where there was a relatively large jump in the distance (Azabagaoglu & Gaytancioglu, 2009; García-Solano et al., 2015; Bodor et al., 2021; Tullis & Albert, 2013). The solutions (i.e., number of segments) were then validated in *k*-means cluster analyses. We conducted MANOVA to confirm whether there were significant differences among the segments based on Wilk's Lambda (Hair et al., 1998). Posthoc Tukey was used to identify the product cues that defined each segment.

2.6 Results

2.6.1 Relative importance of product cues

2.6.1.1 Intrinsic cues

From the aggregated score, we identified that "ocean-fresh flavour", "texture", and "umami" were the most important intrinsic importance, with "ocean-fresh flavour" being 13 and 50 per cent more important than "texture" and "umami", respectively (refer to Table 2-2). Meanwhile, "with shell or without shell", "colour of the foot", or "shape of the meat" were the least important cues. Specifically, they were at least five times less important than "ocean-fresh flavour".

Table 2-2: Aggregated best-worst scaling score for 200 Australian abalone consumers and the relative importance of intrinsic cues.

	Cue	Best	Worst	Agg. Score	Ratio-scale	Relative importance	SD
1	Ocean fresh flavour	558	81	477	1.9	100	1.3
2	Texture	423	64	359	1.7	88	1.1
3	Umami	336	122	214	1.3	66	1.2
4	Aroma	241	92	149	1.0	54	1.1
5	Colour of the meat	200	98	102	0.9	45	1.1
6	Juiciness	181	118	63	0.8	43	1.0
7	Species	207	193	14	0.8	42	1.0
8	Sweetness	156	135	21	0.7	37	1.0
9	Size and weight per piece	169	289	-120	0.7	34	1.0
10	Shell appearance	113	245	-132	0.5	26	0.8
11	Net weight	106	360	-254	0.4	23	0.8
12	Colour of the lips	90	135	-45	0.4	22	0.8
13	With shell or without shell	90	441	-351	0.4	20	0.8
14	Colour of the foot	62	180	-118	0.3	15	0.6
15	Shape of the meat	68	447	-379	0.3	15	0.6
	Sum	3000	3000	0			

2.6.1.2 Extrinsic cues

"Rich in nutrients", "country of origin", and "responsible and sustainable farming" were the three most important cues based on aggregated scores (refer to Table 2-3). There was also a relatively little difference among the three cues regarding their relative importance. Meanwhile, the least three important cues were "cooking and serving tips", "food awards won", and "Halal approved", which were at least 3.7 times less important than "rich in nutrients".

Table 2-3: Aggregated best-worst scaling score for 200 Australian abalone consumers and the relative importance of extrinsic cues.

	Cue	Best	Worst	Agg. Score	Ratio-scale	Relative importance	SD
1	Rich in nutrients	448	85	363	1.7	100	1.2
2	Country of origin	405	108	297	1.5	89	1.3
3	Responsible and sustainable farming	352	98	254	1.4	85	1.2
4	Quality grading	316	67	249	1.4	82	1.0
5	No artificial additives	311	103	208	1.3	78	1.1
6	Regionality	311	179	132	1.2	71	1.2
7	Harvest method	234	150	84	1.1	63	1.0
8	Antibiotics free	248	110	138	1.0	62	1.1
9	No preservatives	216	96	120	0.9	55	1.1
10	Organically grown	199	129	70	0.9	54	1.0
11	Grown in pristine waters	201	136	65	0.9	54	1.0
12	Traceability information	203	202	1	0.8	50	1.1
13	Retail price	214	240	-26	0.8	50	1.1
14	Best before date	210	121	89	0.8	49	1.1
15	Nutrition information	171	173	-2	0.8	49	1.0
16	Satisfaction guarantee	178	190	-12	0.8	48	1.0
17	Production methods	166	174	-8	0.8	48	0.8
18	Product type	167	191	-24	0.7	45	0.9
19	The brand of the product	176	212	-36	0.7	44	0.9
20	No GMO	174	191	-17	0.7	44	1.0
21	Health star ratings	158	183	-25	0.7	43	0.9
22	Promotions	172	334	-162	0.7	42	1.0
23	Packaged with or without of flavour	158	245	-87	0.7	39	0.8
24	Freezing method	122	185	-63	0.6	35	0.8
25	Packed on date	125	165	-40	0.6	34	0.9
26	Packaging types	121	241	-120	0.5	32	0.8
27	Ingredient list	103	195	-92	0.5	29	0.8
28	Number of pieces per pack/can	106	316	-210	0.5	29	0.8
29	Cooking and Serving tips	96	330	-234	0.5	28	0.8
30	Food awards won	66	427	-361	0.3	20	0.6
31	Halal approved	73	624	-551	0.3	19	0.7
	Sum	6200	6200	0			

2.6.2 Clustering results

2.6.2.1 Intrinsic cues

Based on the dendrogram generated by hierarchical cluster analysis, we determined a four-cluster solution as the most acceptable solution. This solution was then validated using *k*-means cluster analysis. The four-cluster solution took the least number of iterations required to reach convergence, indicating its appropriateness. MANOVA was conducted and generated Wilk's lambda value (0.025) with an F-ratio (18.604), giving a p-value of less than 0.001. This confirmed the significant heterogeneity among the clusters (i.e., segments) concerning abalone product intrinsic cues.

The five unique segments were named *appearance lover* (N = 55), *sweet & juicy eater* (N = 37), *conventional seafood buyers* (N = 24), *ocean-fresh flavour advocate* (N = 57), *size matters buyer* (N = 27). Referring to Table 2-4, the *ocean-fresh flavour advocate* preferentially attended to "ocean-fresh flavour" and "umami" cues significantly higher than other segments. Meanwhile, the *appearance lover* emphasised the importance of appearance cues (i.e., colour of the foot, lips, shape of the meat, etc.) significantly higher than other segments. The *sweet & juicy eaters* were characterised by "sweetness" and "juiciness" cues, whereas the *size matters buyer* paid attention to "net weight" and "size and weight per piece". The smallest segment was the *conventional seafood buyers*, who emphasised the "colour of the meat" and "aroma" compared to others.

Table 2-4: Cluster analysis of abalone intrinsic product cues for 200 Australian abalone consumers in a best-worst scaling experiment

Cue	Cluster 1 (N=55)	Cluster 2 (N=37)	Cluster 3 (N=24)	Cluster 4 (N=57)	Cluster 5 (N=27)
Aroma	36	43	**100**	41	21
Colour of the foot	**52**	5	18	2	2
Juiciness	41	**85**	17	21	25
Colour of the lips	**66**	10	20	8	7
Colour of the meat	86	22	**81**	13	29
Net weight	32	6	2	6	**78**
Ocean fresh flavour	86	80	86	**100**	52
Shape of the meat	**51**	3	2	4	17
Shell appearance	**85**	9	14	9	9
Size and weight per piece	**56**	11	4	9	**100**
Species	63	56	12	26	29
Sweetness	31	**78**	20	16	22
Texture	100	100	47	64	69
Umami	83	23	11	**91**	26
With shell or without shell	**57**	9	2	2	**31**

Notes: The bold values illustrate the attributes that significantly characterised the cluster determined by posthoc Tukey test based on ratio score (sig. < 0.05).

2.6.2.2 Extrinsic cues

Following the same analysis procedure for the intrinsic cues, a six-clusters solution was identified as the most appropriate. MANOVA analysis generated a Wilk's lambda value (0.012) with an F-ratio (7.68), giving a p-value of less than 0.001, confirming the significant heterogeneity among the segments. We named the segments from cluster 1 to cluster 6 as *environmentalist, health-conscious, utilitarian, first-in-first-out, naturalist,* and *regio-centric buyers*, respectively. Referring to Table 2-5, the *environmentalist buyers* emphasised the importance of "traceability information" and "harvest method". Meanwhile, the *health-conscious buyers* emphasised "rich in nutrients", "nutrition information", and "health star ratings". We had the *regio-centric buyers*, who only paid attention to abalone products' "regionality" cue. In contrast, the *naturalist buyers* preferentially paid attention to "no artificial additives", "antibiotics

free", "no preservatives", and "no GMO". Results of other segments' characteristics can be reviewed from Table 2-5.

Table 2-5: Cluster analysis of abalone extrinsic product cues for 200 Australian abalone consumers in a best-worst scaling experiment

Cue	Cluster 1 (N=37)	Cluster 2 (N=19)	Cluster 3 (N=17)	Cluster 4 (N=44)	Cluster 5 (N=40)	Cluster 6 (N=43)
No artificial additives	59	52	53	47	**100**	31
Antibiotics free	49	32	46	37	**93**	14
Best before date	42	3	37	**100**	12	15
The brand of the product	44	46	20	23	18	42
Country of origin	67	7	30	71	63	**100**
Cooking and Serving tips	33	22	12	37	5	15
Food awards won	39	5	21	22	5	5
Freezing method	54	25	6	29	24	17
No GMO	39	18	35	16	**72**	13
Halal approved	32	**32**	0	22	3	4
Harvest method	**94**	10	3	41	28	**73**
Health star ratings	49	**60**	33	30	26	13
Ingredient list	34	19	6	30	26	11
Nutrition information	41	**77**	18	37	34	20
Organically grown	80	56	13	23	39	35
Packed on date	41	0	12	**68**	10	12
Packaged with or without of flavour	61	19	30	25	10	33
Packaging types	47	6	17	43	8	17
Number of pieces per pack/can	42	1	33	**42**	6	9
No preservatives	46	19	**58**	23	**92**	9
Retail price	33	5	**100**	**65**	25	11
Grown in pristine waters	49	35	15	37	45	42
Production methods	61	16	18	42	21	42
Product type	40	16	33	47	21	33
Promotions	39	3	**99**	38	16	15
Quality grading	77	72	41	63	63	48
Regionality	36	22	9	47	53	**93**
Rich in nutrients	88	**100**	53	60	74	68
Satisfaction guarantee	47	63	26	54	27	11
Responsible and sustainable farming	95	69	18	45	58	76
Traceability information	**100**	38	13	17	29	35

Notes: The bold values illustrate the attributes that significantly characterised the cluster determined by posthoc Tukey test based on ratio score (sig. < 0.05).

2.6.3 Socio-demographic characteristics across clusters

2.6.3.1 Intrinsic cues

To describe and identify significant differences among the segments' socio-demographic characteristics, a Crosstab comparison with Chi-square and Phi & Cramer's V enabled was used. Chi-square tests (with Yates Continuity Correction) indicated no significant differences between the five segments regarding their age, ethnicity, living location, employment status, abalone purchase frequency and grocery purchasing responsibility (i.e., who is responsible for buying food). The results indicated that *appearance lovers* and *size matters* were the only two segments with a female-dominated population. Additionally, the *appearance lovers* also possessed a significantly higher number of people with a high-income level (i.e., higher than $90,000) and higher education levels than other segments (refer to Appendix 2-4).

2.6.3.2 Extrinsic cues

No significant differences were found between the six extrinsic cue preference segments concerning age, gender, income, employment status, and grocery purchasing responsibility. We found that the *first-in-first-out* and *regio-centric* segments had a significantly higher proportion of people living outside of metropolitan city areas. Meanwhile, the *utilitarian* and *naturalist* had a significantly higher number of Asians in their population compared to other segments. Purchasing frequency of abalone was higher in the *health-conscious* and *regio-centric* segments. Compared to other segments, the *first-in-first-out* had a higher proportion of people with a lower level of education (i.e., secondary school and below). Details regarding each segment's socio-demographic characteristics can be found in Appendix 2-5.

2.7 General Discussion

This is the first study exploring the importance of an exhaustive list of product cues (15 intrinsic and 31 extrinsic cues) in the seafood literature, specifically luxury seafood. Our study, therefore, offers meaningful implications for both theory and practice. The present study offers a wide range of insights via more granular data with superior discrimination concerning the importance of cues and heterogeneity of the consumer market for abalone products in Australia.

Replicating the importance of flavour and texture in the seafood literature (e.g., Freitas et al., 2020; Nurliza et al., 2021; Wang & Somogyi, 2018), the present study demonstrates that food-related decisions are innately driven by sensory experience regardless of product categories. Contradicting prior studies highlighting the importance of colour, size, and shape (e.g., Grunert, 2002; Grunert et al., 2005; Verbeke et al., 2010), the present study reveals that Australian consumers are more likely to rely on cues that directly communicate product quality (i.e., flavour, texture, and aroma) to determine product quality and form their preference.

Our results highlight how communication can influence a cue's relative importance. We find that "no artificial additives" was 1.4 times more important than "organically grown", despite both cues representing the absence of artificial ingredients in the abalone product. Similarly, "rich in nutrients" was two times more important than "nutritional information". These results suggest that Australian consumers preferentially attend to simple and easy-to-interpret cues in their quality judgment, in line with existing literature (e.g., Steenkamp, 1989).

In line with prior research, the current study illustrates the emerging importance of health benefits, sustainability, and naturalness in food-related decision-making

(Ankamah-Yeboah et al., 2016; Birch et al., 2012; Pérez-Ramírez et al., 2015). Extending on the literature, we show that health benefits, sustainability, and naturalness are relatively similar in their importance to Australian consumers, indicating that the Australian abalone industry should adopt healthiness, sustainability, and naturalness as the future strategic pillars. These results offer significant knowledge of the underexplored area of consumers' preferences for value-added attributes in abalone consumption.

The current study is also the first to illustrate the heterogeneity of Australian consumers in the abalone market, extending the knowledge of unique consumers' motivations when purchasing luxury seafood. Using cues' utility scores to delineate consumer typologies, the present study addresses the limitation of relying on socio-demographic characteristics and consumption habits for segmentation analysis. Specifically, we identified five distinct consumer segments based on the importance of intrinsic cues of abalone: *appearance lover*, *sweet & juicy eater*, *conventional seafood buyers*, *ocean-fresh flavour advocate*, *size matters buyer*. Six unique consumer segments were also identified based on extrinsic cues of abalone: *environmentalist, health-conscious, utilitarian, first-in-first-out, naturalist,* and *regio-centric buyers.* Taken together, this study offers more granular insights into abalone consumers based on their preference for intrinsic and extrinsic cues as well as the ability to optimise targeting strategies.

2.8 Theoretical and methodological implications

Extending on cue utilisation theory, the present study demonstrates that conventional intrinsic cues (e.g., colour, shape, and size) may not substantially impact quality inference. We find that cues such as "ocean-fresh flavour", "umami", and "texture" were 2.21, 1.94, and 1.46 times more important than "colour of the meat",

respectively. This challenges the existing theoretical notion that conventional intrinsic cues (e.g., colour, shape, and size) are reliable predictors of consumers' choice of seafood, such as lobster (Wang et al., 2021), tilapia (Darko et al., 2016), and barramundi (Lawley et al., 2021).

The low importance of conventional intrinsic cues (i.e., colour, shape, and size) could be indirectly explained by Australian consumers' lack of objective knowledge to evaluate fisheries and aquaculture products (e.g., Guo & Meng, 2008; Lee & Lou, 1996). In this research, Australian consumers, on average, purchased abalone products less than once per month; thus, they were not familiar with abalone products and may not know how to buy or prepare seafood meals at home (Birch & Lawley, 2014). Therefore, Australian consumers may find it challenging to evaluate abalone products using conventional intrinsic cues (i.e., colour, shape, and size). In the cue utilisation model, Cox (1967) refers to this phenomenon as a low confidence value, which reflects consumers' low confidence in their ability to rely on a certain cue for their evaluation. Although this study did not specifically look at the impact of objective product knowledge on the choice of cues, the results draw an indirect correlation and suggest that lower objective knowledge may lead to a lower probability of consumers using conventional intrinsic cues (i.e., colour or shape). The evidence indicates that consumers only select a cue that is high in predictive value and confidence value to guide their subjective evaluation of a product.

This finding is further supported by our results on the extrinsic cues' utility scores. The results illustrate that consumers preferentially attend to simple and easy-to-interpret cues. We find that when two cues communicate the same attribute (e.g., naturalness), the easy-to-interpret cue may have a stronger predictive value toward the judgment process than a difficult-to-interpret cue. For instance, "no artificial

additives", "no antibiotics", and "no preservatives" were 1.44, 1.13, and 1.01 times more important than "organically grown", respectively. Similarly, the "rich in nutrients (e.g., Protein, Omega-3 fatty acid, minerals, and vitamins)" cue was two times more important than "health star ratings" and "nutrition information". Such a finding has been observed in past literature, which suggests that consumers tend to reject cues that lack vividness and comprehensibility (e.g., Nisbett & Ross, 1980; Steenkamp, 1989; Westbrook & Fornell, 1979). The current study is the first to empirically demonstrate that vividness and comprehensibility of cues impact their salience and how brands could optimally communicate their attributes.

Five unique consumer segments were also identified based on the importance of intrinsic product cues, and six segments based on extrinsic cues, regardless of socio-demographic characteristics. Employing cues' utility scores to delineate consumer typologies within the Australian abalone market, the present study addresses a major limitation in the current literature's reliance on socio-demographic characteristics as the basis for consumer segmentation. Our results identify five unique consumer segments based on intrinsic cues' utility scores and six segments based on extrinsic cues. These findings contribute significantly to understanding market heterogeneity, in which we find various segments with unique demands and motivations when purchasing luxury seafood. Meanwhile, these groups have no significant differences regarding their socio-demographic characteristics. In line with suggestions from the literature, this study illustrates the clear advantages of segmenting consumers based on the importance of product cues. We show that conducting cluster analyses based on product cues' utility scores allows researchers to generate more robust insights into consumers and their attention to specific product features (e.g., Szymkowiak et al., 2020; Gosine & McSweeney, 2019; De Pelsmaeker et al., 2017).

The application of best-worst scaling allows us to elicit consumers' preferences through an array of trade-offs made by the consumers in multiple hypothetical situations (e.g., Louviere et al., 2000; Louviere et al., 2015). Since food-related choices are often made by considering the spectrum of attributes, examining the various trade-offs made by consumers allows researchers to fully understand the antecedents of preferences and choices. For instance, our results demonstrate that consumers who value "no artificial additives" are also more likely to emphasise "antibiotics free" and "no preservatives" while making food-related choices. Our study lays the groundwork for future research into food-related behaviours. Not only could BWS be applied to other food products, but it could also apply to other hypothetical situations. Future research could extend to "dining out" situations, where the value of various service cues (e.g., facility, customer services and decoration) could be estimated.

2.9 Managerial implications

The current study finds that consumers highly valued cues such as "ocean-fresh flavour", "umami", and "texture", demonstrating the significance of eating quality in Australian consumers' judgment of abalone products. Interestingly, Australian consumers did not use conventional intrinsic cues like colours, size, and shape to guide their evaluation. This contradicts the industry's current belief and practice, as they often rely on the use of the meat colour, lips, and shape of the meat to communicate their products' quality, which is relevant for export markets. The current research implies that explicit communication of eating quality (e.g., experience the umami) on packaging may lead to more positive expectations of the eating quality and heighten the buying intention of Australian consumers than simply relying on the size or colour of the products alone.

Further supporting the importance of eating quality, we find that consumers also use "quality grading" to guide their evaluation. Reviewing the Australian abalone market, we find that only one producer implements a quality grading system based on the "size per piece" (i.e., the bigger the size, the better the quality). However, our results indicate that this cue is not highly important. Perhaps there exists an information asymmetry between consumers and producers, where each party perceives quality differently. Although there are various quality assurance programs, such as Tasmanian Abalone Council's quality assurance code of practice or the Australian Fisheries Research and Development Corporation's (FRDC) quality systems, they have yet to be implemented widely. This proposes an opportunity to develop an industry-wide grading system for abalone to differentiate consistent and high-quality Australian products. The proven success of industry-wide quality grading systems in other industries like beef or lamb (D'Souza et al., 2017; Lyford et al., 2010) indicates the potential benefits for the Australian abalone industry to adopt a similar approach.

We find that abalone species are one of the least important quality indicators for Australian consumers despite the literature indicating that species are often considered a strong determinant of seafood selection (Alfnes et al., 2018). This is interesting as Australian producers often use this cue as a quality signal. However, Australian consumers may find it challenging to rely on the species to determine the product's sensory characteristics and eating quality with less familiar seafood like abalone (Alfnes et al., 2018). Therefore, there could be value in developing educational campaigns to equip Australian consumers with a better understanding of the differences between abalone species.

Extrinsically, nutritional value is the most important cue. However, health-related cues such as health star rating, organic certification, GMO-free, and nutritional

information were surprisingly low in importance. Prior studies also show that consumers often overlook certifications such as the Australian Health Star Ratings (e.g., Pelly et al., 2020) and nutritional information (e.g., Kumar et al., 2008). This is because consumers lack confidence in these cues (e.g., Conroy & Lang, 2021; Pelly et al., 2020). Our review shows that Australian abalone producers rarely utilise the nutritional value cue to communicate the healthiness of their products (see Appendix 2-1). This evidence suggests that health benefits, beyond certificates and nutritional information, could be emphasised more explicitly on various marketing collateral (i.e., packaging) to enhance the product's appeal, especially to health-conscious consumers.

Apart from eating quality and nutritional value, our results also identify sustainability, naturalness, and product origins (i.e., country and region) as impactful cues determining consumers' selection of abalone products. These findings have been repeatedly observed in other fisheries and aquaculture products (e.g., Ankamah-Yeboah et al., 2016; Birch et al., 2012; Pérez-Ramírez et al., 2015). Taken together, the present study illustrates that high eating quality, nutritional value, sustainability, naturalness, and Australian origin should be adoped as pillars for future strategy, further enhancing the provenance of Australian abalone.

The present study identifies a number of highly valuable consumer segments that are large in size and offer the potential for a premium return on investment. Our results demonstrate that 70% of the Australian market is comprised of hedonic-oriented consumers (i.e., healthiness, naturalness, and sustainability). They also prefer abalone products packed with ocean-fresh flavour and umami. By anchoring on consistent eating quality, healthiness, naturalness, and demonstrably sustainability, Australian abalone producers could strengthen their positioning and image in the domestic market against international competitors. Furthermore, hedonism-oriented consumers are also

less likely to be influenced by price, allowing the producers to command a higher price without affecting their sales.

2.10 Limitations and future research

The current study has its limitations. Firstly, the sample size employed in this study was relatively small, limiting its statistical representation of the Australian population. A larger sample size could be employed to increase the reliability and representation of the results, especially for the estimation of market size and share for different consumer segments. Secondly, despite communicating the same message, not every cue has the same impact on quality inference (e.g., Liu et al., 2018). Future studies can extend the current findings and look at the most effective cues to communicate important attributes such as nutrition, sustainability, and naturalness.

Thirdly, the study did not compare intrinsic and extrinsic cues directly due to the limitation of balanced incomplete design when dealing with a large number of items. Such a limitation also prevented the ability to delineate whether segmenting consumers based on intrinsic or extrinsic cues would generate more meaningful insights. A comparison of relative importance between intrinsic and extrinsic cues could be meaningful, especially for luxury seafood products, due to the consumers' lack of familiarity and knowledge with seafood (e.g., Lawley et al., 2012). One potential solution would be applying a nested balanced incomplete block design (Deppe et al., 2001), in which researchers could examine a large number of items without the constraint that each respondent must view every attribute.

Finally, the application of BWS does not allow us to estimate the impact of the cues on purchase intention or willingness to pay. Additionally, BWS does not generate

knowledge of the optimal level of each cue (i.e., high vs. low price), which can provide meaningful insights to design the optimal product profile. Therefore, other methods (e.g., conjoint experiment, BWS case 1 and case 2) could be considered for future studies to identify the optimal level of cues and the best combination of cues to heighten willingness to pay. By estimating the consumers' willingness to pay, future research could determine the economic values of various cues and aid a firm's decision-making and priority (Liu et al., 2018).

3 CHAPTER 3: PAPER 2 – THE EFFECT OF SHOPPING CHANNEL (ONLINE VS. OFFLINE) ON MESSAGE FRAMING OF NATURALNESS

3.1 Preface: The Boundary Condition of Psychological Distance

Chapter 2 highlighted naturalness as one of the major extrinsic attributes looked for by consumers in making a food-related decision. This finding is not surprising, considering that the global market for products claiming to be natural is growing and will be worth up to $300 billion by 2030. However, while there has been substantial interest from academia and industry in the effect of natural claims on consumer responses, there is limited research delineating the optimal communication of natural claims. In Chapter 2, the results reveal an interesting phenomenon: Consumers seem to prefer descriptions of cues that are more concretely than abstractly described. For instance, Chapter 2 found that the cue 'organically produced', while also communicating the product's naturalness, was rated much lower (in importance) compared to 'no artificial additives', 'no antibiotics' and 'no preservatives'. Thus, Chapter 3 empirically examines the notion that more concretely described natural claims would be more effective in heightening consumers' attitudinal responses towards food products.

Chapter 3 also demonstrates how 'the situation' could influence consumers' food choices. Shopping location is one of the major situational factors that has been shown to affect consumers' decision-making strategies and mental processes. Now that online shopping has become a major shopping 'location', it could be of value to determine the differences in mental processes that may occur when consumers shop at different locations (online vs. offline). Drawing on the construal level theory, this Chapter demonstrates that where consumers shop (online vs. offline) affects their interpretation and perception of a cue. A concretely framed natural claim is likely to be more effective

when consumers shop offline, and vice versa, due to psychological distance. Evidence supporting this theory is presented in Chapter 3 across two experiments.

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3.2 Introduction

The global market for products that claim to be natural has been growing consistently and was estimated to be worth up to US$ 300 billion by the end of 2030 (Crawford, 2021). Naturalness is now regarded as one of the most significant drivers of consumer choice across several consumer goods categories, such as personal care or beauty (Russo, 2015), health and wellness (Levine, 2018) and medicines (Meier & Lappas, 2016). However, this preference for naturalness is most prominent in the food category, where more than two-thirds of consumers are reported to seek natural-labelled food (Consumer Reports, 2016). In fact, food and beverage accounted for approximately 70% of the global natural products market values in 2022 (Crawford, 2021).

Consumers often attribute functional superiority to natural products over other "manufactured" options, as they hold a sentiment that natural products are innately pure and without contamination (e.g., Amos et al., 2014; Rozin et al., 2012). Thus, naturalness has become heuristic and is used in consumer decision-making, especially food decisions (Li & Chapman, 2012). Furthermore, past studies also point out that consumers are willing to pay a premium for natural-claimed products across food product categories (Liu et al., 2017). Unsurprisingly, food brands, including packaged foods to fast-food restaurants, are quick to catch on and leverage naturalness as part of their strategic marketing advantage (Gee & Haddon, 2016; Woodyard, 2016). This also led to a plethora of naturalness claims in the food market with ambiguous naturalness claims, including "all natural", "naturally derived", and "derived from natural sources".

The abovementioned natural claims are often considered to be potentially deceptive as no clear regulations determine what is natural (FDA, 2017; Rozin et al.,

2012). In fact, from 2011 to 2013, the number of natural-claim-related class action lawsuits increased by 800 per cent compared to the previous eight years (Petty, 2015). The trend persists in the 2015-20 period, with the number of class action suits ranging from 10 to 50 cases each year against false natural claims (Perkins Coie, 2021). As a result, this has led consumers to become increasingly sceptical of products that claim to be natural (e.g., Chambers et al., 2019).

The abundance of false naturalness claims raises an inherent question: how can genuine naturalness brands effectively convey their products' naturalness using informational labels and cut through the abundance of naturalness claims in the market? Despite substantial academic and industry interest (see Román et al., 2017), limited research attempts to delineate the optimal communication of naturalness. Existing research on naturalness labelling only examines the presence vs. absence of natural claims on front-label (e.g., Berry et al., 2017; Galati et al., 2019; Hall et al., 2022). Such a limitation has led to a lack of differentiation among brands in how they communicate naturalness, as Cao and Yan (2016) reported that "all natural" and "100% natural" are the two most popular informational labelling of naturalness.

Additionally, much research on communication of naturalness often focuses on the sensory aspects (e.g., visual, tactile and auditory) of packaging design and labels (e.g., Deliza et al., 2003; Labbe et al., 2012; Labbe et al., 2013; Puyares et al., 2010). Thus, the present study focuses exclusively on the textual priming aspect of informational labels. Drawing from the cue utilisation theory, we posit that consumers are more likely to prefer a concrete over an abstract claim (e.g., Steenkamp, 1990). Specifically, a comprehensive description (e.g., 100% natural with no GMO and preservative) would be more preferable than a ambiguous claim (e.g., all natural).

Furthermore, we postulate that the impact of concrete vs. abstract informational framing of naturalness may hinge on whether consumers shop online or offline, as online shopping has become a big part of consumers' lives. Past research reveals that consumers may experience different psychological processes in online vs. offline shopping; and thus, their decision-making varies based on the shopping channel. Construal level theory (e.g., Kim et al., 2016; Liberman & Trope, 1998; Xu et al., 2021) offers a theoretical background to to explain such a phenomenon. They propose that the difference in consumers' decision-making across shopping platforms could be grounded in psychological distance. Specifically, online shopping represents a psychologically far-away, socially distant, and hypothetical location and vice versa. Thus, consumers' psychological distance increases when shopping online compared with an offline environment. As such, consumers are more likely to construe their online shopping experience as abstract (far) and offline shopping as concrete (near). The differences in mental representation may impact consumers' how consumers evaluate and interpret different naturalness framings.

From the evidence, we posit that when shopping online, consumers are more likely to focus on outcome-related and abstract representations of the attributes. Meanwhile, when shopping offline, they are more focused on process-related and concrete representations of the attributes. Thus, we believe a concrete (vs. abstract) description of naturalness works better in offline (vs. online) shopping. When consumers construe their experience as concrete (vs. abstract), a concrete (vs. abstract) information framing may be perceived as "more fit" and, in turn, positively affect their attitudinal and behavioural responses. Taken together, we theorise that more concrete (vs. abstract) messages work better in offline (vs. online) shopping environments. And

this effect is underlined by consumers' perception of the message concreteness (high vs. low).

Two studies were conducted to validate this notion. Study 1 revealed that in the offline shopping simulated environment, positive attitudes toward the tested product (i.e., canned abalone) are significantly higher when consumers are presented with a concrete (vs. abstract) framing of naturalness. Additionally, this effect is mediated by consumers' perception of message concreteness. That is, when consumers shop offline and view a concrete framing of naturalness, they perceive a higher level of message concreteness and, in turn, have a heightened positive attitude toward the product. Interestingly, we do not observe any significant changes in product attitude for abstract framing of naturalness in the online shopping simulation. Study 2 demonstrated the true effect of concrete framing by ruling out alternative explanations and accounting for confounding factors. Our study offers significant theoretical and practical implications. We demonstrate that a concretely framed naturalness message is more effective in heightening product attitudes, especially for consumers in offline shopping situations. This finding indicates that congruency between consumers' mental representation and message framing is central to consumers' evaluation of the product. As such, there could be value in further exploring the effectiveness of different textual framing methods to communicate naturalness.

3.3 Theoretical Background And Hypotheses Development

3.3.1 Concrete vs. abstract framing of naturalness

Naturalness is one of the most over-utilised claims in the food market. This is largely because consumers are innately drawn to "things" that are perceived as natural

(e.g., Amos et al., 2014). In fact, the term "natural" has become a cue that equates to "better" in consumers' heuristic decision-making processes (Li & Chapman, 2012). Evidence from the literature suggests that consumers perceive natural foods to be safer, healthier, more nutritious and environmentally friendly (e.g., Berry et al., 2017; Li & Chapman, 2012; Rozin et al., 2004). Such positive perceptions result in stronger consumer demand (Consumer Reports, 2016) and willingness to pay a premium for naturally claimed food products (Russo, 2015). This trend is also evident in organic food products, as consumers often perceive organic and natural as synonymous (Essoussi & Zahaf, 2008).

Despite being one of the most sought-after attributes, there is no clear definition or regulation on how one can claim their product is natural (Rozin et al., 2012). According to the U.S. Food and Drug Administration (2017), natural refer to "nothing artificial or synthetic". Meanwhile, the Australian Therapeutic Goods Administration also provided general guidance on how and when natural claims can be employed (TGA, 2019). However, these guidelines are inadequate, and thus, many brands have leveraged this lack of regulations and introduced products that claim to be natural (André et al., 2019). This results in increasing competition in the "natural" food market and heightens the need for more effective communication of naturalness. Many researchers have attempted to examine the effect of naturalness claims on consumers' attitudinal and behavioural responses. However, the majority of studies in this stream of research only examine the effect of presence vs. absence of naturalness claims (e.g., Berry et al., 2017; Galati et al., 2019; Wang et al., 2022).

Naturalness can be communicated in different ways through packaging. Past studies have evaluated various packaging methods to enhance products' perceived naturalness towards the product. For instance, Labbe et al. (2013) conducted an

experiment to test how different sensory cues, including visual, auditory and tactile cues, have an effect on products' expected naturalness. The authors indicated that woven fabric, low sound intensity and high suppleness heightened the expected naturalness of the product. The extant literature has extensively demonstrated the effect of packaging materials, shapes and colours on consumers' perceptions (e.g., Deliza et al., 2003; Labbe et al., 2012; Puyares et al., 2010). However, there are fewer studies attempting to optimise the use of informational labelling. Much research only examining the presence vs. absence of natural claims on front-label (e.g., Berry et al., 2017; Galati et al., 2019; Hall et al., 2022). Meanwhile, with approximately 73 per cent of food-related decisions made at the point of purchase, informational labels can be more effectively utilisied to communicate naturalness and acquire a competitive advantage (e.g., Chandon, 2013; Rettie & Brewer, 2000).

Cao and Yan (2016) obtained industry data from 38 food and beverage firms and indicated that one could employ an abstract (i.e., generic and vague) claim of naturalness, such as *all natural, natural deliciousness,* and *naturally derived.* At the same time, one can also employ a more concrete (i.e., explicit and descriptive) claim of naturalness to specifically explain the absence of additives and intensive synthesis processes, such as *100% natural without artificial additives and synthetic ingredients*. The current implementations of naturalness claims are often perceived as confusing (e.g., Chambers et al., 2019) or misleading (André et al., 2019). Therefore, we predict that a more detailed and concrete description of naturalness (e.g., 100% natural with no GMO and preservative) could be more effective than a mere "all natural" claim.

Drawing from the cue utilisation theory, we posit that consumers are more likely to prefer a concrete and comprehensive description of "naturalness" over an abstract and ambiguous claim (e.g., Steenkamp, 1990). Against this backdrop, the present study

attempted to empirically validate this notion by testing the effectiveness of concrete vs. abstract informational framing of naturalness in food products. To date, no existing studies have evaluated whether a concrete or abstract claim of naturalness is more effective in conveying the food product's naturalness and positively influencing consumers' attitudinal and behavioural responses (e.g., Schifferstein et al., 2021). Given the theoretical importance and practical relevance of answering this research question, our study attempts to examine whether concrete vs. abstract claim of naturalness is more influential in heightening consumer attitude toward food product.

3.3.2 The positive effect of message concreteness

Attribute or message framing refers to various ways to present an attribute or benefit, resulting in consumers constructing a different mental representation of that attribute (Kühberger, 1995). The extant literature on message framing illustrates a variety of manipulations, such as valence (e.g., positive vs. negative; see Levin et al., 2002), numeric formats (e.g., percents vs. cents; see DelVecchio et al., 2007), frames of reference (e.g., self vs. others; see White & Peloza, 2009), temporal context (e.g., now vs. future; see Shu & Gneezy, 2010) and concreteness (e.g., concrete vs. abstract; see Freling et al., 2014). The current study will focus exclusively on the impact of concrete vs. abstract framing of naturalness on consumers' attitudinal responses toward food products.

Message concreteness refers to the extent to which a message specifically and descriptively details the information to the receivers (Miller et al., 2007). In other words, a message's concreteness depends on how the message's language or visuals delineates specific features and detailed information (Miller et al., 2007). For instance, a concretely framed naturalness claim must provide the details of the product's production method, ingredients and substances. In contrast, an abstract message is less

vivid as it gives a more generic claim without any descriptions of the features or benefits. As such, an abstract message often requires the receivers to exert more effort to infer the meaning of the message or product benefits (Menegatti & Rubini, 2013). Examples of abstractly framed "natural" claims in the food and beverage market include *natural, all natural* and *natural deliciousness*.

Extant literature often suggests that a more concrete message could be more effective in conveying an idea or proposition. For instance, the use of concrete messages may result in better information recall (Olver, 1965), short-term memory (Borkowski & Eisner, 1968) and learning performance (Van der Veur, 1975). Additionally, a concrete message can be visualised and inferred faster than an abstract message (Semin & Fiedler, 1988) and thus, is perceived as more truthful (Hansen & Wänke, 2010). From a marketing point of view, the use of concrete message framing could enhance the persuasiveness and effectiveness of marketing messages by facilitating better brand recall and favourable beliefs about the brands (Babin et al., 1992; Burns et al., 1993). Xiao et al. (2022) conducted an experiment to examine the effect of message concreteness on fundraising outcomes. The authors found that when a fundraising message employed concrete language and detailed specific activities from the fundraiser, the intention to donate was significantly heightened. Such evidence suggests that when consumers evaluate a product and perceive the marketing message as concrete, they are more likely to form a more favourable attitude than those employing abstract messages.

3.3.3 The interactive effect of shopping channels and message framing on message concreteness

Message concreteness of naturalness is not, however, always effective in every context. We postulate that the positive effect of message concreteness depends on the

platform where consumers conduct their shopping. The two most prominent grocery shopping channels are brick-and-mortar stores and online shopping, with eCommerce grocery sales expected to grow and equate to half of the traditional supermarket and local stores' worth of sales (Ozbun, 2022). Although online stores can mimic certain attributes from offline stores, such as the presence of an assistant (e.g., online store assistant) or atmosphere (i.e., colours and design), the two shopping channels provide consumers with entirely different experiences (e.g., Lohse & Spiller, 1999). Such different experiences lead consumers to adopt different decision-making strategies depending on where they shop (e.g., Dai et al., 2014; Liu & Forsythe, 2010; Prasad & Aryasri, 2009).

Past studies have demonstrated such differences in consumer decision-making processes in online vs. offline shopping. For instance, Chu et al. (2010) looked at brand loyalty, size loyalty and price sensitivity across online and offline shopping of 93 grocery products. They found that online shoppers are more loyal to brands and sizes and less price sensitive compared to offline shoppers. Similarly, Arce-Urriza et al. (2017) found that online consumers are less sensitive to price promotions than consumers shopping in an offline environment. The differences in consumer decision-making online compared with offline channels may also translate to how consumers view and evaluate naturalness claims.

Drawn from construal level theory (Liberman & Trope, 1998), we posit that the difference in consumers' decision-making across shopping platforms could be grounded in psychological distance. Specifically, online shopping represents a psychologically far-away, socially distant, and hypothetical location and vice versa. Thus, consumers' psychological distance increases when shopping online compared with an offline environment. As such, consumers are more likely to construe their

online shopping experience as abstract (far) and offline shopping as concrete (near). The differences in mental representation may impact consumers' how consumers evaluate and interpret different naturalness framings.

Construal level theory offers us a starting point to explore the differences in consumer decision-making online vs. offline shopping channels. Construal level refers to the level of abstractness (vs. concreteness) of an individual's mental representation of an object, event or experience, and this mental representation is underlined by psychological distance (Liberman & Trope, 1998; Liberman et al., 2002; Trope et al., 2007). According to Trope and Liberman (2010), psychological distance is predicted by spatial distance, temporal distance, social distance and hypotheticality. Psychological distance increases when an object, event or experience is construed as far away (spatial), in the future (temporal) and unlikely to happen (hypothetically). On the other hand, psychological distance decreases when an object, event or experience is construed as nearby, in the present and more likely to happen.

Such conceptualisations suggest that online (vs. offline) shopping could be construed as psychologically distant (vs. proximal) since online shopping is far away and is a "hypothetical" shopping experience. Xu et al. (2021) were the first to provide empirical support for this notion. They conducted two experiments to determine the effect of shopping channels (online vs. offline) on psychological distance and, in turn, consumers' construal level. The authors found that when consumers shop online (vs. offline), their psychological distance increases (vs. decreases) and, in turn, motivates consumers to adopt a high (vs. low) construal level. However, their studies did not examine how the difference in psychological distance and construal level influence consumer's evaluation of different methods of message framing.

When individuals construe an object, event or experience as psychologically distant from them, they often adopt a high-level construal (abstract) mindset and focus on outcome-related benefits and abstract representations of the benefits. On the other hand, individuals with low-level construal (concrete) mindsets often focus on process-related benefits and more concrete representations of the benefits (Liberman & Trope, 1998). There is ample evidence to suggest that a concrete (vs. abstract) framing of an attribute is more influential on consumers' decision-making in psychologically near (vs. distant) events.

Xu et al. (2021) found that consumers paid more attention to desirability (vs. feasibility) attributes when shopping online (vs. offline). The distinction between desirability and feasibility lies in the differences between means and ends (e.g., Gollwitzer & Moskowitz, 1996; Kruglanski, 1996; Miller et al., 1960). That is, desirability attributes refer to the abstract end goals of consuming a product (e.g., Camera A takes beautiful photos), whereas feasibility attributes refer to the concrete means enabling such goals (e.g., Camera A is packed with a 108MP sensor). Meanwhile, Kim et al. (2016) examined the impact of concrete (vs. framing) promotional messages on consumers' decision-making when they plan for a trip that is near (vs. far) in the future. The authors found that concretely (vs. abstractly) framed messages exert a greater impact on consumer judgment in near (vs. far) future vacation planning (Kim et al., 2016).

Drawn from the evidence, the premise of our study is that the effectiveness of concrete (vs. abstract) framing of naturalness depends on the shopping channels (online vs. offline). We propose that since offline (vs. online) shopping is construed as psychologically proximal (vs. distant), consumers are more likely to adopt a low construal level mindset and thus, prefer concretely framed naturalness. Similar

observations are presented in the extant literature; however, to our knowledge, there is no empirical data on the impact of different methods of message framing (concrete vs. abstract) on different shopping channels. For instance, Xu et al. (2021) found that when consumers adopt a low construal level mindset, their attention is drawn to the product's feasibility attributes, whereas when they adopt a high construal level mindset, attention is drawn to desirability attributes. Concurrently, both Kim et al. (2016) and Choi et al. (2017) only manipulated temporal distance (near vs. far future). Taken together, our study attempts to validate our notion and hypothesise:

*H1***:** A concrete (abstract) framing of naturalness enhances (reduces) consumers' perception of the message concreteness.

H2: A concrete framing of naturalness heightens consumers' positive attitudes toward products through perceived message concreteness; however, this effect only occurs in offline shopping conditions.

3.4 Method And Data Analysis

3.4.1 Developing concrete vs. abstract framings of naturalness

We adopted a three-step exploratory study to develop different framing (concrete vs. abstract) of naturalness. First, we conducted a market scan of food and beverage products that claim to be natural. Our scan covered both online and offline platforms from major Australian supermarkets, including Woolworths and Coles. Below is the detailed list of natural claims employed by the industry at the time of our market scan.

Natural	All Natural	No GMO
No artificial flavours	No preservatives	Made with real [ingredients]
Wholefood	No artificial colours	Real [ingredients]

Second, we consulted with existing guidelines provided by the U.S. Food and Drug Administration and Australian Therapeutic Goods Administration. According to

the FDA (2017) and TGA (2019), naturalness refers to the fact that a product or its ingredients must be extracted and derived from nature. Additionally, the final products must have gone through no or minimal processing without chemical synthesis. Furthermore, natural claims must also indicate whether the final products are entirely natural or only partly natural. With such definitions, an appropriate concrete framing of naturalness needs to be specific regarding the processing method and ingredients. Finally, we came up with two abstractly framed natural claims and two concretely framed natural claims. The abstractly framed natural claims include *"natural"* and *"all natural"*, while the concretely framed natural claims include *"100% natural"* and *"100% natural with minimal processing and no artificial ingredients"*.

3.4.2 Pre-test

We conducted a pre-test to validate the four framings of naturalness and select the claims that best represent abstract and concrete framings of naturalness. Employing a one-way between-subject design, 78 respondents (M_{age} = 32.96, SD = 12.32) were recruited via Prolific to evaluate four canned abalone products with different naturalness descriptions: *natural*, *all natural*, *100% natural*, *100% natural with minimal processing and no artificial ingredients*. They then rated the message's perceived concreteness (Bae, 2020), naturalness (Wilks & Phillips, 2017), effectiveness (Davis et al., 2013), transparency (Rawlins, 2008), authenticity (Shoenberger et al., 2020), credibility (Kim & Cameron, 2011), engagement (Laczniak et al., 1999). Finally, respondents were asked to report their attitude toward the naturalness description being employed on the canned abalone.

A one-way ANOVA was conducted to determine the differences between the four descriptions of naturalness. Only one significant difference was observed. That is, *100% natural with minimal processing and no artificial ingredients* (M = 4.69) was

perceived as significantly more concrete than *all natural* (M = 3.34, F (3, 74) = 4.256, p = .007). In terms of perceived naturalness, effectiveness, transparency, authenticity, credibility, engagement, and attitude, no significant differences were found between the four descriptions of naturalness. The results indicated that *all natural* and *100% natural with minimal processing and no artificial ingredients* only differ on perceived message concreteness. At the same time, the results allowed us to rule out other factors (i.e., persuasiveness, authenticity and credibility) that might confound our results. Therefore, *all natural* and *100% natural with minimal processing and no artificial ingredients* were selected for the main study to test the interactive effect of shopping situations and naturalness framing.

3.4.3 Study 1

3.4.3.1 Participants

203 Australian consumers were recruited through Prolific. We excluded 41 responses due to failed attention checks. Another 35 incomplete responses were excluded. Finally, we had a total of 127 valid responses for analyses (46.5% female, M_{age} = 37.3, SD = 12.55).

3.4.3.2 Design and Procedure

The study employed a 2 (shopping situation: online vs. offline) x 2 (naturalness framing: concrete vs. abstract) between-subjects design. Respondents were randomly assigned to one of the four experimental conditions. They were first primed to imagine shopping for groceries either online or offline. In the online condition, the textual priming was accompanied by an image (see Appendix 3-1) replicating an online shopping page, whereas in the offline condition, the image replicated a grocery store's physical shelves (see Appendix 3-2). Next, respondents were asked to review and evaluate a canned abalone that employed either an abstract or concrete framing of

naturalness (see Appendix 3-3). Canned abalone was chosen as a stimulus as part of an ongoing industry collaboration with Jade Tiger Abalone (Australia).

After evaluating the canned abalone, respondents were asked to rate the message' concreteness on four semantic differential scales (α = .83; Bae, 2020). As the dependent variable, respondents indicated their attitude on four semantic differential scales (i.e., Bad – Good; Unfavourable – Favourable; Dislikeable – Likable; Negative – Positive). As a manipulation check, participants were asked to recall whether their shopping condition was online or offline.

Abalone is an unfamiliar product to Australian consumers as more than 90 per cent of Australian abalone production is exported (Austrade, 2021). Thus, we also asked the respondents to report their prior consumption experience with abalone (Gilal et al., 2018) and perceived risk (Grewal et al., 1994) of buying abalone as covariates. This is because we expected that abalone, as an unfamiliar product, might heighten perceived risk and affect respondents' overall attitude toward the product. Another covariate that we accounted for is consumers' need-for-touch trait (Peck & Childers, 2003). Being able to touch physical products is the fundamental difference between offline shopping compared to online shopping, and this tactile sensation is crucial to consumer expectations (Schifferstein & Spence, 2008), judgment (Peck & Childers, 2003), and behavioural responses (Ding & Keh, 2017). Thus, we expected that an individual's tendency to require haptic feedback during their decision-making process might affect their overall evaluation of a product on online channels.

3.4.3.3 Results and Discussion

Accounting for the possibility that perceived naturalness may serve as an alternative explanation, we first ran a two-way ANCOVA, whilst controlling for

perceived risk, prior consumption experience of abalone and need-for-touch tendency, to test the effect of message framings (concrete vs. abstract) and shopping channels (online vs. offline) on perceived naturalness. We observed no significant main effect of message framing ($F(1,120) = .679$, $p = .411$) nor shopping channel ($F(1,120) = .068$, $p = .795$) on perceived naturalness. Similarly, no significant interactive effect between message framing and shopping channel on perceived naturalness was found ($F(1,120) = 3.290$, $p = .072$). The results allowed us to rule out the alternative explanation of perceived naturalness and test for Hypothesis 1.

To test for Hypothesis 1, we first examined the effect of naturalness framings (concrete vs. abstract) on perceived message concreteness moderated by shopping channels. We ran a two-way ANCOVA whilst controlling for perceived risk, prior consumption experience of abalone and need-for-touch tendency. Results indicate a significant main effect of message framing ($F(1,120) = 5.754$, $p = .018$, partial $\eta 2 = .046$). and a non-significant main effect of shopping channels ($F(1, 120) = 0.214$, $p = .645$, partial $\eta 2 = .002$). An interaction effect between message framing and shopping channels was observed $F(1,120) = 4.697$, $p = .032$, partial $\eta 2 = .038$. Referring to Figure 3.1, respondents rated the concrete framing of naturalness ($M = 5.21$, $SE = .215$) as significantly more concrete than the abstract framing ($M = 4.117$, $SE = .208$) in the offline shopping condition. However, such effects did not emerge among respondents in the online condition. The results, therefore, partly support Hypothesis 1.

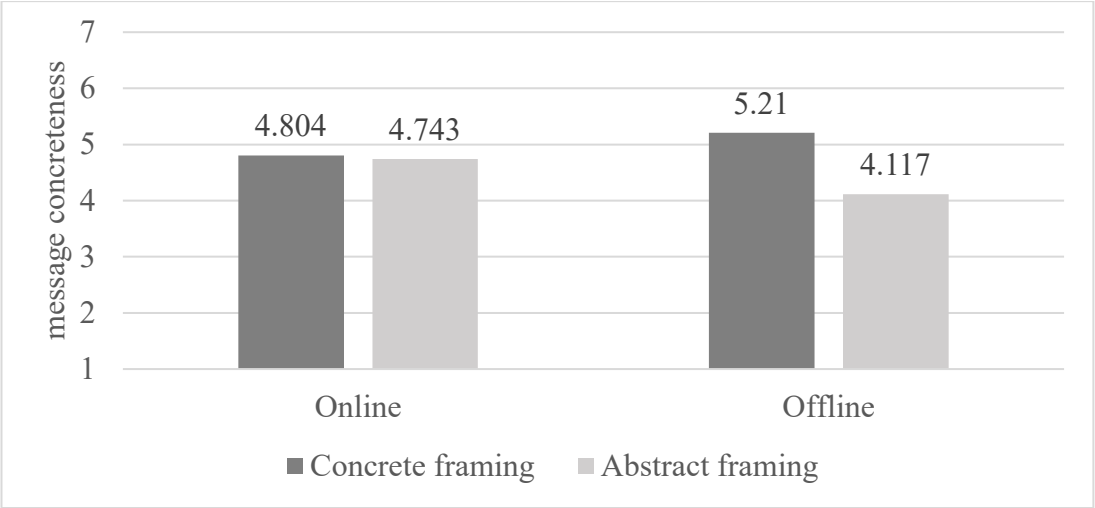

Figure 3-1: Interactive effect of perceived message concreteness between concrete and abstract message framing for online and shopping channels.

To test Hypothesis 2, we conducted a moderated mediation analysis using Hayes (2017)'s PROCESS Model 7 with 5,000 bootstraps resamples. This model estimated the indirect effect of concrete (vs. abstract) naturalness framing on product attitude via perceived message concreteness, moderated by shopping channels. Results revealed a significant index of moderated mediation (B = .342, SE = .1739, 95% CI =.0176 to .705), such that the indirect effect was significant in offline shopping conditions (B = .362, SE = .119, 95% CI = .15 to .62). On the other hand, the indirect effect was found to be non-significant in the online shopping condition (B = .02, SE = .145, 95% CI = -.255 to .337). Referring to Figure 3.2, the results indicate that concretely framed natural claims significantly heightened consumers' positive attitudes toward the product through perceived message concreteness. However, this effect only occurs in offline shopping conditions. On the other hand, no significant direct or indirect effect of abstractly framed natural claims on product attitude regardless of shopping conditions (online and offline). Thus, the results support Hypothesis 2.

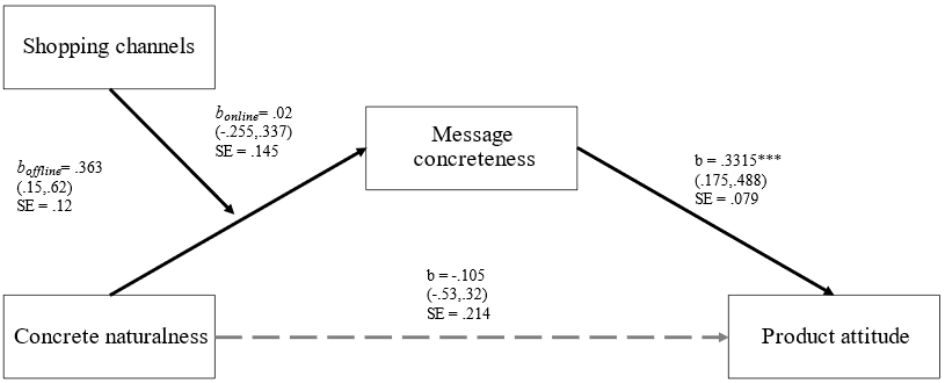

*Figure 3-2: The moderated mediation model Study 1. *p<.05, **p<.01, ***p<.001.*

Note: 95% bias-corrected confidence intervals are provided in parentheses. B, Unstandardised coefficient. SE, Standard Error. Significant pathways are bolded, and non-significant pathways are represented as dotted lines.

3.4.4 Study 2

Study 2 was designed to test for several alternative explanations for the moderated mediation in Study 1. The extant literature provides evidence that a concretely framed message often commands a higher level of perceived trustworthiness (e.g., Hansen & Wänke, 2010). Therefore, we postulated that perceived message authenticity, credibility and transparency may serve as alternative explanations for the indirect effect of concrete messages on product attitude. Moreover, we anticipate that consumers' dispositional scepticism towards advertising messages and labelling initiatives could influence the effect of message framing. Thus, we also sought to measure consumers' dispositional scepticism towards advertising messages and labelling initiatives, modelled it as a covariate in Study 2. Two additional conditions were added in this phase: a control condition and an additional concretely framed natural message condition without the mentioning of 'natural' in the message.

This allowed us to improve the validity of the first phase of this study. We sought to demonstrate the true effect of concrete framing in comparison to a control and account for confounding factors that the word 'natural' can entail (i.e., whether the mere mention of the word 'natural' may have distorted the effects of message framing on product attitude).

3.4.4.1 Participants

250 respondents were recruited from Prolific in exchange for monetary compensation. All respondents were from Australia and New Zealand, with no dietary restrictions. Only 173 of the 250 responses were valid for the final data analysis due to failed attention checks. There were 88 males and 85 females, with a mean age range of 18 to 75 years old (M = 35.5, SD = 11.05).

3.4.4.2 Design and Procedure

Study 2 replicated the design of Study 1 with the addition a control condition and another concretely framed natural message condition. In the control condition, no message mentioning the product's naturalness was presented to the respondents. In the additional concretely framed natural message, the term "natural" was removed to better reflect existing practices in the industry. Specifically, the message was as follows: "made with minimal processing and artificial ingredients". All other procedures and measures in Study 2 were the same as Study 1, with the additional measures of perceived transparency (Rawlins, 2008), perceived authenticity (Shoenberger et al., 2020), perceived credibility (Kim & Cameron, 2011) and dispositional scepticism toward ads and labelling initiatives (Mitra et al., 2019).

3.4.4.3 Results and Discussion

Similar to Study 1, we first ran a two-way ANCOVA, whilst controlling for perceived risk, prior consumption experience of abalone, need-for-touch tendency and dispositional scepticism toward ads and labelling initiatives, to test the effect of message framings and shopping channels on perceived naturalness. Again, we observed no significant main effect of message framing ($F(3,161) = 1.755$, $p = .158$) nor shopping channel ($F(1,161) = .177$, $p = .674$) on perceived naturalness. No significant interactive effect between message framing and shopping channel on perceived naturalness was found ($F(3,161) = .615$, $p = .606$). The results allowed us to rule out the alternative explanation of perceived naturalness.

We then conducted four 4-message framings (abstract, control, concrete without natural, and concrete) x 2-channels (online and offline) ANCOVAs with perceived risk, prior consumption experience of abalone, need-for-touch tendency and dispositional scepticism toward ads and labelling initiatives controlled for as covariates. The first ANCOVA was conducted to test for the main and interactive effect of message framings and shopping channels on perceived message concreteness.

Replicating the results from Study 1, our analyses revealed a significant main effect of message framing ($F(3,161) = 3.14$, $p = .027$, partial $\eta 2 = .055$). Given the results from Study 1, we conducted follow-up independent one-tailed t-tests to explicate the effect of message framing on perceived message concreteness across natural framing conditions. The results indicated that there was no significant difference between the control ($M = 4.36$, $SD = 1.46$) and abstract ($M = 4.35$, $SD = 1.1$) conditions on perceived message concreteness ($t(84) = -.028$, $p = .489$, $d = .000$). Similarly, no significant difference was found concerning the effect of 'concrete' ($M = 4.87$, $SD = 1$) and 'concrete without natural' conditions ($M = 4.81$, $SD = .95$) on

perceived message concreteness (t (85) = .296, p = 384, d = .001). Conversely, we found that both concrete (t (79) = -2.203, p = .015, d = .05) and concrete without natural (t (84) = -2.045, p = .023, d = .047) significantly heightened perceived message concreteness compared to abstract condition. Furthermore, both concrete (t (80) = -1.904, p = .03, d = .041) and concrete without natural (t (77.5) = -1.729, p = .044, d = .032) message framing significantly heightened perceived message concreteness compared to the control condition. The results indicate that the respondents perceived abstract framing and the control condition as low concrete whilst concrete and concrete without natural framing as highly concrete.

The first ANCOVA also revealed a non-significant main effect of shopping channels (F (1,161) = 1.183, p = .278, partial η2 = 007). In addition, a significant interaction effect between message framings and shopping channels on perceived message concreteness was demonstrated (F (3,161) = 4.348, p = .006, partial η2 = .075). We then conducted two follow-up ANCOVAs to look at the effects of message framings on perceived message concreteness across different channels. The follow-up comparisons revealed that concrete framing heightened perceived message concreteness (M = 5.15, SE = .248) significantly compared to abstract framing (M = 3.98, SE = .236), in the online shopping situation (F (3,67) = 4.015, p = .007). Meanwhile, concrete without natural framing (M = 5.19, SE = .23) heightened perceived message concreteness significantly compared to control framing (M = 4.24, SE = .226), in the offline shopping situation (F (3,90) = 3.052, p = .028).

To test for alternative explanations, we conducted three similar two-way ANCOVAs with perceived message transparency, authenticity and credibility as dependent variables. The results indicated that there was no significant main effect of message framings on message transparency, authenticity and credibility (see Table 3-

1). This suggests that message-framing manipulation has no effect on message transparency, authenticity, and credibility. These findings demonstrate the robustness of the message framing manipulation and suggest that message transparency, authenticity, and creditability may not be alternative explanations.

We then conducted three separate moderated mediation analyses using Hayes (2017)'s PROCESS MODEL 7 with 5,000 bootstraps resamples. Given the ANOVA results, message framings (concrete vs. abstract) were configured as a multi-categorical variable (4 levels: abstract vs. control vs. concrete without mentioning natural vs. concrete mentioning natural) with sequential coding. We compared the indirect effect between low concrete (abstract and control) and high concrete message framing (the two concrete conditions). The results revealed no significant indexes of moderated mediation, with authenticity (B = .4148, SE = .3299, 95% CI = -.1906 to 1.1128), credibility (B = .3832, SE = .3057, 95% CI = -.1939 to 1.0256) and transparency (B = .3018, SE = .3094, 95% CI = -.2704 to .9435) as mediating variables. The results ruled out the notion that message framings' effect on product attitude can be alternatively explained by perceived message authenticity, credibility and transparency.

Table 3-1: ANCOVA Results of Alternative Explanations (Authenticity, Credibility and Transparency – Study 2)

Dependent variable	df	F	Sig.	partial η2
Authenticity	(3,161)	0.909	0.438	0.017
Credibility	(3,161)	1.739	0.161	0.031
Transparency	(3,161)	1.183	0.318	0.022

To test for Hypothesis 2, we followed the same moderated mediation models as above, with perceived message concreteness as a mediating variable. Results, again,

revealed a significant index of moderated mediation (B =.3908, SE = .2285, 95% CI = .0159 to .8968). That is, the indirect effect of concretely framed naturalness (both with and without mentioning natural) via message concreteness was significant in the offline shopping condition (B = .3658, SE = .1641, 95% CI =.0842 to .7326). Additionally, the indirect effect of concretely framed naturalness via message concreteness was not significant in the online condition (B = -.025, SE = .1403, 95% CI = -.3327 to .2447).

Referring to Figure 3.3, the results from Study 2 replicated the findings from Study 1. That is, concretely framed naturalness significantly enhanced product attitude via heightened perceived message concreteness only in offline (but not online) purchasing contexts. Study 2 further enhanced the robustness of the present research by ruling out the alternative explanations of message authenticity, transparency and credibility. Additionally, we improved the validity of the present study by adding two more conditions (i.e., control and concrete without mentioning natural). The addition of a control condition served as a reference to demonstrate the true effect of concrete framing. Furthermore, the inclusion of the 'concrete without natural' message condition accounted for the fact that the mention of 'natural' might have an effect on product attitude and might have confounded our results. Together, the findings of Studies 1-2 provide strong and robust evidence that consumers reported a significantly more favourable attitude when they were presented with concretely framed natural messages, especially in offline shopping situations.

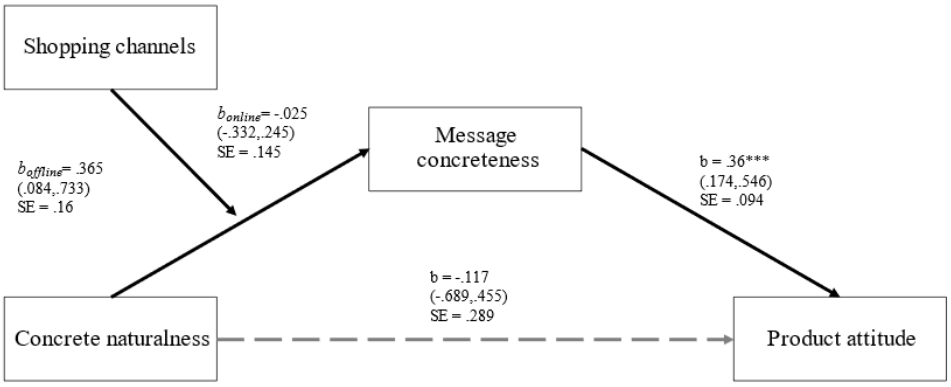

*Figure 3-3:The moderated mediation model in Study 2. *p<.05, **p<.01, ***p<.001.*

Note: 95% bias-corrected confidence intervals are provided in parentheses. B, Unstandardised coefficient. SE, Standard Error. Significant pathways are bolded, and non-significant pathways are represented as dotted lines.

3.5 Discussion

The popularity of food products claiming to be natural continues to rise over the year (Danley, 2021). As one of the most sought-after food attributes, many food and beverage brands utilise naturalness to gain a competitive advantage. A recent report from Whipstitch Capital (2023) indicates that the naturalness market, especially the food and beverage sectors, has been experiencing double-digit growth rates in 2021 and 2022. Such proliferation of naturalness has led to an influx of research examining the effects of natural claims on consumers' food-related behaviours. However, the extant literature primarily concerns consumers' perceptions and inferences of natural claims (e.g., André et al., 2019; Berry et al., 2017; Skubisz, 2017). Meanwhile, limited research attempts to examine different ways of communicating naturalness on front-package labels to improve the effectiveness of the natural claim.

The lack of effort in examining different ways to communicate naturalness is seen in both academic and industry contexts. In the extant literature, research on the communication methods of naturalness has only looked at leveraging tactile sensation, sound, shape, and colour to evoke an association with naturalness (see Schifferstein et al., 2021). However, no research has been published on the use of textual or verbal cues on front-package labelling to enhance the effectiveness naturalness claim (Schifferstein et al., 2021). This limited understanding of using textual or verbal cues to communicate naturalness is also apparent in the industry. As indicated by Cao and Yan (2016) and our pre-test market scan, brands are very similar in how they use textual and verbal cues to communicate naturalness. Textual and verbal cues consisted of written words seeking to convey important information and signal the product quality (e.g., Tang et al., 2004). Optimising the use of linguistics in verbal cues allows brands to positively affect their consumers' attitudinal and behavioural responses (e.g., Tang et al., 2004). Given the theoretical importance and practical relevance of verbal cues, the current study was designed to uncover how message framing, as a component of verbal cues, could be utilised to enhance the effectiveness of natural claims on the front-package label.

The current study is among the first in the research stream investigating how message framing can be utilised to enhance the effectiveness of naturalness claims. Specifically, we seek to delineate the effects of abstract vs. concrete framing of naturalness on consumer attitudes towards food products in online vs. offline shopping situations. Our argument is that concrete framing of naturalness heightens consumers' positive attitudes via increased perceived message concreteness, and this effect only occurs in offline shopping situations. Built upon construal level theory, we predicted that when consumers shop offline, they adopt a low construal level mindset and thus,

are more drawn to concrete framing of naturalness. Our findings provide novel empirical evidence to illustrate the effectiveness of concrete vs. abstract framing of naturalness in different contexts (online vs. offline shopping). Study 1 demonstrated that concrete framing of naturalness heightens consumers' perception of the message concreteness and, in turn, enhances product attitude. This observation is in line with prior studies, which highlight the effectiveness of concrete messages in evoking numerous desirable marketing outcomes such as information recall (e.g., Olver, 1965), message credibility (e.g., Hansen & Wänke, 2010) and favourable behavioural responses (e.g., Burns et al., 1993).

In Study 2, we replicated the findings from Study 1. In addition, we ruled out perceived message authenticity, transparency and credibility as alternative explanations. The two studies demonstrated the true effect of message framings on product attitude via perceived message concreteness, especially in offline shopping. Together, our results suggest that the congruency between concrete framing and low construal level mindset evoked by offline shopping enhances consumers' perception of the message concreteness, and in turn, heightens their positive attitude towards the product. Similar observations from the extant literature align with our findings. For instance, Kim et al. (2016) examine whether consumers prefer concretely (vs. abstractly) framed promotional messages when they plan a vacation to a near (vs. distant) location and in a near (vs. distant) future. Their findings indicate that concretely (vs. abstractly) framed promotional message (i.e., comfortable bedding vs. bed with pillowtop mattresses and 100% down comforters) is more influential in psychologically proximal (vs. distant) vacations. The present research extends this observation to the framing of naturalness in the context of online vs. offline shopping,

offering insights on how message framing could be utilised to improve the impact of naturalness in different contexts.

Furthermore, the two studies illustrate the significance and relevance of examining different methods to communicate naturalness and how they affect consumers' attitudinal and behavioural responses. The present research empirically shows that brands should not employ similar message framings for both online and offline product descriptions. This notion is echoed in the extant literature as prior research also suggests that brands should focus on communicating different attributes and benefits depending on where consumers conduct their shopping (e.g., online vs. offline). For instance, Xu et al. (2021) indicate that consumers prefer a product's desirability aspect (e.g., usefulness) when shopping online. In contrast, consumers prefer a product's feasibility aspect (e.g., ease of use) when shopping offline. Within our study, we demonstrate that a concretely framed naturalness claim offers better desirable marketing outcomes (i.e., positive attitude), especially when consumers shop in a brick-and-mortar store. Such findings indicate that this stream of research could offer various significant theoretical and practical contributions.

3.6 Conclusions And Implications

3.6.1 Theoretical Implications

Extending the extant research on the interplay between perceived psychological distance and message framing (e.g., Choi et al., 2017; Kim et al., 2016), the current study offers additional insights into the consumers' thought process when evaluating marketing messages on different shopping channels. By incorporating construal level theory, we provide support to the notion that consumers adopt a lower (vs. higher)

construal level mindset when they shop offline (vs. online), and this difference, in turn, affects how they evaluate marketing messages (Xu et al., 2021). Our results show that the indirect effect of concrete framing on positive attitudes only occurs in offline shopping conditions. As consumers shop offline, they may perceive a proximal psychological distance (Xu et al., 2021) and thus, adopt a low construal-level mindset. Since there is a congruency between the concrete framing and low construal level, the effect of concrete framing on perceived message concreteness is extrapolated and, in turn, positively affects attitude. Our study demonstrates the differences in consumers' decision-making process and mental representation across shopping channels (online vs. offline). As consumers increasingly employ multiple shopping platforms in their decision-making process, it is essential for both academics and marketers to gauge the differences in behaviour and thought processes of consumers across different platforms. Thus, our findings offer significant theoretical contributions by illustrating such differences in consumers' mental representation and thought processes on online vs. offline shopping platforms.

As our research demonstrates that the congruency between construal level and message framing enhances the effectiveness of marketing messages, we expect to observe similar results with an abstractly framed natural claim in the online shopping condition. Interestingly, we did not find a significant effect of abstract framing in the context of online shopping channels. This finding is inconsistent with prior studies, which suggest that consumers who adopt a high construal-level mindset are more likely to prefer abstractly described attributes (Kim et al., 2016). Such results may suggest that abstractly framed naturalness claims are not effective in evoking positive attitudes, even when consumers adopt a high construal-level mindset. One potential explanation for this discrepancy could be grounded in consumers' ability to process

information (Simon, 1956). Since consumers often have to process a large amount of information during their decision-making process online (Cheng et al., 2014). Thus, an abstractly framed attribute may pose a challenge to consumers to decipher and interpret the message. Considering that abstract message framing only vaguely describes the outcome rather than the means to achieve it, consumers may overlook marketing messages requiring extra cognitive effort to interpret.

Another explanation for this phenomenon is that naturalness, as a credence claim, cannot be accurately evaluated without technical expertise (e.g., Fernqvist & Ekelund, 2014). Furthermore, natural claims have also been repeatedly under-scrutinised (Petty, 2015). As such, consumers are less likely to rely on abstractly framed natural claims to form their attitudes and behaviours. This shows that credence attributes, including naturalness may induce a higher level of uncertainty and perceived risk toward the products. As a result, other psychological mechanisms, such as perceived trustworthiness toward product attributes, risk aversion or loss aversion, may act as a boundary condition of the effect of message framing. Thus, additional research examining the communication of credence attributes should account for these boundary conditions to address this contradicting finding.

Although textual and verbal cues are the main components of a front-package label, our review of the literature suggests that there is a scarcity of research exploring the use of textual or verbal cues to enhance the effectiveness of naturalness claims. Meanwhile, prior studies have repeatedly indicated that consumers' expectations of a product are largely driven by textual information (e.g., Grabenhorst et al., 2008; Lähteenmäki et al., 2010; Liem et al., 2012; Siret and Issanchou, 2000; Sütterlin and Siegrist, 2015). Our study is the first to demonstrate that concrete framing could be more effective than abstract framing in the context of naturalness claims. Existing

studies concerning the communication of naturalness primarily focus on visual cues, such as shape, colour and materials (see Schifferstein et al., 2021). Our study indicates that future studies should further explore how different methods of message framing could be utilised to enhance the effectiveness of naturalness claims on consumers' attitudinal responses across different platforms.

3.6.2 Managerial Implications

Our findings also offer meaningful and actionable insights for food and beverage brands, especially those seeking to utilise naturalness as a competitive advantage. We point out the current limitation in the industry as brands often employ the same message framing regardless of shopping channels. This generates an incongruency between consumers' mental representation and message framing (concrete vs. abstract) and, in turn, lowers the effectiveness of the marketing message. Given the intense competition in the food and beverage sector, especially in the naturalness market, it is important that brands take into account the difference in consumers' decision-making under different shopping conditions and develop marketing assets accordingly. Although the scope of our study only covers the message framing of naturalness, our findings could be generalised to other aspects of marketing communications and packaging design. Our findings suggest that offline-based marketing assets (e.g., posters, flyers and packaging labels) should be designed to be congruent with consumers' low construal level mindset. In other words, these marketing assets should highlight process-related attributes (e.g., production methods), near-future benefits (e.g., instant gratification) and self-oriented benefits (e.g., benefits for personal use rather than society).

Aligning with the extant literature, our study indicates that food and beverage brands should employ concretely framed marketing messages to improve the effectiveness of naturalness claims. Our findings could also be translated to the communication of other attributes, especially credence attributes. Credence attributes, such as sustainability, nutrition and ethical value, cannot be ascertained without technical expertise. Therefore, a concrete framing to accentuate the production, ingredients and benefits of credence attributes could evoke stronger consumer trust and, in turn, positively affect their attitudinal and behavioural responses. This suggestion is supported in the extant literature as Taufik et al. (2023) indicate that concrete description of product benefits evokes a stronger sense of self-rewarding and, in turn, heightens intent to purchase sustainable food.

Given that concrete framing of naturalness performs better in evoking positive attitudes, brands should consider different design approaches attempting to increase their message concreteness. For instance, linguistic and semantic characteristics could be utilised to demonstrate how naturalness is achieved (Robinson & Eilert, 2018). Our study indicates that by using specific descriptions to accentuate the details of the production process, ingredients and nutrition, brands can increase the perceived message concreteness of their natural claims. Visuals could also play a key role in concretising a message. For example, using graphical presentations or illustrations could increase clarity and facilitate cognitive elaboration (MacInnis & Price, 1987). Rim et al. (2015) indicated that simply substituting verbal descriptions (e.g., tomato) with visuals (e.g., an image or illustration of a tomato) can increase the perception of concreteness.

Finally, the results show that concretely framed natural claims only work when consumers shop in-store. For the concretely framed natural claims to work for online

channels, online distributors should consider reducing the psychological distance their consumers perceive. As psychological distance decreases, consumers would be more likely to adopt a low construal level mindset and thus, more likely to prefer a concretely framed natural claim. Reducing psychological distance could potentially require online distributors to introduce haptic feedback to their platform. This could be possible through the emergence of mobile commerce (Melumad & Pham, 2020). Furthermore, social shopping on social networks, where consumers are allowed to shop online and interact with others simultaneously, could also be a promising solution. As consumers can interact and feel others' social presence, social shopping could create closer social proximity, reducing perceived psychological distance (e.g., Darke et al., 2016).

3.7 Limitations And Future Research

The current research is not without limitations, providing avenues for future research. Firstly, our stimulus is a canned abalone, an unfamiliar and hedonic-oriented product. Although we have controlled for prior consumption experience with abalone and perceived risk when buying canned abalone as covariates, this choice of stimulus may hinder the external validity of our study. Thus, future research should extend to other contexts involving more familiar and utilitarian-oriented products to enhance the generalisability of the research.

Secondly, the impact of message framing on consumers' decision-making may vary across product categories. In fact, the extant literature also points out that product categories also interplay with shopping channels and influence consumers' thought processes (Lee et al., 2018; 2021). Our study indicates that food products, as experience goods, may benefit from concretely framed claims since consumers may face challenges evaluating experience goods before actual consumption (i.e., food,

service and entertainment). Therefore, we predict that concrete framings will be more beneficial for experience goods than search goods (e.g., commodities). Future research can test these predictions by extending the current research to other product categories, such as personal care, household, and beauty products.

Thirdly, our study highlights that the congruency between construal level and message concreteness underlies the effect of concrete framing on heightened positive attitudes. However, we do not observe a similar effect in online shopping and abstract framing conditions. We hypothesise that naturalness, as a credence attribute that has been under-scrutinised, may evoke a higher sense of uncertainty and perceived risks. Thus, communication of naturalness requires concretely framed claims to sustain consumers' certainty about the product's benefits. Further research should explore other potential boundary conditions, such as perceived trustworthiness toward product attributes, risk aversion or loss aversion, that might have hindered the effect of abstract framing in our study.

Finally, the present study did not account for the blurring boundaries between online and offline shopping, with consumers often adopting multiple shopping platforms to achieve an omnichannel experience. Industry reports (e.g., McKinsey, 2021) often suggests that consumers make an effort to involve more than one platform (e.g., both online and offline) during their decision-making processes. As such, consumers might be less likely to distrinctly differentiate between online and offline, which is reflected through a growing demand for hybrid shopping modes such as click and collect, personalised push notifications and online ordering in-store (PwC, 2023). Future studies should acknowledge this evolving dynamic and incorporate other hybrid shopping models in order to accurately represent the consumers' behaviours.

4 CHAPTER 4: PAPER 3 – ASSESSING AUSTRALIAN CONSUMERS' JUDGEMENT PROCESSES FOR FRESH PORK: A BEST–WORST APPROACH ON 46 ATTRIBUTES

4.1 Preface: Cue Utilisation and Perception in Different Product Categories

In the first stream of research (i.e., hedonic product), results in Chapter 2 identified naturalness as the salient cue utilised by Australian consumers to formulate their preferences and choices for abalone products. Chapter 3 then demonstrated how naturalness could be optimally communicated in different shopping contexts (online vs. offline). Since cue utilisation strategy differs depending on the product categories, it is impossible to draw the findings from Chapters 2 and 3 and apply them in a different context or product category. Therefore, the second stream of research (i.e., the commodity stream) explores Australian consumers' cue utilisation strategies in an everyday consumption context (i.e., fresh pork) and determines the optimal communication strategy for the salient cue.

Chapter 4 replicates Chapter 2's design and conducts BWS (choice experiment) to empirically determine the saliency of 15 intrinsic and 31 extrinsic cues for fresh pork products. Fresh pork was chosen due to its popularity (second-most consumed meat globally and in Australia) and growth potential. Working with Linley Valley Pork, a major Australian pork producer, this thesis supports the Australian pork industry's growth by offering insights on the elements that should be emphasised in their product development and communication. The results provide evidence of the significance of sensory experiences (i.e., flavour and aroma), naturalness and animal welfare cues in consumer decision making. Employing *k*-means and hierarchical clustering techniques based on cue utility scores, Chapter 4 also identifies a number of consumer segments that make up the Australian fresh pork market.

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4.2 Introduction

Pork is the second-most consumed meat globally (OECD, 2020) and also in Australia (ABARES, 2020). In Australia, fresh pork accounts for approximately 9% of the total revenue from Australian fresh meat, fish and poultry retailing (Jeswanth, 2022). Australian pork is currently experiencing healthy growth due to increased domestic consumption (ABARES, 2020) and consistent demand from export markets (APL, 2019). However, the industry also faces constant pressure from intense foreign competition (APL, 2019), indicating an ongoing need to improve the competitiveness and resilience of the Australian pork industry. The supply of consistently high, eating-quality fresh pork which is strongly aligned with consumers' requirements will underpin the Australian pork industry's positioning (APL, 2020; Pork CRC, 2022). Therefore, the aim of this study is to identify the product cues that can influence consumer purchasing behaviours related to fresh pork.

A thorough review of the literature and of products in the Australian market indicates that fresh pork could include more than 100 cues (refer to Table 4-1). However, there is a lack of empirical data regarding the fresh pork cues that are relevant to Australian

consumers. Additionally, studies have examined only a limited number of intrinsic and extrinsic cues. Ma et al. (2017) examined origin, price, process, fat content and package type on perceived quality and selection of fresh pork. Grunert et al. (2015) only considered fat content, meat colour, packaging type, branding and quality certification of fresh pork. Furthermore, studies have often focused on search cues (i.e., visual cues such as meat colour) or credence cues (i.e., organic certified) while neglecting experience cues (i.e., taste and succulence; Aboah & Lees, 2020). This study therefore adopted cue utilisation theory as our theoretical underpinning and investigated an extensive list of cues that are relevant and salient to the evaluation and purchase of fresh pork by Australian consumers.

This study used the best–worst scaling method (BWS) to comprehensively investigate the importance of 15 intrinsic and 31 extrinsic product cues. The purpose is to inform the Australian pork industry about which elements to emphasise in their product development and communication to be in alignment with consumer requirements. The study also applied clustering techniques (i.e., hierarchical and *k*-means clustering) to explore different segments of Australian fresh pork consumers based on the importance of a large set of cues, thereby offering actionable insights for the industry to develop marketing strategies with a more targeted audience.

4.3 Review of relevant literature

4.3.1 Cue utilisation and consumer decision-making processes

Attributes in the form of 'product cues' are important in guiding the food choices of consumers (e.g., Nocella et al., 2010; Van Loo et al., 2011) and their eating experiences (e.g., Bernués et al., 2003; Bredahl, 2004; Grunert et al., 1996). Consumers use product

cues to evaluate a product (Olson & Jacoby, 1972), overcome their uncertainty (e.g., Chevalier & Mayzlin, 2006), determine product quality (e.g., Darwar & Parker, 1994; Richardson et al., 1994; Zeithaml, 1988) and make purchasing decisions (e.g., Chewning & Harrell, 1990). According to the cue utilisation theory, each product consists of intrinsic and extrinsic cues (Cox, 1967; Steenkamp, 1989). Intrinsic cues refer to the product's technical specifications and sensory properties (Olson, 1977; Olson & Jacoby, 1972). These include meat colour, intramuscular fat and firmness. Meanwhile, extrinsic cues refer to product-related cues that are not part of the physical products (Shirai, 2020), such as brand name, price, qualifications and country of origin.

Product cues can also be used by producers to communicate product quality (Bao et al., 2011; Dawar & Parker, 1994) and differentiate their products from competitors (Choi & Coughlan, 2006; Moon et al., 2018). However, not every cue matters in the same way as consumers only use cues that they deem relevant to their judgments (e.g., Laroche et al., 2003). If an extensive number of cues are included on product packaging, consumers may experience information overload which can lead to poorer decisions (e.g., Chen et al., 2009). Therefore, producers must determine which of the salient cues are most relevant to consumers and communicate those.

4.3.2 Product cues in the context of fresh pork

There are two main strategies to increase product acceptability and liking in the context of fresh meat products including fresh pork (Monsón et al., 2005). The first strategy is to focus on the meat's physical aspects (i.e., intrinsic cues), such as the colour of the meat, the degree of visible fat and drip (Channon et al., 2018; Hopkins et al., 2014; Ng et al., 2016; Verbeke et al., 2005). Understanding the impact of these cues on consumer purchasing decisions could help producers to adjust their production methods to

develop products that are aligned with consumer requirements. Fresh pork producers can also focus on the value-added elements (i.e., extrinsic cues) to positively influence the product's perceived value. These cues include country of origin (Acebron & Dopico, 2000; Banović et al., 2010; Hoffmann, 2000); brand names such as national brands vs. store brands (Banović et al., 2010; Bredahl, 2004); organic, environmentally friendly and animal welfare certifications (Abrams et al., 2010; D'Souza et al., 2017); quality grading; and quality assurance labels (e.g., Van Trijp et al., 1997; Verbeke & Viaene, 1999).

Despite their importance, a comprehensive list of cues relevant to Australian fresh pork consumers has not been studied. Current literature either focuses on only a small number of cues, ranging from five to twenty (e.g., Argemí-Armengol et al., 2019; Grunert et al., 2015; Liu et al., 2018; Meuwissen et al., 2007), or on cues concerning one particular aspect of the product, such as traceability (e.g., Wu et al., 2016) or animal welfare (e.g., Chen et al., 2021). With hundreds of product cues relevant to fresh pork, producers need to determine which cues are most relevant to enhance competitiveness and maximise their return on investment in marketing these cues to consumers.

4.3.3 Consumer segmentation: hierarchical clustering analysis

Fresh pork is no longer treated as a commodity as there are various subgroups of consumers in the market who have differing preferences, demands and buying behaviours (Bittner et al., 2017). As a result, pork producers have been applying various segmentation strategies to characterise different unique consumer groups in order to tailor products and services that align with their diverse preferences (e.g., Wedel & Kamakura, 2000). One segmentation strategy involves factors including gender, age or education; however, sociodemographic characteristics may not be

strongly related to purchasing behaviour (e.g., Aurifeille et al., 2002). The other segmentation strategy is based on the consumer's personality or preferences (i.e., cue's importance) and provides steady, time consistent and more actionable insights; thus, it is the superior strategy (Wedel & Kamakura, 1999). For instance, Chen et al. (2010) conducted a choice experiment on pork chops in Taiwan and found that there was no significant link between the sociodemographic-based segments and choice.

There is, however, a lack of segmentation studies that have adopted the latter approach, and the current literature primarily focuses on either lifestyle (e.g., Grunert et al., 2011) or the importance of intrinsic cues (e.g., Chen et al., 2010). By segmenting consumers based on consumer preferences for cues, producers can tailor their marketing activities, such as education campaigns, labelling initiatives and pricing strategies, to increase consumer purchase intention and acquire a potentially premium return (Sultan et al., 2018).

Based on the foregoing, this study aims to answer the following questions:

RQ1*: Which intrinsic cues do Australian consumers consider when purchasing fresh pork and are there different segments in the Australian fresh pork market based on consumer use of intrinsic cues?*

RQ2*: Which extrinsic cues do Australian consumers consider when purchasing fresh pork and are there different segments in the Australian fresh pork market based on consumer use of extrinsic cues?*

4.4 Material and methods

4.4.1 Sample

A total of 196 consumers of fresh pork were recruited from February to April 2021 by means of Qualtrics based on a stratified sample in accordance with the demographical

data from the census to generate a population representing the average Australian consumer. All participants were from Australia and had purchased fresh pork at least once in the previous two weeks.

4.4.2 Survey instrument and procedure

The study aimed to determine the importance of 15 intrinsic and 31 extrinsic product cues. The study adopted a best–worst scaling experiment in an online survey to examine the importance of the cues. The survey had four main parts. Part 1 involved filtering questions (i.e., age, gender, location) to acquire a sample that reflected the average Australian population. Part 2 involved the first BWS experiment for 15 intrinsic cues, and Part 3 involved the second experiment for 31 extrinsic cues. Finally, Part 4 was comprised of general sociodemographic and consumption frequency questions.

4.4.3 Best–worst experiment

Introduced by Finn and Louviere (1992), best–worst experiments (BWS) aim to examine consumer preferences for items (Case 1), profiles (Case 2), and multi-profiles (Case 3). Participants are required to select the best (most) and worst (least) important items from a series of choices set to elicit a complete ranking for all items studied (e.g., items, levels of items and profiles; Laureiro & Dominguez Arcos, 2012). BWS help to minimise the potential bias in monadic rating methods and increase the discrimination among the importance of items (e.g., Cohen, 2003; Cohen & Orme, 2004; Jaeger et al., 2008). BWS has been widely used to study consumer preference shares for fresh pork attributes (e.g., Cummins et al., 2016; Jaeger et al., 2008; Murphy et al., 2015), pork bacon profiles (e.g., McLean et al., 2017), organic rice (Sakolwitayanon et al., 2018) and food labelling features (de-Magistris et al., 2017). Our study employed Case 1 BWS to investigate the relative importance of multiple product cues. More

specifically, the study adopted a balanced incomplete block design (BIBD) to generate our experiment to ensure no cues were over- or under-represented; therefore, the design controls for contextual effects (Lee et al., 2007; Lee et al., 2008; Massey et al., 2015). BIBD also generates choice sets with a fixed number of cues to control for 'demand effects' (Massey et al., 2015; Mori & Tsuge, 2007).

4.4.4 Development of fresh pork cues

To identify relevant cues, we adapted Sakolwitayanon et al.'s (2018) approach and conducted a four-step exploratory study.

4.4.4.1 Literature review

We reviewed the literature on pork attributes based on six databases (i.e., Google Scholars, Emerald, JSTOR, ProQuest, ScienceDirect and Wiley Online Library). A series of inclusion criteria were used: 'pork', 'attribute', 'cue' had to be mentioned in the abstract, while 'consumption', 'quality', 'perception', 'purchase', 'experience' had to be stated within the article.

4.4.4.2 Reviewing existing products

We then reviewed products sold in major Australian supermarkets (e.g., Woolworths, Coles, IGA and ALDI). We acquired a list of 95 cues relevant to fresh pork (refer to Appendix 4-1).

4.4.4.3 Pre-test to determine the importance of cues

We conducted a pre-test via Prolific to examine the importance of the cues on a 7-point Likert Scale. We acquired a total of 50 valid responses that were evenly split by gender (50% female). All respondents were from Australia and had purchased fresh pork at least once in the previous month. The importance ratings of cues are reported in Appendix 4-1.

4.4.4.4 Reducing the number of cues

In the final stage, three researchers and two industry experts reviewed the complete list of 95 cues to determine the relevancy of each one. This reduction process included merging duplicate cues (i.e., same meaning), removing technical cues (i.e., drip loss), removing non-significant cues (i.e., residual of herbicides in feed). The final list included 46 cues, which generated either 46, 69 or 138 choice sets in a BIBD design (e.g., Takeuchi, 1962). With the 46 choice-sets design, each choice set contained 10 cues, which is not appropriate for BWS (e.g., Cohen, 2009). However, the 69 choice-sets and 138 choice-sets designs would cause cognitive burdens on respondents and lower their response quality. As a result, the study was split into two parts, intrinsic cues and extrinsic cues. A total of 15 intrinsic and 31 extrinsic cues were tested (refer to Table 4-1). All chosen cues were presented to consumers in their original form as presented in the literature or on current packaging.

4.4.5 Development of BWS choice sets

With v cues, a BIBD creates b choice sets with k cues in each choice set, with b always larger than k. In BIBD, each cue appears r times and must be seen in every pair of possible comparisons. Each pair of comparisons occurs λ time, and λ must be a whole number. Additionally, each cue's r and all pairs of comparisons must appear the same number of times (at least once; Green, 1974). To create choice sets, we used Rstudio packages: *support. BWS* (Aizaki & Fogarty, 2018) and *crossdes* (Sailer, 2015) to generate a BIBD design.

The examination of intrinsic cues included 15 choice sets with seven cues in each. Each cue appeared three times across the whole experiment (see Figure 4.1). The examination of extrinsic cues generated 31 choice sets with six cues per set, and each

cue appeared six times. These choice sets were then transferred to Qualtrics to distribute online.

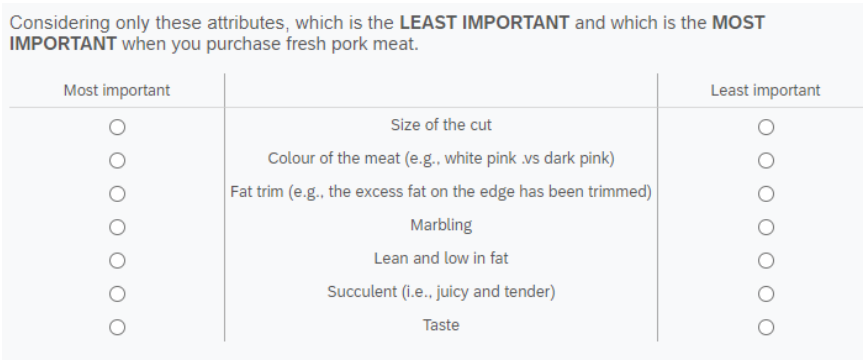

Figure 4-1: Example of a Balanced Incomplete Block Design (BIBD) Choice Set as used in Qualtrics survey.

Table 4-1: The reduced list of final fresh pork cues (to be tested).

Category	Cues
Intrinsic cues	Pork cuts (e.g., Loin .vs Belly)
	Thickness of the cut
	Size of the cut
	Colour of the meat (e.g., white pink vs dark pink)
	Colour of the fat (e.g., opaque white vs yellow)
	Fat trim (e.g., the excess fat on the edge has been trimmed)
	Marbling
	Lean and low in fat
	No smell of boar taint (e.g., without the offensive odour or taste during cooking/eating)
	Firmness
	Succulent (i.e., juicy and tender)
	Wetness (i.e., the appearance of water on the pork surface)
	Weight (NET kg)
	Taste
	Breed type (e.g., Iberico, Berkshire, Duroc, Crossbred)
Extrinsic cues	Packaging types (e.g., plastic tray .vs vacuum bag)
	Price
	The brand of the products (e.g., brand name, heritage, and story of the producers)
	Chilled vs frozen
	Infused with moisture (i.e., for extra moisture)
	Sow Stall Free
	Quality grading
	Slaughtered date
	Best before date
	Promotion (e.g., Discount)
	Nutrition information
	Satisfaction Guarantee
	Cooking and Serving tips (Hints and Tips)
	Quality assurance (e.g., Australian Pork Industry Quality Assured)
	Hormone Growth Promotant Free
	No preservatives

	No artificial additives (e.g., colour and flavour)
	Antibiotics free
	Health star rating
	No Genetically Modified Organism
	Country of origin (e.g., Australia, USA, Canada)
	Regionality (e.g., Western Australia, South Australia, NSW, VIC)
	Traceability Information (e.g., QR Code to track origin, breed type, feed, logistic, etc.)
	Type of feed (e.g., grain, grass, acorn, etc.,)
	Pigs were raised in a pristine and natural farming environment
	Pigs were organically grown/raised
	Free-range certified
	Environmentally-friendly farming practice
	Food award(s) Won
	Raised and slaughtered with high level of animal welfare and treatment (e.g., stress-free environment)
	Sustainably packed

4.5 Data analyses

4.5.1 Tests of data integrity

To test data integrity, the maximum score of one item being chosen as best or worst must be in the range of $-r \times N$ to $r \times N$. The second data integrity test was that the 'sum of best' must be equal to the 'sum of worst' and equal to $b \times n$. If the 'sum of best' was not equal to 'sum of worst', then either data was missing or the questionnaires had a faulty design. This is an additional merit of BWS over methods like rating and ranking (Massey et al., 2015). In the first best–worst experiment, $N = 196$ and $b = 15$; thus, $b \times n$ was 2,940. Referring to Table 4-2, the sum of both best and worst scores equalled 2,940, whereas the range of the scores fell within -1,372 to 1,372, therefore indicating there were no design or data processing errors and that our data integrity was ensured. Similarly, we concluded that the data integrity in the second best–worst experiment (i.e., extrinsic attributes) was also ensured (refer to Table 4-3).

4.5.2 Best–worst scaling importance score

The study calculated the aggregated B-W score (i.e., ranking) and relative importance of each attribute. Aggregated B-W score was calculated by taking the number of times that each attribute was chosen as best (TB) subtracted from the number of times the

same attribute was chosen as worst (TW). The relative importance was calculated by determining the ratio scale of each attribute following this formula: √(TB/TW). The relative importance provides more insightful information as the resulting coefficients indicate the probability nature of one attribute's importance and how important it is compared with other attributes (Cohen, 2009). Thus, this study used the relative score to describe the importance of attributes.

4.5.3 Cluster analysis

Based on the importance of the cues, the study used hierarchical and *k*-means cluster analyses to identify segments of consumers (e.g., Mueller & Rungie, 2009; Parvin et al., 2016). This process was repeated twice to determine clusters based on the importance of intrinsic and extrinsic cues. First, using the obtained ratio scale score, hierarchical cluster analysis was conducted with Ward's method (Punj & Stewart, 1983) and squared Euclidian distances (Knezevic et al., 2019) to generate a dendrogram. The dendrogram suggested the number of clusters by identifying relatively large jumps in the distance (Azabagaoglu & Gaytancioglu, 2009; Bodor et al., 2021; García-Solano et al., 2015; Tullis & Albert, 2013). Then, *k*-means cluster analysis was performed on various solutions (i.e., number of clusters) to determine the best solution. This was determined based on the least number of iterations the analysis took to achieve convergence. MANOVA was conducted on the obtained clusters to discriminate the differences among the clusters (Hair et al., 1998). Wilks' Lambda statistics were used to determine whether there was a significant difference among the clusters on preferences for product cues. A post hoc Tukey test was conducted to identify product cues that significantly characterised each cluster.

4.6 Results

4.6.1 Sociodemographic characteristics of the respondents

There were a total of 196 valid responses which were relatively balanced in gender (105 female and 91 male participants). All respondents resided in Australia and had purchased fresh pork at least once over the previous two weeks. Their ages ranged from 18 to 80 years (M = 43.24, SD = 15.66). Most respondents identified as Australian by ethnicity (75.5%) and resided in the metropolitan area (70.9%). There was a relatively balanced distribution of income, with 37.8% earned between AU$50,000–$99,999 per year. Most of the respondents were 41–60 years old (39.8%), followed by 26–40 year-olds (32.7%). Most respondents were well-educated, with 66.8% holding at least one diploma or higher.

4.6.2 Relative importance of product cues

4.6.2.1 Intrinsic cues

The aggregated BWS score indicated ‘taste’, ‘succulent’ and ‘no smell of boar taint’ as the three most important intrinsic cues with relatively similar importance (refer to Table 4-2). ‘Type of cuts’ and ‘colour of the meat’ were quite important to the consumers; however, they were much less important than ‘taste’. Conversely, ‘thickness of the cuts’, ‘firmness’, ‘wetness on the surface’, ‘marbling’ and ‘breed type’ were the least important intrinsic cues, all scoring lower than 20%, five times less important than ‘taste’.

Table 4-2: Aggregated MaxDiff score and Ratioscale score of intrinsic cues importance.

Cue	Best	Worst	Aggregated score	Ratio score	Relative importance	SD
Taste	546	8	538	2.03	100.00	1.18
Succulent	505	19	486	1.93	94.89	1.16
No smell of boar taint	498	117	381	1.66	81.81	1.47

Type of cuts	321	131	190	1.25	61.73	1.22
Colour of the meat	193	81	112	0.88	43.16	1.06
Leanness	207	142	65	0.88	43.10	1.13
Excess fat was trimmed	135	200	-65	0.65	32.01	0.90
Size of the cuts	122	252	-130	0.55	27.18	0.86
Colour of the fat	91	164	-73	0.41	19.98	0.84
Weight	81	346	-265	0.35	17.36	0.78
Thickness of the cuts	65	180	-115	0.35	17.35	0.68
Firmness	52	88	-36	0.28	13.69	0.64
Wetness on the surface	57	216	-159	0.26	12.99	0.59
Marbling	31	259	-228	0.15	7.60	0.50
Breed type	36	737	-701	0.15	7.27	0.45
Sum	2940	2940	0			

4.6.2.2 Extrinsic cues

The aggregated BWS illustrated that 'animal welfare', 'country of origin', 'no artificial additives', 'no hormone growth promotants' and 'price' were the five most important extrinsic cues, with relatively similar importance (refer to Table 4-3). Conversely, 'cooking and serving tips', 'packaging types', 'food awards', 'extra moisture infusion' and 'traceability' were the five least important extrinsic cues, all scoring below 20%.

Table 4-3: Aggregated MaxDiff score and Ratioscale score of extrinsic cues importance.

Cue	**Best**	**Worst**	**Aggregated score**	**Ratio score**	**Relative importance**	**SD**
Animal welfare	432	96	336	1.60	100.00	1.31
Country of origin	425	126	299	1.58	99.23	1.29
No additives	332	60	272	1.47	92.31	1.03
Price	387	188	199	1.38	86.56	1.35
No hormone growth promotant	321	76	245	1.33	83.58	1.19
Natural farming environment	276	78	198	1.21	75.75	1.09
Best before date	295	100	195	1.18	73.71	1.25
No antibiotics	272	88	184	1.15	71.87	1.18
Quality grading	238	51	187	1.11	69.19	1.03
Quality assurance	240	76	164	1.10	69.10	1.06
Organic certified	219	100	119	1.04	65.40	0.98
No preservatives	231	78	153	1.04	65.32	1.06
Environmentally friendly farming	222	78	144	1.02	63.57	1.07
Free range certified	208	70	138	0.98	61.26	1.02
Promotion	232	287	-55	0.88	54.81	1.23
Satisfaction guarantee	178	146	32	0.80	49.99	1.03
Chill vs. Frozen	186	245	-59	0.74	46.26	1.09

No GMO	149	106	43	0.68	42.82	0.98
Sow stall free	155	152	3	0.67	42.15	1.02
Health star rating	149	205	-56	0.67	42.07	0.96
Regionality	150	246	-96	0.63	39.68	0.98
Nutrition information	128	205	-77	0.61	38.10	0.88
Type of feed (e.g., grain, grass, acorn)	115	203	-88	0.52	32.75	0.87
Brand	106	310	-204	0.45	28.38	0.81
Traceability information	102	341	-239	0.44	27.84	0.80
Slaughtered date	77	294	-217	0.38	23.70	0.77
Sustainable packaging	62	204	-142	0.31	19.37	0.66
Cooking tips	60	559	-499	0.26	16.17	0.68
Packaging types	49	490	-441	0.23	14.60	0.52
Extra moisture infused	38	309	-271	0.19	12.16	0.52
Food award	42	509	-467	0.18	11.31	0.55
Sum	6076	6076	0			

4.6.3 Clustering results

4.6.3.1 Intrinsic cues

Hierarchical clustering results indicated that a four-cluster solution was the most acceptable based on the dendrogram. Then, *k*-means cluster analysis confirmed that the four-cluster solution was appropriate, with the least number of iterations required to reach convergence. The Wilk's lambda value (.045) with an F-ratio giving a p-value of less than .001 confirmed that the clusters differed significantly in their preferences concerning fresh pork intrinsic cues.

The results indicated four distinct consumer segments. *Lean meat eater* (N = 53) significantly emphasised the importance of 'leanness' and 'excess fat was trimmed'. *Colour lovers* (N = 22) were characterised by 'no smell of boar taint', 'colour of the meat' and 'colour of the fat'. The other two segments were *boar taint hater* (N = 61) and *cut and size matter* (N = 60), who were significantly characterised by 'no smell of boar taint' and 'type of cuts' cues, respectively. The results of the cluster analyses for intrinsic cues are presented in Table 4-4.

Table 4-4: Cluster analysis of fresh pork intrinsic informational cues described by relative importance score

Cue	Lean meat eater (N = 53)	Colour lover (N = 22)	Boar taint hater (N = 61)	Cut & size matter (N = 60)
Breed type	15.89	4.10	1.55	4.22
Size of the cuts	17.12	4.82	6.17	**51.12**
Colour of the fat	17.84	**54.34**	5.98	8.32
Excess fat was trimmed	**81.07**	6.14	10.36	11.82
Firmness	20.82	2.05	5.58	14.09
Leanness	**100.00**	27.36	19.18	7.48
Marbling	13.05	4.10	0.57	8.34
Colour of the meat	28.79	**64.41**	21.94	39.14
No smell of boar taint	65.79	**100.00**	**100.00**	7.15
Type of cuts	29.72	21.64	48.21	**77.32**
Succulent	84.35	19.93	**79.60**	90.34
Taste	77.09	41.04	**79.22**	**100.00**
Thickness of the cuts	10.11	2.05	6.73	**30.41**
Weight	19.22	7.59	7.48	20.28
Wetness on the surface	12.52	20.13	9.74	4.89

Notes: Product cues that significantly characterised the cluster was bolded (Tukey test, sig. < .05).

4.6.3.2 Extrinsic cues

For the extrinsic cues, hierarchical and k-means cluster analyses also identified a four-cluster solution. The MANOVA revealed a Wilk's lambda value (.029) with an F-ratio giving a p-value of less than .001, confirming that the clusters were significantly different in their preferences for extrinsic cues. The results indicated four distinct consumer segments. *Utilitarian buyers* (N = 78) emphasised the utility of their purchase, whereas *animal and environment lovers* (N = 28) emphasised 'animal welfare' or 'environmentally friendly farming'. *Naturalness lovers* (N = 29) preferred 'natural' cues such as 'no antibiotics' or 'no HGP'. The last segment were the *demanding buyers* (N = 61), characterised by a significantly higher importance of a wide range of attributes, including 'animal welfare', 'pristine and natural farming environment', 'no HGP' and 'environmentally friendly farming' (refer to Table 4-5).

Table 4-5: Cluster analysis of fresh pork extrinsic informational cues described by relative importance score

Cue	Utilitarian buyers (N = 78)	Animal & environment lovers (N = 28)	Naturalness lover (N = 29)	Demanding buyer (N = 61)
Animal welfare	32.23	**100.00**	31.41	**100.00**
No antibiotics	28.11	26.65	**100.00**	**47.22**
Quality assurance (e.g., APIQ)	38.31	70.11	27.58	47.59
Best before date	**82.24**	8.66	19.59	29.87
Brand	14.13	**56.62**	22.53	6.90
Chill vs. Frozen	**47.12**	7.35	32.98	14.10
Country of origin	57.42	46.99	**89.73**	61.65
Cooking tips	20.28	15.78	0.67	0.84
Environmentally-friendly farming	22.70	**79.74**	9.82	**59.98**
Feed types	7.36	**64.51**	26.18	18.53
Food awards	14.10	12.40	0.00	0.42
Free range certified	30.27	35.60	32.84	51.82
Health star rating	34.36	44.25	7.22	19.93
No hormone growth promotants	32.76	23.72	**89.04**	**69.43**
Moisture infused	9.78	11.53	7.54	3.94
Pristine and natural farming environment	25.58	**78.53**	26.86	**72.11**
No GMO	18.19	11.39	**81.35**	18.32
No additives	53.93	31.52	**99.56**	53.78
No preservatives	37.90	38.95	**87.17**	25.23
Nutrition information	**33.23**	**50.21**	6.48	12.16
Organic certified	26.12	55.56	28.35	**59.47**
Packaging types	9.76	**27.61**	4.55	4.32
Price	**100.00**	66.03	34.44	6.94
Promotion	**70.16**	43.09	5.53	3.27
Quality grading	52.90	**83.10**	20.46	29.60
Regionality	26.72	44.27	29.04	14.62
Satisfaction guarantee cue	**46.22**	**56.83**	12.32	14.32
Slaughtered date	23.64	3.68	5.33	12.98
Sow stall free	13.81	24.42	32.51	39.40
Sustainably packaged	11.75	20.86	10.81	10.40
Traceability	7.49	45.33	10.16	22.94

Notes: Product cues that significantly characterised the cluster was bolded (Tukey test, sig. < .05).

4.6.4 Sociodemographic characteristics across clusters

4.6.4.1 Intrinsic cues

No significant differences between the four clusters were found with regard to their sociodemographic characteristics, except for income, living location and education. *Lean meat eaters* had significantly higher incomes and educational levels than other segments (refer to Appendix 4-2). In addition, the majority of *lean meat eaters, colour lovers and boar taint haters* lived in metropolitan areas (refer to Appendix 4-2).

4.6.4.2 Extrinsic cues

There were no significant differences between the four segments with regard to their sociodemographic characteristics. Only gender, education and purchase frequency were found to be significantly different among the four segments. Specifically, *demanding buyer*s had a significantly higher proportion of females than did the other segments, while *animal and environment lovers* were the most highly educated segment. Lastly, *animal and environment lovers* had a significantly higher purchase frequency of fresh pork than other segments (refer to Appendix 4-3).

4.7 Discussion and Implications

Improving the quality of fresh pork meat and the industry's competitiveness have been the major focus areas of the Australian pork industry in the past decade. Significant efforts have been made by Pork CRC and APL to improve the consistency of high-quality meat through optimising feed intake (e.g., Muller & Roura, 2021), ensuring food safety (Chinivasagam, 2019) and increasing chiller efficiency (e.g., Hewitt, 2021). In line with these areas of focus, this study investigated 15 intrinsic and 31 extrinsic cues, including search, credence and experience attributes that are inherent to consumer judgements of fresh pork. We extended previous findings and offered

more granular insights with respect to the current demands in the Australian pork market.

Our study empirically shows that consumers highly value ‘‘taste’ and ‘succulence (i.e., juiciness and tenderness)’, which is in agreement with prior studies on Australian consumer perspectives (e.g., Channon et al., 2017; Channon et al., 2018). While the results are not surprising, it suggests that consumers use experience attributes to infer product quality. This challenges the conventional perspective that experience quality cannot be assessed prior to consumption (Oude Ophuis & Van Trijp, 1995) and is inferred from search or credence attributes (e.g., Grunert, 2002; Grunert et al., 2004; Verbeke et al., 2010). We found that consumers were less likely to use search cues, such as meat colour, fat colour, marbling or firmness cues, to judge fresh pork. Our study suggests that experience cues may have stronger predictive value for consumer judgements of fresh pork than search or credence cues. Supporting this notion, Turnwald et al. (2019) found that taste-focused labels, such as ‘mouth-watering’ or ‘juicy’ increased vegetable intake by 29% and 14% compared with health-focused labels and basic labels, respectively. By explicitly communicating experience cues, fresh pork producers could positively influence consumer behavioural intentions. This warrants further investigation to determine how to more effectively communicate experience cues.

In considering the future strategic focus for the Australian pork industry, eating quality remains a significant determinant of consumer preference (e.g., APL, 2020; Channon et al., 2017; Channon et al., 2018; D’Souza et al., 2017; Stollznow, 2008). Our findings support this and also indicate that consumers seek quality grading and assurance (e.g., APIQ assurance). The study confirms a promising avenue to develop an industry-wide grading model to predict the eating quality of fresh pork (e.g., Channon et al., 2018;

D'Souza et al., 2017). Given the positive impact of Meat Standard Australia beef grading on consumer acceptance and willingness to pay a premium (e.g., D'Souza et al., 2017; Lyford et al., 2010), the fresh pork industry could benefit from developing similar quality guidance to support consumer's decision-making processes.

Apart from taste and succulence, the smell of boar taint was a major factor that negatively affected eating quality, aligning with prior studies (e.g., Font-i-Furnols, 2012; Miller, 2020). In recognition of this issue, Australian fresh pork producers have adopted production methods, such as immunological castration (i.e., GnRF vaccination), as a preventive method to reduce boar taint and improve eating quality. As a result, more than 60% of the pigs in Australia are immunologically castrated (The Pig Site, 2019). Other preventive and non-invasive production methods have been reported to remove boar taint which have animal welfare co-benefits such as maintaining clean pens and selective breeding (e.g., Squires et al., 2020). Our review of the existing products sold in Australia found that 'no smell of boar taint' was not being used by brands in their marketing collateral (i.e., brochures and in-store displays). One possible explanation is that Australian pork producers have a concern that mentioning 'boar taint' on packaging may negatively influence consumer perceptions. Alternatively, the pork producers could emphasise a positive aspect, such as 'great flavour and tender meat', to avoid turning consumers away.

Our findings demonstrate that naturalness and animal welfare are the most important extrinsic cues for Australian consumers. Extrinsic cues, such as 'raised and slaughtered with a high level of animal welfare', 'no artificial additives' and 'no hormone growth promotants', were in the top five most important cues in the study. This is the first report demonstrating that concerns for animal welfare and naturalness are of relatively similar importance to Australian consumers. This study is consistent with prior studies

that have described growing concerns about animal welfare and naturalness (e.g., D'Souza et al., 2017), the pork industry (APL, 2020) and consumer reports (e.g., Futureye, 2018; Reeves, 2022). Taken altogether, this study emphasises the need to balance future marketing strategies between high animal welfare standards, enhancing eating quality and maintaining a high level of naturalness.

Price was the fourth most important extrinsic cue in our study, suggesting that Australian consumers are concerned about the cost of fresh pork when making a purchase decision. As Australian pork producers are actively promoting higher animal welfare and naturalness standards, the cost of production is likely to increase (APL, 2020) and, therefore, create a potential barrier to consumption (Miele, 2010; Thorslund et al., 2016). However, our results also suggest that value-added elements, such as animal welfare and naturalness, are more important than price, indicating that Australian consumers may be willing to pay more for animal welfare and naturalness. The literature supports our findings (e.g., Clark et al., 2017; Denver et al., 2017; D'Souza et al., 2017). Thus, we recommend that the Australian pork industry focus on communicating and educating their consumers on the high levels of animal welfare and the minimal use of additives (e.g., metabolic modifiers) used in current practice. This approach allows Australian pork producers to enhance their product's favourability and command a premium.

Our results also demonstrate that there are opportunities to improve the communication of animal welfare and naturalness. Specifically, product cues may have different effects on consumer judgements, even if they communicate similar messages. For instance, 'raised and slaughtered with a high level of animal welfare and treatment' or 'free-range certified' was more impactful than 'sow stall free'. Prior studies have also supported this notion that 'sow stall free', an industry-wide standard in Australia,

does not command a higher price (D'Souza et al., 2017). With respect to naturalness, consumers preferred 'no antibiotics', 'no additives' and 'no preservatives' over 'organic certified'. Our results show that consumers typically use easy-to-process cues in their food purchases, which is in line with current literature (e.g., Steenkamp, 1990). Therefore, concrete and easy-to-interpret cues may have a stronger affect than abstract and jargonistic cues. It must also be noted that not every action concerning animal welfare will enhance favourability, as shown in the case of 'sow stall free'. Therefore, communicating the right aspects of animal welfare are more likely to elicit positive consumer sentiments and be more financially successful.

There are multiple emerging food technologies, such as shock-wave treatments, metabolic modifiers and moisture infusion, to enhance the eating quality of red meat (i.e., tenderness; e.g., Warner et al., 2016). Although these methods are used to deliver consistent, high-quality meat, they may elicit negative perceptions from consumers (e.g., D'Souza et al., 2017; Dunshea et al., 2016). Our study indirectly supports this notion as we found 'extra moisture infused' was the second-worst cue while naturalness (i.e., 'no artificial additives' or 'no HGP') was highly valued. From a pre-farm-gate perspective, pork producers may consider utilising other strategies, with support from their specialist pig nutritionist, including diet alteration (i.e., reducing energy content) and feed additives (i.e., phytogenic feed additives) to achieve desired carcass specifications while maintaining a high level of naturalness.

Country of origin, not surprisingly, was the second most important extrinsic cue, suggesting that Australian consumers trust and prefer domestic fresh pork. This sentiment reflects a strong nationalism sentiment which benefits Australian pork producers (APL, 2010, 2020) and further emphasises the significance of the 'Product of Australian' trademark (e.g., D' Souza et al., 2017). Although all fresh pork

consumed in Australia is raised and produced in Australia, imported pork products (i.e., bacon and ham) have accounted on average for 46% of the share of domestic pork consumption per annum over the last decade (APL, 2021). These imported pork products are often sold at lower price points due to their lower cost of production (APL, 2021). Therefore, the 'Product of Australian' trademark can be used to differentiate locally produced pork products from overseas competitors, offering Australian producers a strong domestic competitive advantage despite higher price points.

Our study also found that consumers did not highly value certifications, such as *free-range certified, sow stall free, organic certified and health star ratings*. One potential explanation is that consumers do not fully understand or trust these certifications. In fact, prior studies have shown that consumers have low trust toward certifications due to a high level of distrust of the food industry (e.g., Conroy & Lang, 2021). This lack of trust has also been observed among consumers towards the Australian Health Star Rating, which has been attributed to a lack of transparency (e.g., Pelly et al., 2020). The evidence suggests an urgent need to increase the transparency of the abovementioned certifications to clearly explain the value propositions and assurance provided by these certifications.

The current study is the first exploratory study to look at Australian fresh pork consumer segments based on the importance of both intrinsic and extrinsic cues. Prior segmentation studies have only focused on consumer lifestyle and consumption frequency (e.g., Olsen et al., 2011) or the importance of intrinsic cues (e.g., Chen et al., 2010). Our study found four distinct segments of intrinsic attributes: *boar taint hater, colour lover, lean meat eater* and *cuts and size matter*; and four segments for extrinsic attributes: *utilitarian, demanding, natural and animal-lovers* consumers. Although the dynamicity and heterogeneity of consumer demands have been agreed

upon at both industry and academic levels, there has been a limited effort to translate these differences into specifications for pork producers to implement to achieve a competitive advantage (Grunert et al., 2011). We demonstrated the robustness of combining conjoint experiments (i.e., BWS) and cluster analyses to delineate different typologies of consumers. These insights can help the industry develop future marketing strategies with a more targeted audience.

This study is not without its limitations. First, the study employed a small sample size; thus, the results may not be statistically representative to a broader population. A larger sample is required for reliable and robust results. Second, the absence of some cues may affect the study results. For instance, Grunert et al. (2002) indicated that 'no pesticide residues in feed' was the most important extrinsic pork cue in Germany and Argemí-Armengol et al. (2019) found 'slaughter method' to be important for highly involved shoppers. Therefore, future studies should consider the inclusion of more cues to acquire a more extensive comparison of cues. Finally, our research design did not allow us to capture the perceived importance of different levels of each cue (e.g., low vs. high animal welfare standards). We were also not able to estimate the impact of each cue on consumer willingness to pay. Thus, future studies could apply other methods (e.g., discrete choice experiments, BWS case 2 and 3) to identify the optimal level of each cue and its impact on willingness to pay.

5 CHAPTER 5: PAPER 4 – REVIEW: A SYSTEMATIC REVIEW AND COMMENTARY ON CONSUMER PERSPECTIVES TOWARDS ANIMAL WELFARE OF MEAT PRODUCTS

5.1 Preface: Information Asymmetry and Intention–Behaviour in the Animal Welfare Market

Chapter 4 demonstrated that animal welfare was a major factor determining consumer decision making related to fresh pork (i.e., commodity stream). Chapter 5 builds on this finding, seeking to extend the knowledge of how to effectively communicate animal welfare practices. This Chapter started with a narrative review of the extant literature on different communication methods and how they affect consumers' attitudinal and behavioural responses. The narrative review raised a question regarding the effectiveness of animal welfare claims on consumers' actual buying behaviour. Past research and industry reports suggest that even though consumers often exhibit favourable behavioural intentions towards meat products with animal welfare claims, this does not translate to actual consumption.

This observed intention–behaviour gap may be influenced by the existence of information asymmetry in the food supply chain. As consumers are increasingly dissociated from the food supply chain, they may not view a certain animal welfare practice (e.g., farrowing crate) in the same way as the producers. Specifically, in Paper 3, the thesis indicates that Australian consumers did not highly value 'sow-stall free' (which has been designed to provide a more stress-free environment), despite the fact that 'raised and slaughtered with a high level of animal welfare and treatment (e.g., stress-free environment)' ranked first in the importance ranking. A possible explanation was that consumers might not fully understand the impact of "sow-stall free" and overlooked such an improvement made by the producers. This premise

highlights the opportunity for further research into the practices that constitute animal welfare from the consumer's point of view. Furthermore, it is critical to investigate the potential causes behind the intention–behaviour gap and the identification of possible solutions to overcome such a significant barrier to more socially sustainable consumption.

The narrative reviews showed many mixed or contradictory findings regarding the effects of various animal welfare practices. As a result, the thesis synthesises the literature on such matters to determine what animal welfare practices have been empirically shown to have a positive and consistent effect on consumer responses. By conducting a systematic literature review covering a 20-year period (2002–2022), Chapter 5 gathers empirical results regarding the effectiveness of different animal welfare practices and communication strategies. The results highlight the misalignment in the definition of animal welfare between consumers and producers as the main cause of the intention–behaviour gap in the animal welfare market. The results also illustrate that consumers often face internal conflicts between their self-interest (i.e., price, quality and safety) and animal wellbeing. These conflicts often result in consumer reluctance to buy welfare-improved meat.

The manuscript reporting this research is currently under-review at the Current Opinion in Food Science:

Duong, C., Sung, B., Lee, S., & Easton, J. (under review). The Intention-Behaviour Gap in Animal Welfare: A Consumer Perspective. *Current Opinion in Food Science (SJR Q1)*

5.2 Introduction

Animal welfare is one of the contentious issues among multiple stakeholders in the food supply chain (e.g., policymakers, academics, businesses, NGOs, producers and citizens (Golob & Kronegger, 2019). This growing concern has fuelled a global push for improved animal welfare in the livestock industry (Clark et al., 2016; Cornish et al., 2016; Martelli, 2009). Consumers actively seek meat products, including pork, chicken and beef, with welfare-related claims such as outdoor access, free range and organic (e.g., Alonso et al., 2020). Although many stakeholders suggest that communicating animal welfare practices could allow meat producers to gain a strong competitive advantage and command a premium price for their products, prior evidence suggests otherwise. Past research also establishes that consumers are only willing to pay a small price premium for animal welfare products (Clark et al., 2017). This phenomenon is coined as the intention-behaviour gap, where consumers exhibit high interest but opt not to choose improved welfare meat over conventional ones (e.g., Akaichi & Revoredo-Giha, 2016; Miele, 2010; Vanhonacker et al., 2010).

Against this backdrop, this opinion review aims to examine the effectiveness of different improved animal welfare practices in enhancing consumers' attitudinal responses and behavioural intentions in purchasing meat products. Following a systematic literature review protocol proposed by Petticrew & Roberts (2008), articles published in different disciplines and for different consumer populations were synthesised (see details in Appendix 5).

This review covered a 20-year period (2002 – 2022) and identified 59 peer-reviewed animal welfare-related articles that attempted to empirically examine consumers' attitudinal responses and behavioural intentions toward various animal welfare practices. From 59 articles, we systematically coded 79 individual studies, which

included a total of 58,789 respondents (mean = 744, Min = 50, Max = 6,378). Our thematic analysis identified eight major animal welfare domains repeatedly mentioned in prior studies: (a) production; (b) housing and living conditions; (c) solutions to avoid or reduce pain from surgery; (d) feed; (e) transportation; (f) breed; (g) hormones and antibiotics; and (h) slaughtering (refer to Table 5-1). Drawing from the review, we identified a number of key issues preventing consumers from buying improved-welfare meat. This opinion review will clarify the issues and propose potential solutions to address the intention–behaviour gaps.

5.3 Animal welfare from a consumer perspective – a knowledge gap

There is a lack of direct empirical comparison of animal welfare practices to demonstrate what consumers perceive as important. Only one article (out of 59) attempted to carry out such comparisons. For instance, Winkel et al. (2020) quantitively compared 33 different animal welfare practices and found that human-animal interaction (i.e., animal-friendly interaction, well-trained staff and regular monitoring) was perceived by consumers as the most important animal welfare domain. Meanwhile, Vanhonacker et al. (2008) and Prickett et al. (2010) both found that Belgian and U.S. consumers often associate improved animal welfare with biological functioning (e.g., feed, water and medical treatment were readily available). Our systematic literature review, however, shows that 'human-animal interaction' and 'biological functioning' received little attention in the existing literature on consumers' perspectives (see Table 5-1). Instead, scholars focused on the impact of production systems, housing and living conditions, and surgical practices (i.e., organic, outdoor housing and castration were studied extensively).

Given the limited evidence of the actual importance ranking of animal welfare domains, it remains unclear which should be prioritised from the consumers' perspectives (see Coleman et al., 2022). This finding indicates that there could be benefit from more extensive empirical research on consumers' views and perceptions of 'human-animal interaction', 'animal health' and 'availability of feed and water'. Such research could offer valuable insights into consumers' perceptions of these domains in comparison to existing studies (i.e., production systems, housing and living conditions) and inform the livestock industry's engagement with consumers.

Table 5-1: Overview of animal welfare practices and their effect on consumers' attitudinal and behavioural responses

Domain	Practices	N	% null	% positive	% conflicting	% negative
Production systems (n = 32)	Raised in organic system	19	5	95	0	0
	Raised in free range system	7	0	100	0	0
	Raised on pasture	5	0	100	0	0
	Raised crate-free	4	0	100	0	0
	Raised in group pens	3	33	67	0	0
	Raised stall-free	3	0	100	0	0
	Raised in barn	2	0	100	0	0
	Raised in extensive farming	2	0	100	0	0
	Raised in deep litter	1	100	0	0	0
	Raised in hoop system	1	100	0	0	0
	Raised in enriched cage	1	0	100	0	0
	Raised in grazing system	1	0	100	0	0
	Raised artificially – lamb are reared without a ewe	1	0	0	0	100
	Raised with ewe – lamb are reared with a ewe	1	0	100	0	0
Housing and living conditions (n = 27)	Allow outdoor access	20	5	95	0	0
	Provide straw bedding	9	33	67	0	0
	Reduce group size (number of animals per farm)	8	0	100	0	0
	Reduce farm density (space allowed per animal)	8	0	100	0	0
	Animals live on slatted floor (allow better drainage and hygiene)	6	0	0	0	100
	Animals (chicken) live on litter floor (e.g., husk, saw dust, ground nut hulls)	4	0	100	0	0
	Allow animals to run free indoors	3	33	67	0	0
	Provide greenery indoors	2	0	100	0	0

	Provide animals with access to manipulable materials	2	0	100	0	0
	Provide natural day-light cycle indoors	2	0	100	0	0
	Provide sand bedding	2	0	100	0	0
	Reduce mortality rate	2	0	100	0	0
	Avoid mixing of unfamiliar aniamals (pigs)	2	0	100	0	0
	Animals are regularly monitored by farmers	2	0	100	0	0
	Reduce fencing on farm	1	0	100	0	0
	Provide perches	1	0	100	0	0
	Live outdoor with access to shelters	1	0	100	0	0
	Raised in a small farm	1	0	100	0	0
	Provide better climate indoors	1	0	100	0	0
	Provide windows indoors	1	0	100	0	0
	Animals have access to various functional areas	1	0	100	0	0
	Animals are able to wallow (pigs)	1	0	100	0	0
	Animals have access to roughage	1	0	100	0	0
	Animals are allowed to drink from open water source	1	0	100	0	0
	Animals are allowed to interact with each other	1	0	100	0	0
	Animals are monitored by well-trained staff	1	0	100	0	0
Solutions to avoid or reduce pain in surgical procedure (n = 22)	Castration – none	15	33	40	0	27
	Castration – Surgery with pain relief	13	46	54	0	0
	Castration – immunocastration	8	0	100	0	0
	Castration – not needed (female pigs)	6	67	33	0	0
	Castration – fattening of pigs instead of castration (to remove boar taint)	1	0	100	0	0
	Tail docking – none (reduce biting via other methods)	1	0	100	0	0
	Tail docking – none but tail bitting could occur	1	0	0	0	100
	Tail docking – none	1	0	100	0	0
	Grinding canines – none	1	0	100	0	0
Feeding (n = 16)	Fed with GMO-free feed	10	0	100	0	0
	Fed with feed made directly on farm	2	0	100	0	0
	Fed with feed sourced from local region	2	0	100	0	0
	Fed with no microbial contaminated feed	2	0	100	0	0
	Fed with grass (grass-fed)	2	0	100	0	0
	Fed with feed supplemented with natural herbs	1	0	100	0	0
	Fed with organically produced feed	1	0	100	0	0

Transportation (n = 15)	Mobile abattoir – butchers come to animals (no live animals transportation)	7	43	43	0	14
	Transportation – limited time	3	33	67	0	0
	Transported by certified service providers	3	0	67	33	0
	Transportation – limited distance	2	100	0	0	0
	Transportation – limited	2	100	0	0	0
	Animals are not fixated during transportation (only at delivery)	1	0	100	0	0
Breed (n = 12)	Slow growth breed	9	0	100	0	0
	Type of breed	2	50	50	0	0
	Gene-editing to remove board taint	1	0	100	0	0
Hormones & antibiotics (n = 13)	Raised without antibiotics	11	0	100	0	0
	Raised without growth hormones	5	0	100	0	0
Slaughtering (n = 4)	Stunned with CO_2 gas before slaughtered	3	0	100	0	0
	Slaughtered humanely	1	0	100	0	0

Note:
N – number of studies examining the corresponding practices.
%null – the proportion of studies reported that animal welfare practices have no effect on consumers' attitudinal and behavioural responses.
%positive – the proportion of studies reported that animal welfare practices have a positive effect on consumers' attitudinal and behavioural responses.
%conflicting – the proportion of studies reported conflicting results on the effect of animal welfare on consumers' attitudinal and behavioural responses.
%negative – the proportion of studies indicated that animal welfare practices have a negative effect on consumers' attitudinal and behavioural responses.

5.4 Animal welfare from a consumer perspective

Animal welfare is multidimensional and complex, as there is no universally accepted definition or standard of animal welfare (Cornish et al., 2016). In fact, there are at least eight major domains with 69 individual higher-welfare practices (refer to Table 5-1). Additionally, multiple stakeholders are involved in the supply chain and consumption of livestock products (e.g., Degeling & Johnson, 2015). Each stakeholder may define and perceive animal welfare differently (e.g., Vanhonacker et al., 2008). From a consumer's perspective, we found a specific pattern emerging from the past 20 years of research. Specifically, 15 practices have been repeatedly (n > 2) shown to have positive effects (>90% consistent results across studies; see Table 5-2). Among these

15 practices, the research found that consumers predominantly exhibited positive responses toward outdoor access (n = 20), organic production (n = 19), antibiotic-free (n = 11), GMO-free feed (n = 10), slow-growth breed (n = 9), smaller group size (n = 8) and stocking density (n = 8). This suggests consumers highly associate good animal welfare with traditional and natural husbandry practices (Vapnek & Chapman, 2010).

Such ample evidence indicates that consumers ideally believe that animals should be allowed to lead 'normal lives' and behave naturally, such as grazing, social interaction and being free from intensive human intervention (e.g., Clark et al., 2016; Hötzel et al., 2017; Lassen et al., 2006). Additionally, we found that these practices to be the most desirable welfare-related practices and often command the highest premium (e.g., Carlsson et al., 2005; Norwood & Lusk, 2011; Risius & Hamm, 2017). Thus, by adopting the aforementioned husbandry practices and communicating them clearly, producers could enhance the consumers' attitudinal responses and willingness to pay for their products.

Table 5-2: Overview of animal welfare practices that have been constantly shown to have positive effects on consumers' attitudinal and behavioural responses

Domains	Practices	N	%positive
Production systems	Raised in organic system	19	95
	Raised in free range system	7	100
	Raised on pasture	5	100
	Raised crate-free	4	100
	Raised stall-free	3	100
Housing and living conditions	Allow outdoor access	20	95
	Reduce group size (number of animal per farm)	8	100
	Reduce farm density (space allowed per animal)	8	100
	Animals (chicken) live on litter floor (e.g., husk, saw dust, ground nut hulls)	4	100
Breed	Slow growth breed	9	100
Feeding	Fed with GMO-free feed	10	100
Hormones & antibiotics	Raised without antibiotics	11	100
	Raised without growth hormones	5	100
Solutions to avoid or reduce pain in surgical procedure	Castration - immunocastration	8	100
Slaughtering	Stunned with CO2 gas before slaughtered	3	100

Note:
N – number of studies examining the corresponding practices.
%null – the proportion of studies reported that animal welfare practices have no effect on consumers' attitudinal and behavioural responses.
%positive – the proportion of studies reported that animal welfare practices have a positive effect on consumers' attitudinal and behavioural responses.

5.5 Aligning with consumers' definition of animal welfare: The challenges

5.5.1 Consumers vs. producers: Misaligned definition of welfare

While consumers may define animal welfare as allowing animals to lead 'normal lives' and behave naturally, other stakeholders do not necessarily share this view. This is because allowing natural animal behaviour may expose them to bacteria, viruses, parasites and injuries, negatively impacting animal health and survival rates (e.g., Bonnefous et al., 2022). As a result, the producers may need to rely on antibiotics or other alternatives, such as probiotics and prebiotics-supplemented feed, improved biosecurity, and vaccines. However, these improvements may significantly increase production costs. Thus, appeasing consumers' definition of animal welfare may not be feasible and economically wise for the producers.

Our review, therefore, suggests that consumers and producers have different definitions of animal welfare, and the industry's efforts to improve animal welfare standards may not be sufficient to positively affect consumers' responses. As a result, the industry's efforts are often overlooked and not highly valued by consumers. This prompts an urgent need to align what animal welfare objectively constitutes and what consumers subjectively believe is important for animal welfare. A possible solution for this is to bridge the gap between the two communities regarding their definition of animal welfare. Consumers could be better informed regarding the impact of welfare-related practices adopted by the farming community. Dialogue between various stakeholders (e.g., researchers, producers, policymakers and consumers) could provide a strong foundation to give clarity to the definition of animal welfare. Additionally, programmes aimed towards raising consumers' awareness and knowledge concerning different domains and practices in animal welfare could enable a common ground between the producers and consumers. These programmes could also change consumers' tendency to associate animal welfare with 'natural' husbandry (Vapnek & Chapman, 2010).

5.5.2 Consumers' misconceptions of animal welfare practices

Our review indicates that consumers' attitudinal and behavioural responses toward animal welfare may not be driven by factors truly beneficial for the animals due to the lack of objective knowledge (e.g., Coleman et al., 2022; Malek et al., 2017). For instance, slatted floors (i.e., parallel slats floors indoors) could improve animal welfare as they allow better drainage and reduce the risk of infection (e.g., Delsart et al., 2020; Graunke et al., 2011). However, the present review showed that consumers responded negatively to this practice (refer to Table 5-3) because they perceive that it causes

discomfort to the pigs and associate it with industrial, intensive and confined livestock husbandry.

Furthermore, numerous studies also report that improved welfare practices in transportation had minimal effect on consumers' attitudinal and behavioural responses (see Table 5-3). For instance, limited distance (Grunert et al., 2018), less transportation (Liljenstolpe, 2008, 2011) and mobile abattoir (Carlsson et al., 2007) did not heighten consumers' willingness to pay for the improved-welfare meat. These findings are surprising as past studies indicate that longer duration and distance of transport often cause stress and reduce animal health post-transport (e.g., Schuetze et al., 2017). Lagerkvist and Hess (2011) offered a possible explanation that consumers are not willing to pay a premium for welfare-friendly practices that they consider to be the minimum standard and should be legally enforced. This could be the case for transportation, where consumers perceive that the practices should be legally enforced, and therefore, they may not be willing to pay a premium for such improvements.

Such evidence confirms that consumers may have distorted perceptions of animal welfare standards due to their lack of objective knowledge of animal production systems. A practice with objective benefits for animal welfare may not produce desirable marketing outcomes if consumers do not perceive that practice positively. Furthermore, for a welfare-related practice to produce desirable outcomes, consumers must perceive an actual increase in animal well-being compared to their minimum or expected standard. This evidence offers a clear direction for future research. There could be value in extending the industry's understanding of consumers' perceptions toward various animal welfare practices. Research should examine the minimum acceptable level of welfare standards from the consumers' perspective. Such insights would help to mitigate the likelihood of market failure, where the producers'

implementations of animal welfare practices fail to meet consumers' expected standards.

Table 5-3: Overview of animal welfare practices that have been shown to have null or negative effects on consumers' attitudinal and behavioural responses

Domains	Practices	N	% null	% conflicting results	% negative
Production systems	Raised in group pens	3	33	0	0
	Raised in deep litter	1	100	0	0
	Raised in hoop systems	1	100	0	0
	Raised artificially – lambs are reared without a ewe	1	0	0	100
Housing and living conditions	Animals live on slatted floors (allow better drainage and hygiene)	6	0	0	100
	Allow animals to run free indoors	3	33	0	0
	Provide straw bedding	9	33	0	0
Solutions to avoid or reduce pain in surgical procedures	Castration – none	15	33	0	27
	Castration – Surgery with pain relief	13	46	0	0
	Castration – not needed (female pigs)	6	67	0	0
	Tail dock – none but tail bitting could occur	1	0	0	100
Transportation	Mobile abattoir – butchers come to animals (no live animals transportation)	7	43	0	14
	Transportation – limited time	3	33	0	0
	Transported by certified service providers	3	0	33	0
	Transportation – limited distance	2	100	0	0
	Transportation – limited	2	100	0	0
Type of breed	Type of breed	2	50	0	0

Note:
N – number of studies examining the corresponding practices.
%null – the proportion of studies reported that animal welfare practices have no effect on consumers' attitudinal and behavioural responses.
%conflicting – the proportion of studies reported conflicting results on the effect of animal welfare on consumers' attitudinal and behavioural responses.
%negative – the proportion of studies indicated that animal welfare practices have a negative effect on consumers' attitudinal and behavioural responses.

5.5.3 Price barriers

As a result of the misconceptions, consumers often highly value 'traditional' and 'natural' husbandry practices, such as organic, free-range and free from hormones and antibiotics. Most studies in our review reported a significant positive effect of the aforementioned practices on consumers' willingness to pay a premium (more than 95% consistent results across studies; refer to Table 5-2). However, many studies also reported that price remains an important attribute that significantly influences consumers' decision-making. As such, a major price increase caused by expensive husbandry practices (e.g., free-range and organic) may even offset the utility of these practices. In our review, Denver et al. (2017) estimated the Danish pork market share for three levels of welfare practices (i.e., standard-level following regulations, medium-level and high-level welfare). The authors concluded that most consumers are not willing to pay additional premiums to upgrade from medium to high-level welfare.

Due to consumers' reluctance to pay a premium for the highest animal welfare standards, livestock producers often resist adopting welfare-related practices beyond regulatory requirements. As such, governmental interventions (e.g., policies, regulations and assistance) are pivotal in encouraging producers to further improve their animal welfare standards and align with consumers' preference for 'natural' living for the animals. Ideally, the increasing cost of improved animal welfare practices should be transferred more evenly through the supply chain, especially toward the retailers, who are often unwilling to pay the incurred cost of higher animal welfare standards (Bock & Van Huik, 2007).

5.5.4 Self-interest remains a heuristic in meat consumption

Consumers' conflicting decisions concerning improved welfare meat are often attributed to a self-interest vs. collective interest dilemma during their decision-making. Past studies generally suggest that premium price is central to the dilemma facing consumers when considering improved welfare meat (see De Jonge & Van Trijp, 2013). Our systematic review repeatedly found positive effects from practices that are objectively beneficial for the consumers, such as GMO-free, antibiotics-free, and no growth hormones (see Table 5-2). Such evidence strongly supports the notion that self-interest-related attributes (i.e., sensory experience, health, safety and price) may outweigh animal welfare during consumers' decision-making. Castration is a notable example of this. Although non-castration practices avoid causing pain, many studies found that consumers exhibited a significantly lower WTP for pork from non-castrated pigs (e.g., Liljenstolpe, 2008, 2011; Kallas et al., 2013). That is because non-castration may cause boar taint in the final product, which is undesirable for the consumer's sensory experience. It becomes clear that although consumers do not want animals to experience any negative affective states during their lives, they also do not want to trade off their self-interests (i.e., sensory experience, health, safety and price) for better animal welfare.

As such, consumers often experience internal conflict when making a decision concerning animal welfare. As shown in past research, such conflicts arise due to the dissonance in their beliefs. On the one hand, consumers strongly believe that animals should be raised as healthy and happy as possible. On the other hand, improved welfare practices do not necessarily produce the most desirable products in terms of sensory experience and economic value for consumers. One sensible approach is to compromise between animal welfare and other products' characteristics, such as

sensory experiences, health and safety. Producers do not necessarily need to adopt the highest level of animal welfare practices but rather those that provide the animals with better quality of lives and produce final products with desirable sensory experiences and price. For instance, producers could consider adopting an open-housing system, where animals are kept indoors but have access to much larger space (by eliminating partitions and fencing) and manipulable materials. Such a system can enhance animal health by sheltering them from harsh environments and injuries whilst maintaining a lower labour cost. A compromised approach enables producers to sell their products at a smaller premium whilst ensuring an acceptable level of welfare. This approach has the potential to reach the average consumers despite their preferences for the outdoor grazing system.

5.5.5 The heterogeneity of consumer demand

The market for animal welfare is often characterised by its heterogeneity. Our review demonstrated a high level of heterogeneity between consumers from different cultural backgrounds and consumer segments from the same country. We recorded 18 studies that estimated the effect of animal welfare on consumers' responses cross-culturally. The results from all 18 studies indicated there were differences across countries concerning the relative importance of improved welfare practices. For instance, Grunert et al. (2018) and Denver et al. (2017) respectively found that German and Danish consumers rated 'allowing animals to free run indoors' as highly important; however, Polish consumers did not rate this practice as important. Similarly, Grunert et al. (2018) indicated that straw bedding (i.e., access to straw) was ranked lower in terms of importance for both German and Polish consumers, whilst this practice was found to be significant for Swedish (Liljenstolpe, 2008, 2011) and U.K. consumers

(Pettersson et al., 2016). Additionally, of the 79 studies recorded in our review, 55 specified and reported heterogeneity within their samples.

There are two potential explanations for such heterogeneity. First, we have established that there is no current universally accepted definition of animal welfare; thus, each consumer with a distinct cultural background and knowledge may interpret the concept differently. Second, each country may have distinct governance models pertaining to animal welfare. There are three main distinct models dictating animal welfare standards: the 'market demand', 'welfare state' and 'terroir' models (Kjærnes et al., 2009). A market model is actively driven by commercial entities (e.g., retailers) and allows market-driven product differentiation based on the level of animal welfare (e.g., the U.K. and Netherlands; Miele & Lever, 2014). Meanwhile, the welfare-state model emphasises a high level of animal welfare regulation developed via public policy (e.g., Scandinavian model), and the 'terroir' model links animal welfare to local and traditional practices (e.g., France and Italy; see Miele & Lever, 2014). Different models have led to varied experiences and expectations concerning animal welfare across countries.

This evidence strongly indicates that well-performed practices in a certain region or group of consumers may not perform well in other regions or groups of consumers. Therefore, future research could explore the impact of animal welfare from a cross-cultural perspective to identify the differences and tailor their marketing approach and product development to specific cultural groups. Additionally, there should be a proactive approach to animal welfare by the key stakeholders in meat production. A hybrid model between the 'market' and 'welfare-state' models could be beneficial, where both commercial entities and regulators are central to improving animal welfare standards. On the one hand, specific practices and product differentiation could be

adopted by commercial entities in anticipation of regulations and providing consumers with options varied on animal welfare levels (Oosterkamp et al., 2011). On the other hand, policymakers must safeguard the industry from 'failures' to meet minimum animal welfare standards through regulations and interventions.

5.6 Conclusion

The livestock industry is continuously challenged to align with consumers' demand for higher animal welfare standards and ensure the economic viability of their business. Many of the challenges that have been identified in this review appear to hinder their efforts to incorporate better welfare practices and contribute to the intention-behaviour gap. Our review points toward a misalignment between consumers' and producers' understanding of animal welfare. Notably, the producers' focus on biological aspects of animal welfare is overlooked by the consumers, whilst consumers often pursue 'natural' and 'traditional' husbandry practices that are not necessarily beneficial for the animals. For this reason, priority should be given to bridging the gap between producers and consumers. Furthermore, consumer-led research that provides a better understanding of consumers' perceptions could be of value in guiding how the industry communicates their practices and engages with the public, which in turn helps to mitigate the likelihood of market failure.

This review highlights the dilemma facing consumers when making decisions concerning welfare-related meat products. Price remains a major barrier preventing consumers from buying improved-welfare meat. Additionally, consumers may not be willing to sacrifice their sensory experiences, health and safety for a higher level of animal welfare standards. Thus, producers may need to consider the balance between

welfare standards and its economic viability. Potential solutions may include adopting a compromised approach, which seeks to offer the animal a better quality of life whilst ensuring the desirable sensory experiences and price for the customer. Furthermore, our review highlights the importance of involving multiple entities (i.e., the market, policymakers, and society) in promoting animal welfare standards. Governmental regulations and policies have been shown to be beneficial in incentivising commercial entities to proactively implement better welfare practices. At the same time, they are also crucial in safeguarding the industry from failing to meet minimum standards.

6 GENERAL DISCUSSION

The overarching goal of this thesis was to extend current knowledge on 'Why do people eat what they eat? When, where and how can what they eat be influenced?' By adopting a multidisciplinary and multi-method approach, the thesis helped to unpack the complexity of the food-related decision-making process in different product categories. Specifically, the present thesis investigated the interactions between the food, the situation and the individuals and how these interactions drive consumer food choices. In the first stage, Chapters 2 and 4 demonstrated how 'the food' and 'the individual' interplay and influence consumer food choices.

Chapters 3 and 5 then followed up the results (in Chapters 2 and 4) and examined the interaction between the food, the individuals and the situation. Chapter 3 demonstrated how consumers respond to marketing communication in different shopping contexts (online vs. offline). Chapter 5 reviewed how consumers evaluate products using product cues in an animal welfare context. This Chapter consolidates the findings in a discussion of the theoretical, methodological and managerial contributions of this thesis.

6.1 Cue utilisation strategies in food choices

Chapters 2 and 4 add to our knowledge of cue utilisation strategies in many ways. First, by looking at two different product categories (pork vs. abalone), the thesis demonstrates that consumers' cue utilisation strategies differ depending on the product that they are evaluating. Both Chapters 2 and 4 identified the salient product cues in consumer decision-making processes for two distinct product categories – pork as an everyday food product (commodity) and abalone as a premium food product (hedonic). Additionally, these two Chapters used the robust BWS method to illustrate the in-market heterogeneity and how unique, individual, preferred value drives the selection

of cues. However, findings from Chapters 2 and 4 should be interpreted with caution due to the relatively small sample size, which might have limited the statistical representation of the Australian population. Further research is required to strengthen the evidence.

In Chapter 2, the thesis adopted a best–worst scaling experiment (BWS) to examine the utility of 15 intrinsic and 31 extrinsic abalone product cues. This is the first study to conduct a direct comparison of up to 46 product cues. The results revealed the five pillars underpinning consumer evaluations of abalone, including eating quality, healthiness, naturalness, sustainability and region of origin, thereby aligning with other research on seafood products (Ankamah-Yeboah et al., 2016; Birch et al., 2012; Nurliza et al., 2021; Wang & Somogyi, 2018). Overall, the results showed that Australian consumers emphasised healthiness (i.e., rich in nutrients) and naturalness (i.e., no artificial ingredients) in their evaluation of abalone products.

Chapter 4 showed that these factors assumed less importance in the case of pork (a commodity product), for which consumers care more about animal welfare. This evidence supports our notion of the benefits of investigating both the specific product and the product category (e.g., red meat in general) to accurately pinpoint what consumers demand. Chapters 2 and 4 also highlighted the importance of naturalness and sustainability (e.g., organic production, sustainable production and animal welfare) in consumers' food-related decision-making. In contradiction to the literature's conventional wisdom, this thesis shows that price is no longer the top priority for Australian consumers when buying food products. The results highlight that consumers are willing to make a trade-off in terms of price if the products satisfy their demand for value-added elements, such as animal welfare and naturalness.

6.2 Individual differences in food evaluation

Significantly, the thesis (through Chapters 2 and 4) makes a substantial contribution to progressing the method of eliciting consumer preferences and delineating in-market heterogeneity. Applying BWS, the thesis mimics a real decision-making process in which consumers make choices based on trade-offs based on an array of product cues. The benefit of this approach is that it allows an accurate determination of salient product cues driving food choices using pork and abalone as products in this study. This thesis also demonstrates the advantage of combining discrete choice experiments (i.e., utility scores) and cluster analyses to portray different consumer typologies. Specifically, this work offers a more consistent and robust approach to segmenting consumers based on the utility scores of product cues (e.g., De Pelsmaeker et al., 2017; Gosine and McSweeney, 2019; Szymkowiak et al., 2020). As such, this methodological approach enabled improved targeting strategies for the industry.

Chapter 2 segmented the market heterogeneity and identified various unique consumer segments based on the utility score of intrinsic and extrinsic product cues. Based on the utility score of intrinsic cues, Chapter 2 found five major consumer segments, namely: (1) *appearance lovers*, (2) *sweet & juicy eaters*, (3) *conventional seafood buyers*, (4) *ocean-fresh flavour advocates* and (5) *size matters*. Based on the extrinsic cues' utility score, six consumer segments were identified, namely (1) *environmentalist*, (2) *health-conscious*, (3) *utilitarian*, (4) *first-in-first-out*, (5) *naturalist* and (6) *regio-centric buyers*. This finding illustrates how consumers' unique demands translate to their selection of product cues (i.e., cue importance) during their decision-making processes.

Replicating Chapter 2's design, Chapter 4 examined the salient product cues and market heterogeneity in the context of fresh pork. Findings from Chapter 4 provided further evidence of the significance of eating quality, naturalness and animal welfare, as has been found in prior research (Channon et al., 2017; Channon et al., 2018; D'Souza et al., 2017). Intrinsically, four consumer segments were identified, namely (1) *boar taint haters*, (2) *lean meat eaters*, (3) *colour lovers* and (4) *cuts and size matters*. Extrinsically, four segments were identified, namely (1) *animal and environment lovers*, (2) *naturalness lovers*, (3) *demanding buyers* and (4) *utilitarian buyers*. The findings delineated different typologies of pork consumers beyond macro-market characteristics (i.e., sociodemographics), offering meaningful and unique insights to translate the in-market heterogeneity into product specifications.

6.3 The interplay between the food itself, the individuals and the situation in food choices

Building upon the findings from Chapter 2, Chapter 3 examined how the food itself, the individuals and the situation interplay and influence consumer food choices. Drawing from construal level theory, Chapter 3 examined the interplay between the situation (i.e., shopping channel) and the food itself (i.e., message framing) and how they influence the individuals (i.e., interpretation of message). Across three experimental studies, Chapter 3 provided evidence that concretely framed naturalness messaging significantly heightened consumers' positive attitudes towards abalone products. However, this effect only occurred in offline shopping conditions. Chapter 3's contribution is two-fold. First, the finding highlights the effectiveness of textual or verbal cues on packaging in eliciting desirable marketing outcomes. This extends literature that has predominantly focused on sensory aspects, such as colour, tactile sensation and sound (e.g., Deliza et al., 2003; Labbe et al., 2012; Labbe et al., 2013; Puyares et al., 2010).

Furthermore, the findings demonstrate that individual construal levels vary across different shopping contexts (i.e., online vs. offline), and effective communication should account for such differences. In other words, the effectiveness of a marketing message could vary across different channels (online vs. offline) due to the adoption of different mental representations by individuals. This finding highlights the importance of congruency between consumers' construal levels (i.e., mental representation of an event) and the message framings. The evidence suggests that knowledge of the salient attributes and cues only partially answers the question: "Why do people eat what they eat?" Chapter 3 shows that food-related choices are complex and are often influenced by the interplay of the food itself (i.e., cues), the situation (i.e., shopping location) and the individual (i.e., mental processing).

6.4 The impact of information asymmetry on food choices

In Chapter 4, the thesis showed that despite communicating the same attribute (i.e., animal welfare), *raised and slaughtered with a high level of animal welfare* and *free-range certified* were much more impactful than *sow stall free*. Such differences could be driven by information asymmetry between consumers and producers, who might have starkly different definitions of animal welfare. Due to such differences, producers may communicate product cues that are perceived as insignificant to animal welfare from the consumer's point of view (Vanhonacker et al., 2008). Therefore, Chapter 5 took a different approach and sought to resolve the information asymmetry by examining how consumers define animal welfare from a product cues (i.e., farming practices) perspective. As such, Chapter 5 involved a systematic literature review covering 20 years of research on consumers' attitudinal and behavioural responses to different animal welfare product cues.

Chapter 5 supports the notion that there is information asymmetry in the context of animal welfare (Vanhonacker et al., 2008). The thesis adds to the literature by providing evidence of this information asymmetry as one of the primary drivers of the intention–behaviour gap in the animal welfare meat market. The results demonstrate that consumers often associate animal welfare with natural and traditional farming that does not necessarily benefit the animals or is not economically viable for the producers. Second, the findings reveal that consumers are not willing to trade off their self-interests (e.g., safety, healthiness and taste) for better animal welfare standards. This evidence supports the notion that decisions (including those that are food-related) are primarily influenced by an individual's self-interest (e.g., Moore & Loewenstein, 2004). Even though animal welfare practices in meat production are an attractive attribute (i.e., the food itself), consumers do not necessarily choose meat that claims improved welfare practices due to their self-interest (i.e., the individuals) and the current information asymmetry between the consumers and the food supply chain (i.e., the situation).

Together, the two streams of research within this thesis offer new evidence and many implications for the literature and practice. All four Chapters confirm the importance of examining how the interplay between the food itself, the individuals and the situation affects food-related choices. It also offers further knowledge into consumers' cue utilisation strategies across different product categories and delineates different individual typologies and how they affect those strategies. The thesis also describes other factors that may influence how consumers interpret or perceive a cue. With respect to different shopping situations, results from this thesis delineate optimal framing techniques to communicate the salient attributes (i.e., naturalness). This thesis also provides commentary on various situational challenges that inhibit consumers

from translating their intentions into actual behaviours (i.e., animal welfare) and, in turn, offers potential solutions to address those challenges.

7 THEORETICAL AND METHODOLOGICAL IMPLICATIONS

The thesis offers four broad and significant theoretical and methodological implications that advance the current literature on food decision-making processes. These include: a) demonstrating the validity and usefulness of cue utilisation theory in understanding the reasons behind consumer food choices; b) advancing methodological progress in delineating market heterogeneity using a combination of behavioural data and clustering techniques; c) illustrating the intricacy and nuance behind the cue utility score, which is determined by its predictive and confidence value; and d) illustrating how consumer perceptions of the food itself could be influenced by their individual factors (i.e., self-interest) and situational factors (i.e., marketing interventions).

The validity and usefulness of cue utilisation theory in understanding the reasons behind consumers' food choices are explored in Chapters 2 and 4. The thesis extends the theory by illustrating how consumers may adopt different cue utilisation strategies depending on the products and their individual differences. For instance, evidence that consumers prioritise the healthiness and naturalness of abalone products is reported in Chapter 2, while evidence that animal welfare assumes a greater relevance than these two attributes is reported in Chapter 4. Furthermore, evidence that many different consumer segments exist with distinctive cue utilisation strategies is reported for both hedonic products (i.e., abalone) and commodity products (i.e., pork). For instance, *appearance lovers* may rely on intrinsic cues, such as colour, shape and size, to

formulate their perceptions and guide their decisions, while *utilitarian buyers* mostly rely on heuristics, such as price, best-before date and quality certifications.

We then integrated behavioural data (i.e., utility scores) and clustering techniques (i.e., hierarchical and k-means) in Chapters 2 and 4. This application demonstrates that consumer preferences and choices are more likely to be driven by their unique motivations rather than their sociodemographic characteristics. For instance, a *naturalist* would likely value *no artificial additives*, *antibiotics free* and *no preservatives*, regardless of their sociodemographic characteristics. By conducting discrete choice experiments and cluster analyses in sequence, studies can generate more robust and granular insights into different consumer segments and their unique demands for specific product features (e.g., De Pelsmaeker et al., 2017; Gosine and McSweeney, 2019; Szymkowiak et al., 2020). Studies in Chapters 2 and 4 are the first to apply this methodological approach to delineate in-market heterogeneity based on 46 product cues in the context of fresh pork and abalone products. As segmentation is vital to understanding the market, the thesis offers methodological and theoretical progress, enabling a much more consistent and meaningful population clustering.

This thesis also illustrates the interplay between a cue's predictive value and confidence value in consumers' food-related decision making. At the core of cue utilisation theory, a cue's utility score is determined by both predictive value and confidence value. While predictive value refers to the extent to which a cue is a valid quality indicator, confidence value refers to the extent to which consumers are confident in their ability to accurately use and assess that cue (Cox, 1967; Olson, 1972). If a cue's predictive value is high but its confidence value is low, its overall utility score would be reduced. Supporting evidence for this notion is outlined in the studies by mimicking real shopping scenarios. By forcing consumers to make trade-

offs between many product cues, the thesis increases the discrimination between cue utility scores and accurately identifies the reasons behind consumer decisions.

For instance, conventional intrinsic cues, such as size, colour and firmness, do not have high utility scores (i.e., importance) in hedonic and commodity products for Australian consumers (as described in Chapters 2 and 4). This finding is interesting because these conventional cues are typically high in predictive value (Grunert et al., 2015; Lawley et al., 2021; Wang et al., 2021). One potential explanation for this is that while their predictive cues might be conventionally high, their confidence value might have been low in the studies included in this thesis. Australian consumers (this thesis' sample) are more likely to buy pre-packed fresh produce and, thus, are less confident in evaluating food products using intrinsic cues (e.g., Guo & Meng, 2008). Therefore, regardless of the extent to which a cue is a valid quality indicator, it may not have a high utility score (i.e., low relative importance) if consumers do not feel confident evaluating that cue. The thesis offers the first empirical evidence to suggest that a cue's confidence value may outweigh its predictive value in forming its utility score.

The intricacy and nuances of food-related decision making are further illustrated in this thesis. It is found that situational factors (i.e., marketing interventions) affect how consumers perceive the food itself (i.e., product cues). Product cues, such as *rich in nutrients (e.g., Protein, Omega-3 fatty acids, minerals and vitamins)*, were found to be two times more important than *health star ratings and nutrition information*, despite they both communicate the abalone's healthiness (Chapter 2). For pork, the product cues *no antibiotics*, *no additives* and *no preservatives* were all rated as more important than *organic certified* (Chapter 4), although organic products are generally produced without antibiotics, additives or preservatives. Such results suggest that a cue's utility score can be changed based on how the cue is communicated. This thesis provides

evidence that consumers rate cues more highly when they are straightforward, simple and easy to understand. This aligns with the notion that consumers are more likely to overlook product cues that lack clarity and vividness (e.g., Nisbett & Ross, 1980; Westbrook & Fornell, 1979). While the impact of communication on consumer perceptions has been repeatedly observed, this thesis is the first to offer a novel explanation behind such a mechanism. The thesis shows that the communication of a cue (i.e., vividness and comprehensibility) can contribute to a cue's confidence value and, in turn, its overall utility score.

To demonstrate this notion, Chapter 3 seeks to explain how communication could alter a cue's utility score and also explores whether such an effect occurs in every shopping situation (online vs. offline). Evidence shows that consumers prefer a more concretely described cue. Specifically, when a cue is concretely described, consumers perceive a higher level of concreteness (i.e., vividness and comprehensibility) of the message. This then heightens their favourable attitude towards the evaluated products. Consistent with the literature, this finding indicates that a more concretely described cue could enable better information recall (Olver, 1993), short-term memory (Borkowski & Eisner, 1968) and learning performance (Van der Veur, 1975). Interestingly, results from Chapter 3 again demonstrate the complexity of food choices and how the interplay between the food itself, the individuals and the situations affect consumer decision making. This is because consumers prefer a more concretely described cue only when they shop offline.

When consumers shop offline, they are primed to adopt a low construal-level mindset; the effect of message concreteness is extrapolated and, in turn, positively affects their attitudinal responses towards the product. Through a series of three studies in Chapter 3, this thesis highlights how the congruency between the food itself (i.e.,

concretely framed naturalness), the situation (i.e., shopping location) and the individual (i.e., mental processing) affects consumer food choices. The studies in this thesis are among the first to empirically demonstrate the change in individual mental representations caused by the shopping context. Furthermore, this research is among the first to illustrate how the interplay between the food itself, the situation and the individual affect consumer decision-making processes and product evaluations. Considering the proliferation of omnichannel (i.e., multi-channel experience), the findings from Chapter 3 highlight the importance of maintaining congruency between mental representation (driven by different shopping channels) and communication of a cue. Such congruency underpins the effectiveness of communication across different shopping platforms.

The interplay of the food itself, the individual and the situation is also observed in a more everyday consumption context (i.e., fresh pork). Chapter 5 complements the work conducted in Chapter 2, which alludes that there are factors beyond the food itself that influence consumer decision making. The thesis highlights many situational and individual factors inhibiting actual consumption, even though consumers show positive interest towards the product (i.e., animal welfare). The factors identified include the information asymmetry within the food supply chain, consumer self-interest and moral disassociation. Although the food itself (i.e., animal welfare) is desirable, the situation (i.e., information asymmetry) and the individuals (i.e., self-interest) may counteract and reduce the product's desirability. Evidence that many communication strategies for animal welfare practices in food production fail to address situational and individual factors was demonstrated in Chapter 5. As such, they are limited in effectiveness. Taken together, Chapter 5 serves as a roadmap for future

research on animal welfare and provides valuable directions for future areas of investigation.

8 MANAGERIAL IMPLICATIONS

From a managerial perspective, the thesis offers many significant implications, thereby supporting the Australian food and beverage industry. On a larger scale, the thesis also offers many societal contributions, aligning with the UN's Sustainable Development Goals in promoting healthier and more responsible food choices. The thesis identifies the salient attributes guiding consumers' food-related decision-making processes in hedonic and commodity products (Chapters 2 and 4). It also determines whether consumers demand healthier and socially responsible food options. In Chapter 3, we delineate the optimal marketing strategies (i.e., framing technique) to promote natural product consumption across different shopping situations (i.e., online vs. offline). Finally, in Chapter 5, the thesis determines the barriers preventing consumers from choosing more responsible food choices (i.e., animal welfare) and offers solutions to address those barriers. Taken together, the thesis contributes to the practice in four broad and significant ways.

First, the thesis confirms the significance of eating quality in food-related decision-making, regardless of the food categories (Chapters 2 and 4). The interesting finding here is that consumers and producers may have different views on what cues determine eating quality. The industry often relies on the 'conventional' intrinsic cues, such as colour, shape and firmness, to evaluate and communicate the quality of the meat (e.g., Australian Pork Limited, 2021; Channon et al., 2017; Channon et al., 2018; D'Souza et al., 2017). However, Chapters 2 and 4 indicate that consumers do not

highly value these 'conventional' cues. Instead, consumers are more likely to rely on 'explicit descriptions' of flavour or aroma to assess eating quality. For instance, the results reveal that consumers highly value cues like *ocean-fresh flavour* and *umami* for abalone (Chapter 2). Similarly, consumers emphasise the significance of *succulence* and *no smell of boar taint* when evaluating and buying fresh pork (Chapter 4). Many meaningful interpretations and contributions to marketing practices could be drawn from these findings.

In accordance with these findings, the thesis suggests that producers should use 'explicit descriptions' of flavour and aroma to communicate the product's eating quality. This allows the consumers to vividly formulate their expectations about the product's eating quality (i.e., how the product tastes). Corroborating this idea, Turnwald et al. (2019) discovered that an 'explicit description' of taste, such as *mouth-watering* or *juicy*, significantly increased vegetable intake compared to basic labelling. This finding is also applicable to advertisers beyond the context of food products. How a marketing message is framed is central to its persuasiveness (Xiao et al., 2022). As demonstrated in my thesis, a more vivid and explicit message may help consumers comprehend the product benefits quickly or induce less uncertainty when faced with various choices. To increase the vividness and concreteness, and in turn, the persuasiveness of a marketing message, many methods could be considered, such as visuals, metaphors, or narrative evidence (see Blondé & Girandola, 2016). However, managers should also be cautious in their implementation as my thesis demonstrated the importance of having a congruency between consumers' mental representation (i.e., where they shop) and the message framing (i.e., concreteness).

Furthermore, the findings also indicate that there may be value in developing industry-wide educational initiatives to equip consumers with better objective

knowledge to discern product quality based on conventional cues. This may be due to the consumer sample (i.e., Australian consumers), which has been reported to have low confidence in using conventional intrinsic cues (e.g., colour, shape and size) to assess eating quality, as they are more familiar with pre-packed fresh produce (i.e., hard-to-detect intrinsic differences due to consistency and lack of physical inspection). Considering consumers' lack of confidence, an industry-wide quality grading system led by major industry bodies such as Australian Pork Limited (for fresh pork) and Fisheries Research and Development Corporation (for abalone) could serve as a valuable quality indicator. The benefit of an industry-wide quality grading system is visible in many other contexts. For example, the Meat Standard Australia beef grading was found to be a reliable predictor of consumer acceptance and willingness to pay premium (e.g., D'Souza et al., 2017; Lyford et al., 2010). This promising strategy, therefore, could be adopted by both the Australian pork and abalone industries to support consumer decision-making.

Second, a heightened relevance of hedonism in food-related decision-making is also revealed, as most consumers (> 70% of market size) are hedonic-oriented (Chapters 2 and 4). Even though price remains a significant factor, value-added attributes, such as animal welfare, naturalness and sustainability, are rated as much more important (in both Chapters 2 and 4). This suggests that consumers increasingly emphasise hedonic aspects of food products, such as naturalness, animal welfare and sustainability. This evidence offers strong support for the notion that food choices are becoming increasingly complex and beyond the conventional utility (i.e., eating quality and price). Consumer perspectives on food consumption seem to gradually shift towards more hedonically focused patterns.

From a food supply chain perspective, producers could enhance their competitive advantage, resilience and sustainable growth by proactively adopting sustainability, naturalness and animal welfare as their strategic pillars. From a societal perspective, this finding should also be viewed as a positive sign from a societal perspective since it aligns with the global effort to promote healthier and more responsible food choices. Governmental bodies could take note of this shift in consumption trends and put forth policies to further speed up the widespread adoption of healthier and more responsible food choices. For instance, the introduction of a voluntary front-of-pack Health Star Rating label is a socially responsible initiative. However, as shown in my thesis, consumers did not value this initiative due to the lack of transparency in how the food is rated (e.g., Pelly et al., 2020). Therefore, there could be value in strengthening public trust and support for this initiative by increasing public accessibility to the branded food composition database.

Third, this thesis shows that a concretely framed claim about naturalness (i.e., more vivid and comprehensible) would enhance the appeal of the food products. However, such an effect only occurs in offline shopping (Chapter 3). The thesis highlights how congruency between the interplay of the food itself, the situations and the individuals would influence food choices. This discovery holds significance for food producers, as brands often employ identical message framing irrespective of shopping channels. Such a tactic often diminishes the effectiveness of the marketing messages. This demonstrates the complexity of food choices and the significance of achieving congruency between the food itself, the situations and the individuals. In light of this insight, brands should develop their marketing assets according to the shopping conditions (e.g., online vs. offline).

A consideration of the shopping conditions could be applied to communication strategies for other hedonic attributes, such as sustainability and animal welfare. It is almost impossible for an average consumer to verify a product's sustainability and animal welfare standards. Therefore, by employing concrete framing to emphasise the production methods and processes, food producers could evoke a heightened sense of self-reward and, consequently, positively influence consumers' attitudinal and behavioural responses towards the products. Food producers could also consider different approaches to concrete framing beyond textual or verbal cues. For instance, visuals, such as graphic illustrations, have been shown to increase the comprehensibility of the messages, thereby improving the effectiveness of the marketing messages (Rim et al., 2015).

The thesis also highlights an information asymmetry that exists between producers and consumers. Chapter 4 contains evidence that consumers highly value *free-range*, yet consumers largely ignore *sow stall free* (i.e., low utility score), even though *sow stall free* is a production method designed to improve living conditions for the pigs (Barnett et al., 2001). This is interesting since *free-range* does not necessarily improve animal well-being because it may expose animals to bacteria, viruses and parasites from being out in the open (Bonnefous et al., 2022). This evidence illustrates that consumers do not possess the same objective knowledge as producers on what could be objectively beneficial for the animals. Such a gap prompts further investigations into the causes behind such information asymmetry. To answer this question, the thesis conducted a systematic literature review regarding consumer perceptions and responses towards different animal welfare practices (Chapter 5).

The findings reveal that the definition of animal welfare is misaligned between producers and consumers in many meat product categories. Consumers' attitudinal

responses and behavioural intentions towards certain animal welfare practices are driven by their perceptions of what constitutes animal welfare rather than objective knowledge. In contrast, producers often invest in and communicate the practices they believe will objectively better the animals' well-being. Such differences create a situation in which consumers may not appreciate the industry's practices. This may explain the contradictory findings found in Chapter 4. Furthermore, many individual factors (e.g., self-interest, cognitive biases and mental disengagement) could also negatively impact the effect of animal welfare practices on consumers' attitudinal and behavioural responses.

From the findings, this thesis illustrates the significance of bridging the gap between livestock producers and consumers in animal welfare. A potential way to close this gap is by enabling a dialogue with a scientifically-driven foundation on what defines animal welfare and how it is considered in meat production. This would enable consumers to be better informed about different animal welfare domains and practices. This could be delivered through various educational initiatives, stakeholder dialogues (e.g., researchers, producers, policymakers and consumers) and awareness programmes that encompass the considerations of animal welfare, in particular, husbandry practices in Australia. Such a dialogue may allow consumers to better understand the producers' efforts and commitments in raising animal welfare standards. There could be further value in equipping the industry with consumer-oriented insights, including details on what constitutes animal welfare and how to address their personal barriers (e.g., self-interest, cognitive biases and mental disengagement). This could offer valuable guidance to the industry on communicating and engaging with the public, reducing the likelihood of market failure.

Another worthwhile consideration is finding solutions to counteract the barriers consumers may face when evaluating fresh meat with high welfare standards. Price remains one of the most significant barriers. Higher animal welfare standards often incur additional production costs, which are eventually passed on to consumers. Governmental intervention through regulations and financial subsidies is vital in addressing production costs. One suggestion that could be taken from the research in this thesis is that the cost of improved animal welfare standards should be regulated and transferred more equally across the food supply chain rather than being the sole responsibility of producers. This is especially relevant since grocery retailers often refuse to pay the incurred cost of higher animal welfare standards (Bock & Van Huik, 2007).

9 LIMITATIONS AND FUTURE RESEARCH

Notwithstanding its contributions, this thesis is not without limitations. The thesis is focused on Australian consumers to align with the interests of the Australian food and beverage industry. Although Australia is culturally diverse, studies have illustrated that Australian consumers are, on average, more likely to be hedonically driven in their decision-making processes (Hofstede, 2011, 2023). This observation has been supported by other studies, which have shown that consumers from different cultural backgrounds may adopt distinctive cue utilisation strategies to evaluate their products. For instance, Ho et al. (2022) found that Chinese consumers are more concerned with product assurance cues, such as country of origin and safety, than are Australian consumers due to past food scandals occurring in their domestic market. The high level of hedonic motivation may explain why we observe higher utility scores for hedonic-oriented cues, such as naturalness and animal welfare. Therefore, the

results may not be representative of consumers from different cultural backgrounds. Future studies could extend this thesis by conducting cross-cultural examination, thereby offering a richer understanding of how individual differences may interact with the food itself and the situations that influence food choices.

Another limitation observed in Chapters 2 and 4 is that there was no direct comparison between the utility score of intrinsic and extrinsic cues. This is because the studies dealt with many product cues (up to 46). A direct comparison between intrinsic and extrinsic cues could provide many meaningful insights, one of which could be whether it is more effective to focus on intrinsic or extrinsic aspects of product development (Lawley et al., 2012). Future studies could resolve this limitation by applying a nested, balanced, incomplete block design, enabling a direct comparison of a large number of cues without forcing respondents to view every cue (Deppe et al., 2001). Additionally, Chapters 2 and 4 did not estimate the utility score for different levels of each cue (e.g., low vs. high price). Other methods, such as the conjoint experimental design, could be applied in follow-up studies to determine the optimal level of each cue and cue combination.

The thesis also examined only fresh pork and abalone to align with the industry partners (i.e., Linley Valley Pork and Jade Tiger Abalone) involved in this thesis. As discussed in Chapter 1 and further demonstrated in Chapters 2 and 4, other food products may have a set of important product cues that are different from those found in this thesis. Furthermore, different product categories may influence consumer thought processes (Lee et al., 2018, 2021) and affect consumer decision-making. Therefore, future studies could extend to a wider range of food products to enhance the generalisability and external validity of the research.

Another research avenue that merits further investigation is how individual factors moderate consumers' food-related decision-making processes. Although the thesis identifies several individual factors at play within food-related decision-making, more focus could be directed to this determinant. For instance, in Chapter 3, the interaction effect between offline shopping channels and concrete framing is demonstrated but not for online shopping and abstract framing conditions. As a heavily scrutinised attribute, naturalness might have evoked a sense of risk and uncertainty. Therefore, an abstractly framed naturalness may not be effective regardless of the shopping channels. Another potential explanation is that other individual factors, such as risk or loss aversion tendency, might have moderated the effect of abstract framing in these studies.

Although the thesis offers some methodological advances through its multi-method approach, there are still various methodological limitations. For instance, the reliance on self-reported surveys may limit its external validity since much of human decision-making is driven by implicit responses (e.g., emotions) that exist outside of a person's conscious awareness (Sung et al., 2020). Thus, explicit responses from self-reported surveys may not fully explain what truly drives individual food choices. Future studies could potentially embrace psychophysiological measures to investigate the psychological mechanisms, such as visual attention, engagement and discrete emotions, and elucidate individuals' decision-making and behaviours (McInnes et al., 2023; Sung et al., 2020).

Another methodological limitation of the systematic literature review in Chapter 5 is that even though the review covers a large number of animal welfare studies, it is based on only three major databases (i.e., Web of Science, Science Direct and Scopus) covering the 2002–2022 period. Other databases, such as AgEconSearch, Google

Scholar and FSTA – Food Science – were not included in the review. Additionally, grey literature, conference proceedings and non-peer-reviewed papers were not included. Although such a decision enabled a review of the highest quality literature, the inclusion of these other literature sources could provide a more comprehensive outlook on emerging and major topics (i.e., animal welfare) and industry reports. Future studies could consider expanding to grey literature sources to complement the thesis. Future studies could also extend the thesis by adopting meta-analysis to quantify the true effect of animal welfare practices on consumers' attitudinal and behavioural responses.

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11 APPENDIX

Chapter 2:

Appendix 2-1: Fresh pork cues acquired from the thorough literature review and the industry audit of actual products.

Category	Cue	Sourced Literature Review	Industry audit	Final decision
Intrinsic	Flavour	Oakes & Ponte (1996); Preece (2006); Sanchez-Brambila et al. (2002)	Used on packaging Significant	Merged with "Ocean Fresh Flavour"
	Umami	Wang et al. (2018); Wang & Somogyi (2020)	Used on packaging Significant	Included
	Saltiness	Sanchez-Brambila et al. (2002)	Not used on packaging Not significant	Removed
	Sweetness	Sanchez-Brambila et al. (2002); Sveinsdóttir et al. (2009)	Not used on packaging Significant	Included
	Bitterness	Sanchez-Brambila et al. (2002)	Not used on packaging Not significant	Removed
	Metallic	Sanchez-Brambila et al. (2002)	Not used on packaging Not significant	Removed
	Fishy	Sanchez-Brambila et al. (2002)	Not used on packaging Not significant	Removed
	Sour	Alfnes et al. (2018); Sanchez-Brambila et al. (2002)	Not used on packaging Not significant	Removed
	Carboardy taste	Sanchez-Brambila et al. (2002)	Not used on packaging Not significant	Removed
	crustacean taste	Sanchez-Brambila et al. (2002)	Not used on packaging Not significant	Removed
	Astringent	Sanchez-Brambila et al. (2002)	Not used on packaging Not significant	Removed
	Decaying vegetation	Sanchez-Brambila et al. (2002)	Not used on packaging Not significant	Removed
	Ocean fresh flavour	Found in existing abalone and other seafood products	Used on packaging Significant	Included
	Oily flavour	Sanchez-Brambila et al. (2002)	Not used on packaging Not significant	Removed
	Juiciness	Sveinsdóttir et al. (2009)	Used on packaging Significant	Included

	Texture	Oakes & Ponte (1996); Preece (2006); Sanchez-Brambila et al. (2002)	Used on packaging Significant	Included
	Starchy	Sanchez-Brambila et al. (2002)	Not used on packaging Not significant	Removed
	Firmness	Oakes & Ponte (1996); Sanchez-Brambila et al. (2002)	Not used on packaging Significant	Merged with "Texture"
	Freshness	Sanchez-Brambila et al. (2002)	Not used on packaging Significant	Removed
	Cohesiveness	Sanchez-Brambila et al. (2002)	Not used on packaging Not significant	Removed
	Chewiness	Sanchez-Brambila et al. (2002)	Not used on packaging Significant	Merged with "Texture"
	Hardness	Sanchez-Brambila et al. (2002)	Not used on packaging Not significant	Removed
	Softness	Oakes & Ponte (1996)	Not used on packaging Not significant	Removed
	Tender	Oakes & Ponte (1996)	Not used on packaging Significant	Merged with "Texture"
	Aroma	Nurliza et al. (2021)	Not used on packaging Significant	Included
	Colour of the foot	Oakes & Ponte (1996)	Used on packaging Significant	Included
	Colour of the meat	Oakes & Ponte (1996)	Used on packaging Significant	Included
	Colour of the lips	Gordon & Cook (2004)	Used on packaging Significant	Included
	Shell colour	Oakes & Ponte (1996)	Used on packaging Significant	Included
	Shell pigmentation	Oakes & Ponte (1996)	Not used on packaging Not significant	Removed
	Shape of the meat	Found in existing abalone and other seafood products	Used on packaging Significant	Included
	Species	Alfnes et al. (2018); Gordon & Cook (2004); Sogn-Grundvåg et al. (2014)	Used on packaging Significant	Included
	With shell or without shell	Found in existing abalone and other seafood products	Used on packaging Significant	Included
	Size	Nurliza et al. (2021); Oakes & Ponte (1996)	Used on packaging Significant	Included

	Weight per piece (unit)	Found in existing abalone and other seafood products	Used on packaging Significant	Merged with "Size"
	Drained weight	Found in existing abalone and other seafood products; Nurliza et al. (2021)	Used on packaging Not significant	Merged with "Net weight"
	Net weight	Found in existing abalone and other seafood products; Nurliza et al. (2021)	Used on packaging Significant	Included
	Min weight per piece	Sogn-Grundvåg et al. (2014)	Not used on packaging Not significant	Merged with "Size"
	Meat to shell weight	Found in existing abalone and other seafood products	Used on packaging Not significant	Merged with "Net weight"
Extrinsic	Product types (canned/frozen/fresh)	Alfnes et al. (2018); Camire et al. (2020); Davidson et al. (2012); McKenzie et al. (2021)	Used on packaging Significant	Included
	Brand name	Alfnes et al. (2018); McKenzie et al. (2021); Sogn-Grundvåg et al. (2014)	Used on packaging Significant	Included
	Packaging types (in Pouch/ Vacuum/ Tray/ Can)	McKenzie et al. (2021); Sogn-Grundvåg et al. (2014)	Used on packaging Significant	Included
	Cleanliness in package	Found in existing abalone and other seafood products	Used on packaging Not significant	Removed
	Directions for Use	Nurliza et al. (2021)	Used on packaging Not significant	Removed
	Packed on date	Found in existing abalone and other seafood products	Used on packaging Significant	Included
	Best before date	Alfnes et al. (2018)	Used on packaging Significant	Included
	Retail price	Wang et al. (2018); McKenzie et al. (2021); Nurliza et al. (2021); Sogn-Grundvåg et al. (2014)	Used on packaging Significant	Included
	Storage Suggestion	Found in existing abalone and other seafood products; Sveinsdóttir et al. (2009)	Used on packaging Not significant	Removed
	Nutritional Information	Alfnes et al. (2018); Wang et al. (2018); Nurliza et al. (2021)	Used on packaging Significant	Included
	Grade (by Weight)	Found in existing abalone and other seafood products	Used on packaging Significant	Merged with "Quality Grading"
	Ingredient list	Nurliza et al. (2021)	Used on packaging Not significant	Included
	Use instructions	McKenzie et al. (2021); Nurliza et al. (2021)	Used on packaging Not significant	Removed

	Allergy advice	Found in existing abalone and other seafood products	Used on packaging Not significant	Removed
	About the product	Found in existing abalone and other seafood products	Used on packaging Not significant	Removed
	Number of piece per pack/can	Found in existing abalone and other seafood products	Used on packaging Significant	Included
	Promotion	Found in existing abalone and other seafood products	Used on packaging Significant	Included
	Rich in Vitamins	Found in existing abalone and other seafood products	Used on packaging Significant	Merged with "Rich in nutrients"
	High in Omega-3 fatty acids	Found in existing abalone and other seafood products; Alfnes et al. (2018); Bi et al. (2016)	Used on packaging Significant	Merged with "Rich in nutrients"
	Rich in Minerals	Found in existing abalone and other seafood products	Used on packaging Significant	Merged with "Rich in nutrients"
	Health Star Ratings	Found in existing abalone and other seafood products	Used on packaging Significant	Included
	No preservatives	Alfnes et al. (2018); Nurliza et al. (2021)	Used on packaging Significant	Included
	Low mercury level	Found in existing abalone and other seafood products	Used on packaging Not significant	Removed
	Antibiotics free	Alfnes et al. (2018)	Used on packaging Significant	Included
	No additives	Alfnes et al. (2018); Nurliza et al. (2021)	Used on packaging Significant	Merged with "No artificial additives"
	GMO-free	Alfnes et al., 2018; Camire et al. (2001)	Used on packaging Significant	Included
	No artifical colours	Alfnes et al. (2018); Nurliza et al. (2021)	Used on packaging Significant	Merged with "No artificial additives"
	Traceability tag	Alfnes et al. (2018); Freitas et al. (2020)	Used on packaging Significant	Merged with "Tracebility information"
	Country of origin	Alfnes et al. (2018); McKenzie et al. (2021); Brayden et al. (2018); Camire et al. (2001); Gordon & Cook (2004); Sogn-Grundvåg et al. (2014); Zander & Feucht (2018)	Used on packaging Significant	Included
	Location of harvest	Alfnes et al. (2018); Davidson et al. (2012)	Used on packaging Significant	Changed to "Regionality"

	Location of processing	Nurliza et al. (2021)	Used on packaging Not significant	Removed
	Harvested on date	Found in existing abalone and other seafood products	Used on packaging Not significant	Merged with "Packed on date"
	AWA Approved	Alfnes et al. (2018); Camire et al. (2001); McKenzie et al. (2021); Wang & Somogyi (2018); Zander & Feucht (2018)	Used on packaging Significant	Merged with "Responsible & sustainable farming"
	Organic certified	Alfnes et al. (2018); Brayden et al. (2018); Camire et al. (2001); Zander et al. (2018)	Used on packaging Significant	Included
	MSC approved	Alfnes et al. (2018); Camire et al. (2001); McKenzie et al. (2021); Wang & Somogyi (2018); Zander & Feucht (2018)	Used on packaging Significant	Merged with "Responsible & sustainable farming"
	ASC approved	Alfnes et al. (2018); Camire et al. (2001); McKenzie et al. (2021); Wang & Somogyi (2018); Zander & Feucht (2018)	Used on packaging Significant	Merged with "Responsible & sustainable farming"
	Halal approved	Found in existing abalone and other seafood products	Used on packaging Significant	Included
	Food awards	Found in existing abalone and other seafood products	Used on packaging Significant	Included
	Quality grading	Found in existing abalone and other seafood products	Used on packaging Significant	Included
	Farmed vs Wild-caught	Alfnes et al. (2018); Brayden et al. (2018); Camire et al. (2020); Davidson et al. (2012)	Used on packaging Significant	Included
	Grown in pristine water	Found in existing abalone and other seafood products	Used on packaging Significant	Changed to "Harvest method (Farmed vs Wild-caught)"
	Processing facility	Found in existing abalone and other seafood products	Used on packaging Not significant	Removed
	Processed in Brine or Sauce	Found in existing abalone and other seafood products	Used on packaging Significant	Included
	Freezing method (e.g., IQF)	Found in existing abalone and other seafood products	Used on packaging Significant	Included
	Production methods (e.g., cooked vs raw)	Found in existing abalone and other seafood products	Used on packaging Significant	Included
	Responsible & sustainable farming	Alfnes et al. (2018); Camire et al. (2001); McKenzie et al. (2021); Wang & Somogyi (2018); Zander & Feucht (2018)	Used on packaging Significant	Included

	Environmental impact	Alfnes et al. (2018); Loose et al. (2013)	Used on packaging Significant	Merged with "Responsible & sustainable farming"
	Animal welfare	Alfnes et al. (2018); Zander et al. (2018)	Not used on packaging Not Significant	Merged with "Responsible & sustainable farming"
	Fair trade	Alfnes et al. (2018)	Not Used on packaging Not Significant	Merged with "Responsible & sustainable farming"
	Food safety (HACCP Certified)	Alfnes et al. (2018)	Used on packaging Significant	Removed

Appendix 2-2: Data Integrity Check

Data integrity was checked using two tests. First, the maximum score of one cue chosen as best or worst must be in the range of -r × N to r × N (i.e., r refers to the number of times each cue appears across the choice sets). Second, the "sum of best" of all cues must be equal to the "sum of worst" of all cues and equal *b* x *N*.

Appendix 2-3a: Aggregated BWS Scores

Aggregated BWS score was calculated using the following formula: *TB – TW*

TB refers to the number of times one cue was chosen as best.

TW refers to the number of times one cue was chosen as worst.

Appendix 2-3b: BWS Ratioscale

BWS ratioscale was calculated using the following formula: √(TB/TW)

*To avoid dividing by 0, researchers added 0.5 to the TW with a value of 0 (Cohen, 2009).

Appendix 2-3c: BWS Relative Importance

The cue with the highest ratioscale was benchmarked as 100 to compare the relative importance of other cues (Cohen, 2009).

Appendix 2-4: Intrinsic segments socio-demographic characteristics

		Cluster 1 (N=55)	Cluster 2 (N=37)	Cluster 3 (N=24)	Cluster 4 (N=57)	Cluster 5 (N=27)
Age		35.7818	41.2973	43.7083	41.1228	37.5926
Gender	Male	58.2%	43.2%	20.8%	40.4%	59.3%
	Female	41.8%	56.8%	79.2%	59.6%	40.7%
Income	Lower than $10,000	1.8%	5.4%	8.3%	0.0%	3.7%
	$10,000 - $19,999	0.0%	8.1%	0.0%	7.0%	11.1%
	$20,000 - $29,999	3.6%	13.5%	4.2%	12.3%	3.7%
	$30,000 - $39,999	1.8%	5.4%	12.5%	12.3%	18.5%
	$40,000 - $49,999	1.8%	8.1%	20.8%	12.3%	11.1%
	$50,000 - $59,999	7.3%	0.0%	0.0%	7.0%	3.7%
	$60,000 - $69,999	5.5%	0.0%	4.2%	8.8%	0.0%
	$70,000 - $79,999	10.9%	8.1%	12.5%	10.5%	7.4%
	$80,000 - $89,999	5.5%	8.1%	8.3%	1.8%	7.4%
	$90,000 - $99,999	16.4%	13.5%	4.2%	10.5%	11.1%
	$100,000 - $149,999	30.9%	21.6%	25.0%	14.0%	18.5%
	Higher than $150,000	14.5%	8.1%	0.0%	3.5%	3.7%
Ethnicity	Australian	69.1%	56.8%	66.7%	68.4%	63.0%
	Western European	1.8%	0.0%	16.7%	7.0%	3.7%
	Eastern European	5.5%	0.0%	4.2%	1.8%	0.0%
	East Asian	9.1%	16.2%	0.0%	0.0%	14.8%
	Southeast Asian	9.1%	13.5%	8.3%	12.3%	14.8%
	South Asian	1.8%	8.1%	0.0%	7.0%	3.7%
	Middle East	1.8%	2.7%	0.0%	0.0%	0.0%
	African	0.0%	0.0%	4.2%	0.0%	0.0%
	South American	0.0%	0.0%	0.0%	1.8%	0.0%
	Others	1.8%	2.7%	0.0%	1.8%	0.0%
Living location	Metropolitan city area	89.1%	78.4%	70.8%	78.9%	70.4%
	Outside of metropolitan city area	10.9%	21.6%	29.2%	21.1%	29.6%
Education	Up to secondary school	1.8%	0.0%	8.3%	5.3%	3.7%

	Senior secondary school	7.3%	18.9%	29.2%	29.8%	3.7%
	Diploma	10.9%	18.9%	20.8%	12.3%	25.9%
	Undergraduate	54.5%	29.7%	25.0%	29.8%	40.7%
	Postgraduate	25.5%	27.0%	12.5%	17.5%	25.9%
	Higher Degree by Research	0.0%	5.4%	4.2%	5.3%	0.0%
Purchase frequency	Less than once per month	83.6%	78.4%	75.0%	68.4%	88.9%
	Once or twice per month	12.7%	13.5%	16.7%	21.1%	7.4%
	More than twice per month	3.6%	8.1%	8.3%	10.5%	3.7%

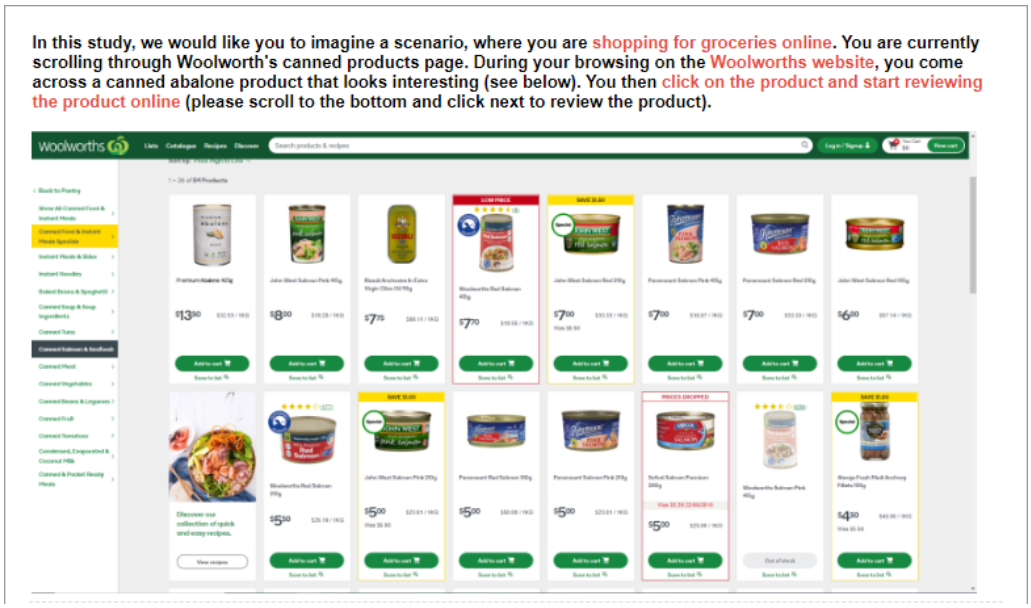
Appendix 2-5: Extrinsic segments socio-demographic characteristics

		Cluster 1 (N=37)	**Cluster 2 (N=19)**	**Cluster 3 (N=17)**	**Cluster 4 (N=44)**	**Cluster 5 (N=40)**	**Cluster 6 (N=43)**
Age		34.9730	35.1053	38.8824	37.2955	44.0500	43.6977
Gender	Male	51.4%	42.1%	52.9%	40.9%	45.0%	46.5%
	Female	48.6%	57.9%	47.1%	59.1%	55.0%	53.5%
Income	Lower than $10,000	5.4%	0.0%	0.0%	9.1%	0.0%	0.0%
	$10,000 - $19,999	2.7%	10.5%	17.6%	4.5%	2.5%	2.3%
	$20,000 - $29,999	2.7%	15.8%	5.9%	6.8%	10.0%	9.3%
	$30,000 - $39,999	2.7%	5.3%	5.9%	15.9%	7.5%	11.6%
	$40,000 - $49,999	8.1%	5.3%	11.8%	11.4%	15.0%	4.7%
	$50,000 - $59,999	5.4%	5.3%	5.9%	4.5%	5.0%	2.3%
	$60,000 - $69,999	2.7%	10.5%	0.0%	2.3%	7.5%	4.7%
	$70,000 - $79,999	10.8%	5.3%	5.9%	6.8%	12.5%	14.0%
	$80,000 - $89,999	10.8%	0.0%	5.9%	4.5%	2.5%	7.0%
	$90,000 - $99,999	10.8%	5.3%	17.6%	13.6%	12.5%	11.6%
	$100,000 - $149,999	21.6%	31.6%	17.6%	18.2%	25.0%	20.9%
	Higher than $150,000	16.2%	5.3%	5.9%	2.3%	0.0%	11.6%
Ethnicity	Australian	70.3%	68.4%	29.4%	77.3%	47.5%	79.1%
	Western European	0.0%	5.3%	0.0%	2.3%	15.0%	4.7%
	Eastern European	2.7%	5.3%	0.0%	0.0%	0.0%	7.0%
	East Asian	5.4%	0.0%	29.4%	4.5%	15.0%	0.0%
	Southeast Asian	8.1%	15.8%	41.2%	6.8%	12.5%	4.7%
	South Asian	5.4%	5.3%	0.0%	2.3%	10.0%	2.3%
	Middle East	2.7%	0.0%	0.0%	2.3%	0.0%	0.0%

	African	0.0%	0.0%	0.0%	2.3%	0.0%	0.0%
	South American	0.0%	0.0%	0.0%	2.3%	0.0%	0.0%
	Others	5.4%	0.0%	0.0%	0.0%	0.0%	2.3%
Living location	Metropolitan city area	83.8%	89.5%	100.0%	65.9%	85.0%	72.1%
	Outside of metropolitan city area	16.2%	10.5%	0.0%	34.1%	15.0%	27.9%
Education	Up to secondary school	0.0%	0.0%	11.8%	4.5%	2.5%	4.7%
	Senior secondary school	10.8%	36.8%	5.9%	22.7%	17.5%	16.3%
	Diploma	27.0%	5.3%	0.0%	27.3%	7.5%	14.0%
	Undergraduate	40.5%	15.8%	29.4%	31.8%	50.0%	41.9%
	Postgraduate	18.9%	42.1%	52.9%	13.6%	15.0%	18.6%
	Higher Degree by Research	2.7%	0.0%	0.0%	0.0%	7.5%	4.7%
Purchase frequency	Less than once per month	81.1%	36.8%	94.1%	86.4%	85.0%	72.1%
	Once or twice per month	16.2%	42.1%	5.9%	6.8%	5.0%	23.3%
	More than twice per month	2.7%	21.1%	0.0%	6.8%	10.0%	4.7%

Chapter 3:

Appendix 3-1. Online shopping manipulation priming



Appendix 3-2. Offline shopping manipulation priming

In this study, we would like you to imagine a scenario, where you are shopping for groceries at one of your local Woolworths stores. You are currently strolling down their canned food products aisle. During your browsing, you come across a canned abalone product that looks interesting (see below). You then approach the section, pick up the canned abalone and start reviewing the product (please scroll to the bottom and click next to review the product).

Appendix 3-3. Concrete vs. abstract framing of naturalness stimuli

This premium canned abalone is all natural. Our abalone is grown in Australia and frozen from live before packing to preserve the tenderness and sweetness of the meat. You can buy this premium abalone online through the Woolworths website.

Abstractly Framed Naturalness

This premium canned abalone is 100% natural with minimal processing and no artificial ingredients. Our abalone is grown in Australia and frozen from live before packing to preserve the tenderness and sweetness of the meat. You can buy this premium abalone online through the Woolworths website.

Concretely Framed Naturalness

Chapter 4:

Appendix 4-1: Fresh pork cues acquired from the thorough literature review and the industry audit actual products.

Category	Rank	Cue	Literature Review	Pre-test		Industry Audit	Final Decision
				M	SD		
Intrinsic	1	Freshness	Oh and See, (2012)	6.60	0.73	Not used on packaging Not significant factor	Removed
	2	Taste	Melton et al. (1996); Meuwissen et al. (2007)	6.48	0.81	Used on packaging Significant factor	Included
	3	Flavour	Melton et al. (1996); Meuwissen et al. (2007)	6.32	0.89	Used on packaging Significant factor	Merged with" "Taste"
	4	Succulent (i.e., juicy and tender)	Melton et al. (1996)	6.16	0.89	Used on packaging Significant factor	Included
	5	No smell of boar taint (e.g., Without the offensive odour or taste during cooking/eating)	Font-i-Furnols (2012)	6.04	1.21	Not used on packaging Significant factor	Included
	6	Colour of the meat	Argemí-Armengol et al. (2019); Ngapo et al. (2007); Papanagiotou et al. (2012)	5.96	1.05	Not used on packaging Significant factor	Included
	7	Pork cuts (e.g., Loin vs Belly)	Argemí-Armengol et al. (2019)	5.84	1.18	Used on packaging Significant factor	Included
	8	Juiciness	Melton et al. (1996)	5.78	1.17	Used on packaging Significant factor	Merged with "Succulent "
	9	Fat to lean ratio	Argemí-Armengol et al. (2019)	5.52	1.23	Used on packaging Significant factor	Merged with "Leanness "
	10	Size of the cut	Melton et al.,(1996); Ngapo et al.,(2007)	5.38	1.19	Not used on packaging Significant factor	Included
	11	Thickness of the cut	McLean et al. (2017); Rice et al. (2019)	5.28	1.20	Not used on packaging	Included

						Significant factor	
	12	Leanness	Ma et al. (2017)	5.26	1.47	Not used on packaging Significant factor	Merged with "Fat to lean ratio"
	13	Colour of the fat	Seman et al. (2013)	5.08	1.14	Not used on packaging Significant factor	Included
	14	Fat trim (The excess fat on the edge has been trimmed)	Argemí-Armengol et al. (2019); Ngapo et al. (2004)	5.08	1.47	Not used on packaging Significant factor	Included
	15	Weight (NET kg)	Argemí-Armengol et al. (2019)	5.06	1.24	Used on packaging Not significant factor	Included
	16	Firmness	Ngapo et al. (2004)	4.90	1.25	Not used on packaging Significant factor	Included
	17	Wetness (i.e., the appearance of water on the pork surface)	Moeller et al. (1999)	4.64	1.31	Not used on packaging Not significant factor	Included
	18	Marbling	Argemí-Armengol et al. (2019); Font-i-Furnols et al. (2012); Papanagiotou et al. (2012)	4.16	1.57	Not used on packaging Significant factor	Included
	19	Drip loss	Argemí-Armengol et al. (2019); Ngapo et al. (2004)	3.62	1.75	Not used on packaging Significant factor	Removed
	20	Breed type (i.e., Iberico, Berkshire, Duroc, Crossbred)	Argemí-Armengol et al. (2019)	3.00	1.74	Used on packaging Not significant factor	Included
Extrinsic	1	Best before date	Argemí-Armengol et al. (2019); Borgogno et al. (2015); Wongprawmas et al. (2018)	6.44	0.91	Used on packaging Significant factor	Included
	2	Price	Kirsten et al. (2017); Lusk et al. (2007); Ma et al.	6.14	0.93	Used on packaging Significant factor	Included

			(2017); Meuwissen et al. (2007)				
	3	Salmonella safety	Meuwissen et al. (2007)	6.04	1.54	Not used on packaging Not significant factor	Removed
	4	Unit price	Found in existing fresh pork products	5.72	1.26	Used on packaging Not significant factor	Merged with "Price"
	5	Country of Origin	Argemí-Armengol et al. (2019); Meuwissen et al. (2007)	5.72	1.54	Used on packaging Significant factor	Included
	6	Animal welfare and treatment information (e.g., raised in a stress-free environment)	Cummins et al. (2016); Lusk et al. (2007)	5.38	1.78	Used on packaging Significant factor	Included
	7	Free range	Ophuis (1994)	5.36	1.59	Used on packaging Significant factor	Included
	8	Chilled vs. frozen	Wang et al. (2018); Ma et al. (2017)	5.32	1.60	Not used on packaging Not significant factor	Included
	9	No artificial additives (colour and flavour)	Found in existing fresh pork products	5.30	1.82	Used on packaging Significant factor	Included
	10	Chemical free	Wang et al. (2018)	5.22	1.87	Not used on packaging Not significant factor	Removed
	11	Antibiotics free	Lusk et al. (2007)	5.22	1.96	Used on packaging Significant factor	Included
	12	Environmentally Friendly Farming	Lusk et al. (2007); Wang et al. (2018)	5.22	1.71	Used on packaging Significant factor	Included
	13	Quality assurance	Wu et al. (2016)	5.12	1.71	Used on packaging Significant factor	Included
	14	Promotional cues (e.g., Discount)	Found in existing fresh pork products	5.06	1.66	Not used on packaging Significant factor	Included

	15	No preservatives	Found in existing fresh pork products	5.06	1.82	Used on packaging Significant factor	Included
	16	Value proposition	Found in existing fresh pork products	5.02	1.33	Used on packaging Not significant factor	Merged with "Brand name of producer"
	17	Hormone Growth Promot ant Free	Yang et al. (2017)	4.98	2.02	Used on packaging Significant factor	Included
	18	Quality grading	Wu et al. (2016)	4.88	1.49	Not used on packaging Significant factor	Included
	19	Batch date (slaughter date)	Argemí-Armengol et al. (2019); Chen et al. (2012); Liu et al. (2018); Wu et al. (2016)	4.86	1.85	Not used on packaging Significant factor	Included
	20	Pristine and natural farming environment	Found in existing fresh pork products	4.82	1.80	Used on packaging Not significant factor	Included
	21	Nutrition information	Found in existing fresh pork products	4.80	1.92	Used on packaging Not significant factor	Included
	22	Ingredient list	Found in existing fresh pork products	4.78	1.90	Used on packaging Not significant factor	Removed
	23	Health star rating	Found in existing fresh pork products	4.76	1.96	Used on packaging Significant factor	Included
	24	Treated with Radiation	Meuwissen et al. (2007)	4.72	1.82	Not used on packaging Not significant factor	Removed
	25	All natural	Found in existing fresh pork products	4.72	1.82	Used on packaging Significant factor	Included
	26	Low cholesterol, fat, and sodium	Found in existing fresh pork products	4.70	1.81	Used on packaging Not significant factor	Removed

	27	History of illness and taking protective measures	Liu et al. (2018)	4.68	1.87	Not used on packaging Not significant factor	Removed
	28	Residues of medicines	Meuwissen et al. (2007)	4.58	1.85	Not used on packaging Not significant factor	Removed
	29	Farming space	Tonsor et al. (2009); Verbeke et al. (2010)	4.56	1.90	Not used on packaging Not significant factor	Removed
	30	Sustainably packed	Found in existing fresh pork products	4.54	1.81	Used on packaging Not significant factor	Included
	31	Type of feed (e.g., grain, grass, acorn, etc.,)	Liu et al. (2018)	4.52	1.53	Used on packaging Not significant factor	Included
	32	Environmental information of the origin	Liu et al. (2018); Cummins et al. (2016)	4.52	1.91	Not used on packaging Not significant factor	Removed
	33	Satisfaction Guarantee	Found in existing fresh pork products	4.48	1.84	Used on packaging Not significant factor	Included
	34	Space per growing pig	Meuwissen et al. (2007)	4.46	2.04	Not used on packaging Not significant factor	Removed
	35	Location of farm (or Producers)/ Origin and Location of Farm	Argemí-Armengol et al. (2019); Meuwissen et al. (2007)	4.42	1.75	Used on packaging Not significant factor	Changed to "Regionality"
	36	Living surface	Meuwissen et al. (2007); Verbeke et al. (2010)	4.30	1.73	Not used on packaging Not significant factor	Removed
	37	Medicines use	Capper (2020)	4.28	1.85	Not used on packaging Not significant factor	Removed
	38	Space per nursing sow	Velarde et al. (2015)	4.26	2.01	Not used on packaging Not	Removed

						significant factor	
	39	Residues of herbic in feed	Meuwissen et al. (2007)	4.24	1.85	Not used on packaging Not significant factor	Removed
	40	Storage Suggestion	Found in existing fresh pork products	4.22	1.90	Used on packaging Not significant factor	Removed
	41	Organically raised	Wang et al. (2018)	4.22	1.99	Used on packaging Significant factor	Included
	42	Sow Stall Free	D' Souza (2017)	4.22	1.95	Used on packaging Significant factor	Included
	43	Extra cooking for safety	Meuwissen et al. (2007)	4.18	1.89	Used on packaging Not significant factor	Removed
	44	Location of processing	Liu et al. (2018); Meuwissen et al. (2007)	4.16	1.93	Used on packaging Not significant factor	Removed
	45	Processing information	Liu et al. (2018); Wu et al. (2016)	4.12	1.78	Not used on packaging Not significant factor	Removed
	46	Space per gestating sow	Meuwissen et al. (2007); Verbeke et al. (2010)	4.12	1.97	Not used on packaging Not significant factor	Removed
	47	Retail information	Liu et al. (2018)	4.10	1.64	Not used on packaging Not significant factor	Removed
	48	Packaging types (e.g., tray vs vacuum)	Argemí-Armengol et al. (2019); Ma et al. (2017)	4.08	1.76	Used on packaging Significant factor	Included
	49	No genetically modified organism (No GMO)	Zheng et al. (2012)	4.08	2.22	Used on packaging Significant factor	Included
	50	Group size (number of sows)	Velarde et al. (2015)	4.04	1.89	Not used on packaging Not significant factor	Removed

	51	Recyclability instructions	Found in existing fresh pork products	3.94	1.91	Used on packaging Significant factor	Removed
	52	Survival rate of farrows	Velarde et al. (2015)	3.90	1.91	Not used on packaging Not significant factor	Removed
	53	Brand name of Producer	Argemí-Armengol et al. (2019); Bredahl (2004); Lusk et al. (2007)	3.90	1.57	Used on packaging Significant factor	Included
	54	Residuals of human food in feed	Meuwissen et al. (2007)	3.88	1.71	Not used on packaging Not significant factor	Removed
	55	Producers' information	Liu et al. (2018); Wu et al. (2016)	3.86	1.76	Used on packaging Not significant factor	Removed
	56	Farming house	Verbeke et al. (2010)	3.86	1.91	Not used on packaging Not significant factor	Removed
	57	Cooking and Serving tips (Hints and Tips)	Found in existing fresh pork products	3.78	1.73	Used on packaging Not significant factor	Included
	58	Traceability Information (e.g., QR Code to track origin, breed type, feed, logistic, etc.)	Argemí-Armengol et al. (2019); Meuwissen et al. (2007)	3.72	1.77	Used on packaging Significant factor	Included
	59	GM substances	Meuwissen et al. (2007)	3.70	2.00	Not used on packaging Not significant factor	Removed
	60	Bonemeal in feed	Meuwissen et al. (2007)	3.68	1.70	Not used on packaging Not significant factor	Removed
	61	Cooking Suggestion	Found in existing fresh pork products	3.66	1.89	Used on packaging Not significant factor	Merged with "Cooking and Serving Tips"

	62	Nesting provisions	Velarde et al. (2015)	3.66	1.94	Not used on packaging Not significant factor	Removed
	63	GM breeding	Meuwissen et al. (2007)	3.60	1.97	Not used on packaging Not significant factor	Removed
	64	Transportation information	Liu et al. (2018); Wu et al. (2016)	3.56	1.62	Not used on packaging Not significant factor	Removed
	65	Breeding goal	Meuwissen et al. (2007)	3.54	1.51	Not used on packaging Not significant factor	Removed
	66	Provision of dry straw (inches)	Velarde et al. (2015)	3.50	1.47	Not used on packaging Not significant factor	Removed
	67	Food Award(s) Won	Found in existing fresh pork products	3.50	1.58	Used on packaging Significant factor	Included
	68	Minor surgeries	Schreiner (2018)	3.46	1.73	Not used on packaging Not significant factor	Removed
	69	Teeth clipping	Meuwissen et al. (2007)	3.36	1.76	Not used on packaging Not significant factor	Removed
	70	Castration	Meuwissen et al. (2007)	3.34	1.83	Not used on packaging Not significant factor	Removed
	71	Tail docking	Meuwissen et al. (2007)	3.34	1.76	Not used on packaging Not significant factor	Removed
	72	Producers' contact	Found in existing fresh pork products	3.34	1.81	Used on packaging Not significant factor	Merged with "Brand name of producer"
	73	Producer address	Found in existing fresh pork products	3.30	1.87	Used on packaging Not significant factor	Merged with "Brand name of producer"

	74	Heritage of Producers	Found in existing fresh pork products	3.18	1.64	Used on packaging Not significant factor	Merged with "Brand name of producer"
	75	Tag line	Found in existing fresh pork products	2.56	1.55	Used on packaging Not significant factor	Merged with "Brand name of producer"

Appendix 4-2: Intrinsic segments socio-demographic characteristics

		Lean meat eater	Colour lover	Boar taint hater	Cuts and size matters
Age		46.15	40.77	41.67	43.17
Gender	Male	54.7%	54.5%	32.8%	48.3%
	Female	45.3%	45.5%	67.2%	51.7%
Ethnicity	Australian	73.6%	68.2%	78.7%	76.7%
	Western European	5.7%	9.1%	4.9%	10.0%
	Eastern European	1.9%	4.5%	6.6%	3.3%
	East Asian	3.8%	9.1%	3.3%	8.3%
	South East Asian	5.7%	9.1%	1.6%	0.0%
	South Asian	3.8%	0.0%	1.6%	0.0%
	Middle East	1.9%	0.0%	0.0%	0.0%
	African	0.0%	0.0%	1.6%	0.0%
	North American	1.9%	0.0%	0.0%	0.0%
	Others	1.9%	0.0%	1.6%	1.7%
Income	Lower than $10,000	7.5%	0.0%	0.0%	5.0%
	$10,000 - $19,999	7.5%	9.1%	4.9%	1.7%
	$20,000 - $29,999	7.5%	0.0%	11.5%	18.3%
	$30,000 - $39,999	7.5%	18.2%	8.2%	8.3%
	$40,000 - $49,999	1.9%	13.6%	18.0%	15.0%
	$50,000 - $59,999	7.5%	13.6%	8.2%	11.7%
	$60,000 - $69,999	1.9%	22.7%	8.2%	11.7%
	$70,000 - $79,999	5.7%	0.0%	14.8%	6.7%
	$80,000 - $89,999	7.5%	0.0%	6.6%	8.3%
	$90,000 - $99,999	9.4%	4.5%	1.6%	1.7%
	$100,000 - $149,999	24.5%	9.1%	13.1%	8.3%
	Higher than $150,000	11.3%	9.1%	4.9%	3.3%
Living location	Metropolitan city area	77.4%	63.6%	80.3%	58.3%
	Outside of metropolitan city area	22.6%	36.4%	19.7%	41.7%
Education	Up to secondary school	3.8%	13.6%	1.6%	11.7%
	Senior secondary school	18.9%	22.7%	32.8%	28.3%
	Diploma	24.5%	40.9%	19.7%	16.7%
	Undergraduate	20.8%	22.7%	23.0%	30.0%
	Postgraduate	32.1%	0.0%	23.0%	13.3%
Purchase frequency per week	Once per week or less	75.5%	72.7%	88.5%	81.7%
	Two or three time a week	15.1%	27.3%	11.5%	15.0%
	More than three time a week	9.4%	0.0%	0.0%	3.3%

Appendix 4-3: Extrinsic segments socio-demographic characteristics

		Utilitarian buyers	Animal and environment lovers	Naturalness lovers	Demanding buyers
Age		40.91	38.39	55.55	42.59
Gender	Male	48.7%	67.9%	55.2%	27.9%
	Female	51.3%	32.1%	44.8%	72.1%
Ethnicity	Australian	79.5%	75.0%	72.4%	72.1%
	Western European	5.1%	3.6%	10.3%	9.8%
	Eastern European	2.6%	0.0%	6.9%	6.6%
	East Asian	7.7%	7.1%	6.9%	1.6%
	South East Asian	1.3%	7.1%	3.4%	3.3%
	South Asian	1.3%	0.0%	0.0%	3.3%

	Middle East	0.0%	0.0%	0.0%	1.6%
	African	0.0%	0.0%	0.0%	1.6%
	North American	1.3%	0.0%	0.0%	0.0%
	Others	1.3%	7.1%	0.0%	0.0%
Income	Lower than $10,000	3.8%	7.1%	0.0%	3.3%
	$10,000 - $19,999	5.1%	3.6%	10.3%	3.3%
	$20,000 - $29,999	12.8%	10.7%	13.8%	8.2%
	$30,000 - $39,999	7.7%	7.1%	6.9%	13.1%
	$40,000 - $49,999	14.1%	7.1%	17.2%	9.8%
	$50,000 - $59,999	6.4%	7.1%	13.8%	13.1%
	$60,000 - $69,999	11.5%	3.6%	3.4%	11.5%
	$70,000 - $79,999	10.3%	7.1%	10.3%	4.9%
	$80,000 - $89,999	6.4%	3.6%	3.4%	9.8%
	$90,000 - $99,999	3.8%	10.7%	3.4%	1.6%
	$100,000 - $149,999	11.5%	21.4%	6.9%	18.0%
	Higher than $150,000	6.4%	10.7%	10.3%	3.3%
Living location	Metropolitan city area	65.4%	78.6%	69.0%	75.4%
	Outside of metropolitan city area	34.6%	21.4%	31.0%	24.6%
Education	Up to secondary school	2.6%	14.3%	6.9%	8.2%
	Senior secondary school	33.3%	17.9%	24.1%	23.0%
	Diploma	26.9%	3.6%	24.1%	24.6%
	Undergraduate	17.9%	21.4%	31.0%	31.1%
	Postgraduate	19.2%	42.9%	13.8%	13.1%
Purchase frequency per week	Once per week or less	85.9%	57.1%	93.1%	80.3%
	Two or three time a week	12.8%	28.6%	3.4%	18.0%
	More than three time a week	1.3%	14.3%	3.4%	1.6%

Chapter 5:

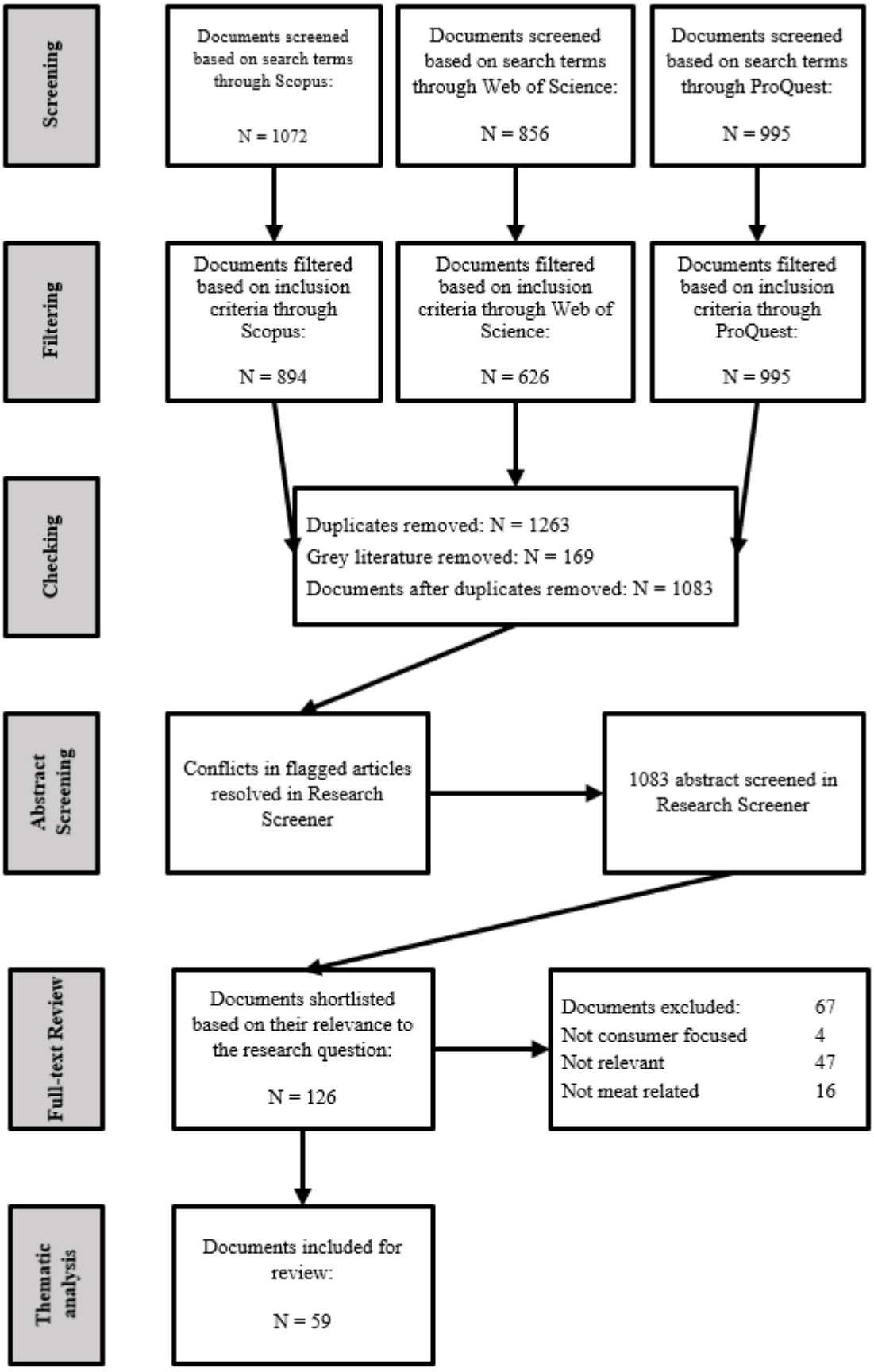
Appendix 5-1. Inclusion criteria.

Language	English
Study design	SEM, quantitative empirical; conjoint analysis, auction, dichotomous choice, contingent valuation, choice experiments, additional methods of willingness-to-pay or intention to purchase
Population	Consumers OR buyer OR public
Outcome	Willingness to pay, willingness to pay premium, intention-to-purchase, choice, stated preferences vs. revealed preferences

Appendix 5-2. Keywords considered for search.

Databases	Scopus, Web of Science and ProQuest
Type of manipulation	Intervention* OR marketing OR communication* OR strateg* OR information* OR label* OR message* OR collateral* OR tactic* OR campaign* OR nudge*
Type of Outcome	Value OR intention OR behaviour OR purchase OR intention to purchase OR WTP OR willingness to pay OR willingness to buy OR buy OR preference OR demand OR choice OR perception
Animal Type	Farm animal OR production animal *pig OR swine OR sow OR hog OR poultry OR broiler OR chick OR fowl OR turkey OR hen OR egg OR pork OR piglet OR weaner OR cattle OR cow OR beef OR horse OR bovine OR sheep OR lamb OR mutton OR goat OR duck OR turkey OR goose OR meat*
Animal Welfare	Animal welfare OR ethical meat OR organic meat OR Free-range

Appendix 5-3. The research process of Systematic Literature Review



Abstract review

The present review used Research Screener (Chai et al., 2021), a machine learning tool, to semi-automate the abstract screening process. First, the Endnote library was exported to Research Screener, where duplicates were further identified and removed. Second, the researchers identified a number of seed articles (i.e., articles that are most relevant to the research questions) and input them into the Research Screener for the training algorithm to rank articles based on their relevance. Third, one researcher screened one round of abstracts (i.e., 50 abstracts each round) provided by the Research Screener. The researcher read the abstracts and flagged those that were deemed to be relevant. Then, three other researchers also conducted their independent screenings and flagged the relevant abstracts. Afterwards, a meeting was carried out to resolve the conflict among the researchers on which abstracts should be flagged. The results were then input back into the Research Screener to train the ranking algorithm further. This process was replicated for another round (i.e., 50 abstracts) to ensure a high agreement among researchers in terms of inclusion and exclusion criteria of abstracts. Fourth, one researcher then proceeded to complete the screening of all remaining abstracts (i.e., 19 rounds = 950 abstracts). Finally, a total of 126 abstracts were flagged for full-text review.

Full-text review and data extraction

This paper adopted the ADO (Paul & Benito, 2018) and TCCM (Paul, Parthasarathy, & Gupta, 2017) frameworks to examine the following:

- Antecedents (animal welfare practice)
- Decision (mediators and moderators)
- Outcome (attitudinal and behavioural responses)
- Theory (theoretical underpinning)
- Contexts (where, when and what were studied).
- Characteristics (population characteristics)
- Methods

Four reviewers conducted their independent full-text review on at least 10% of the studies and produced a data extraction form. Afterwards, the reviewers will compare their extraction form to check for potential errors, missing data and variables. After finalising the data extraction strategy, the primary researcher conducted a full-text review and thematic analyses for 126 articles. A working spreadsheet was created to appraise 126 articles and identify relevant animal welfare practices, domains and their effect on consumers' attitudinal and behavioural responses. During this process, the primary research identified 67 articles that were not relevant to the research question (refer to Appendix 3). In total, there were 59 articles included in the data extraction and thematic analyses.

Full list of articles included in thematic analyses

Paper	Year	Country	Population	Sample size	Method	Species
Ufer, D., Ortega, D. L., Wolf, C. A., Swanson, J., & McKendree, M. Market Acceptance of Animal Welfare-Improving Biotechnology: Gene-Editing and Immunocastration in US Pork. Journal of Agricultural and Resource Economics, 47(2), 444-461 (2022).	2022	US	Consumer	203	Becker–DeGroot–Marschak	Pigs
Akaichi, F., Glenk, K., & Revoredo-Giha, C. Bundling food labels: What role could the labels "Organic,""Local" and "Low Fat" play in fostering the demand for animal-friendly meat. Agribusiness, 38(2), 349-370 (2022).	2022	UK	Consumer	120	Choice experiment (CE)	Pigs
Schmiess, J. S., & Lusk, J. L. Trade-Off between Animal Welfare and Environmental Impacts of Beef Production: An Analysis of Presentation Effects on Consumer Choice, Journal of Agricultural and Resource Economics, Volume 47, Issue 2, 278-299 (2022)	2022	US	Consumer	1559	Conjoint choice	Beef
Stoltenberg, B., Unfried, M., & Manewitsch, V. Better Product Labels for Better Consumer Choices. NIM Marketing Intelligence Review, 14(1), 49-53 (2022).	2022	Germany	Consumer	400	Conjoint choice	Pigs
Angón, E., Requena, F., Caballero-Villalobos, J., Cantarero-Aparicio, M., Martínez-Marín, A. L., & Perea, J. M. Beef from calves finished with a diet based on concentrate rich in agro-industrial by-products: acceptability and quality label preferences in Spanish meat consumers. Animals, 12(1), 6 (2021).	2022	Spain	Consumer	300	Conjoint choice	Beef
Lin-Schilstra, L., & Fischer, A. R. Paradoxical consumers in four European countries: Meat-eating justification and willingness to pay for meat from animals treated by alternatives to surgical castration. Meat Science, 188, 108777 (2022).	2022	Cross-country	Consumer	825	Contingent valuation	Pigs
Jelić Milković, S., Lončarić, R., Zmaić, K., Kranjac, D., & Canavari, M. Choice Experiment Performed on the Fresh Black Slavonian Pig's Meat: A Preliminary Study. Poljoprivreda, 27(2), 75-83 (2021).	2021	Croatia	Consumer	100	Conjoint choice	Pigs

García-Gudiño, J., Blanco-Penedo, I., Gispert, M., Brun, A., Perea, J., & Font-i-Furnols, M. Understanding consumers' perceptions towards Iberian pig production and animal welfare. Meat Science, 172, 108317 (2021).	2021	Spain	Consumer	403	Conjoint choice	Pigs
Gross, S., Waldrop, M. E., & Roosen, J. How does animal welfare taste? Combining sensory and choice experiments to evaluate willingness to pay for animal welfare pork. Food Quality and Preference, 87, 104055 (2021).	2021	Germany	Consumer	155	Choice experiment (CE)	Pigs
Hwang, J., Lee, S., Jo, M., Cho, W., & Moon, J. The effect of sustainability-related information on the sensory evaluation and purchase behavior towards salami products. Food Science of Animal Resources, 41(1), 95 (2021).	2021	Korea	Consumer	90	Choice experiment (CE)	Pigs
Chen, M., Hu, E., Kuen, L. L., & Wu, L. Study on consumer preference for traceable pork with animal welfare attribute. Frontiers in Psychology, 12, 675554 (2021).	2021	China	Consumer	328	Choice experiment (CE)	Pigs
Xu, L., Yu, M., & Chen, X. Decoy Effect on Consumers' Purchase Behaviors in Relation to Meat Products: Comparison of Pork and Chicken. Frontiers in Psychology, 12, 679256 (2021).	2021	China	Consumer	405	Conventional experiment	Cross-species
Neuhofer, Z. T., & Lusk, J. L. Decomposing the Value of Food Labels on Chicken. Journal of Agricultural and Applied Economics, 53(2), 229-245 (2021).	2021	US	Consumer	2049	Choice experiment (CE)	Chicken
Winkel, C., Schukat, S., & Heise, H. Importance and feasibility of Animal Welfare Measures from a consumer perspective in Germany. Food ethics, 5, 1-16 (2020).	2020	Germany	Consumer	1048	Questionnaires	Pigs
Chini, J., Spers, E. E., Silva, H. M. R. D., & Oliveira, M. C. J. D. The influence of signal attributes on the willingness to pay for pasture-raised beef. RAUSP Management Journal, 55, 435-456 (2021).	2020	Cross-country	Consumer	267	Choice experiment (CE)	Beef
Otieno, D. J., & Ogutu, S. O. Consumer willingness to pay for chicken welfare attributes in Kenya. Journal of International Food & Agribusiness Marketing, 32(4), 379-402 (2020).	2020	Kenya	Consumer	200	Choice experiment (CE)	Chicken
Eldesouky, A., Mesias, F. J., & Escribano, M. Consumer assessment of sustainability traits in meat production. A	2020	Spain	Consumer	285	Choice experiment (CE)	Beef

choice experiment study in Spain. Sustainability, 12(10), 4093 (2020).						
Cornish, A. R., Briley, D., Wilson, B. J., Raubenheimer, D., Schlosberg, D., & McGreevy, P. D. The price of good welfare: Does informing consumers about what on-package labels mean for animal welfare influence their purchase intentions?. Appetite, 148, 104577 (2020).	2020	Autralia	Citizens	1612	Questionnaires	Cross-species
Sødring, M., Nafstad, O., & Håseth, T. T. Change in Norwegian consumer attitudes towards piglet castration: Increased emphasis on animal welfare. Acta Veterinaria Scandinavica, 62(1), 1-9. (2020).	2020	Norway	Consumer	1002	Questionnaires	Pigs
van Riemsdijk, L., Ingenbleek, P. T., van der Veen, G., & van Trijp, H. C. Positioning strategies for animal-friendly products: a social dilemma approach. Journal of Consumer Affairs, 54(1), 100-129 (2020).	2020	Netherland	Consumer	575	Choice experiment (CE)	Chicken
Uehleke, R., & Hüttel, S. The free-rider deficit in the demand for farm animal welfare-labelled meat. European Review of Agricultural Economics, 46(2), 291-318 (2019).	2019	Germany	Consumer	607	Contingent valuation	Pigs
Latacz-Lohmann, U., & Schreiner, J. A. Assessing consumer and producer preferences for animal welfare using a common elicitation format. Journal of Agricultural Economics, 70(2), 293-315 (2019).	2019	Germany	Consumer	554	Choice experiment (CE)	Pigs
Di Pasquale, J., Nannoni, E., Sardi, L., Rubini, G., Salvatore, R., Bartoli, L., ... & Martelli, G. Towards the abandonment of surgical castration in pigs: How is immunocastration perceived by Italian consumers?. Animals, 9(5), 198 (2019).	2019	Italy	Consumer	969	Conventional experiment	Pigs
Akaichi, F., Glenk, K., & Revoredo-Giha, C. Could animal welfare claims and nutritional information boost the demand for organic meat? Evidence from non-hypothetical experimental auctions. Journal of Cleaner Production, 207, 961-970 (2019).	2019	UK	Consumer	120	Vickery Auction	Pigs
Grunert, K. G., Sonntag, W. I., Glanz-Chanos, V., & Forum, S. Consumer interest in environmental impact, safety, health and animal welfare aspects of modern pig production: Results	2018	Cross-country	Consumer	1007	Choice experiment (CE)	Pigs

of a cross-national choice experiment. Meat science, 137, 123-129 (2018).						
Casal, N., Font-i-Furnols, M., Gispert, M., Manteca, X., & Fàbrega, E. Effect of environmental enrichment and herbal compounds-supplemented diet on pig carcass, meat quality traits, and consumers' acceptability and preference. Animals, 8(7), 118 (2018).	2018	Spain	Consumer	106	Conjoint choice	Pigs
Lusk, J. L. Consumer preferences for and beliefs about slow growth chicken. Poultry science, 97(12), 4159-4166 (2018).	2018	U.S	Consumer	2049	Choice experiment (CE)	Chicken
Dahlhausen, J. L., Rungie, C., & Roosen, J. Value of labeling credence attributes—common structures and individual preferences. Agricultural economics, 49(6), 741-751 (2018).	2018	Germany	Consumer	802	Conjoint choice	Pigs
Mulder, M., & Zomer, S. Dutch consumers' willingness to pay for broiler welfare. Journal of Applied Animal Welfare Science, 20(2), 137-154 (2017).	2017	Netherland	Consumer	1603	Choice experiment (CE)	Chicken
Denver, S., Sandøe, P., & Christensen, T. Consumer preferences for pig welfare–Can the market accommodate more than one level of welfare pork?. Meat Science, 129, 140-146 (2017).	2017	Denmark	Consumer	396	Choice experiment (CE)	Pigs
Risius, A., & Hamm, U. The effect of information on beef husbandry systems on consumers' preferences and willingness to pay. Meat science, 124, 9-14 (2017).	2017	Germany	Grocery shoppers	676	Choice experiment (CE)	Beef
Pettersson, I. C., Weeks, C. A., Wilson, L. R. M., & Nicol, C. J. Consumer perceptions of free-range laying hen welfare. British Food Journal, 118(8), 1999-2013 (2016).	2016	UK	Consumer	6378	Questionnaires	Chicken
de Jonge, J., van der Lans, I. A., & van Trijp, H. C. Different shades of grey: Compromise products to encourage animal friendly consumption. Food quality and preference, 45, 87-99 (2015).	2015	Netherland	Consumer	1269	Choice experiment (CE)	Chicken
Van Loo, E. J., Caputo, V., Nayga Jr, R. M., & Verbeke, W. Consumers' valuation of sustainability labels on meat. Food Policy, 49, 137-150 (2014).	2014	Belgium	Consumer	359	Choice experiment (CE)	Chicken
Viegas, I., Nunes, L. C., Madureira, L., Fontes, M. A., & Santos, J. L. Beef credence attributes: Implications of	2014	Portugal	Grocery shoppers	613	Choice experiment (CE)	Beef

substitution effects on consumers' WTP. Journal of Agricultural Economics, 65(3), 600-615 (2014).						
de Jonge, J., & van Trijp, H. Heterogeneity in consumer perceptions of the animal friendliness of broiler production systems. Food Policy, 49, 174-185 (2014).	2014	Netherland	Grocery shoppers	1269	Choice experiment (CE)	Chicken
Heid, A., & Hamm, U. Animal welfare versus food quality: Factors influencing organic consumers' preferences for alternatives to piglet castration without anaesthesia. Meat Science, 95(2), 203-211 (2013).	2013	Germany	Consumer	88	Vickery Auction	Pigs
Marian, L., & Thøgersen, J. Direct and mediated impacts of product and process characteristics on consumers' choice of organic vs. conventional chicken. Food Quality and Preference, 29(2), 106-112 (2013).	2013	Denmark	Grocery shoppers	384	Conjoint choice	Chicken
Koistinen, L., Pouta, E., Heikkilä, J., Forsman-Hugg, S., Kotro, J., Mäkelä, J., & Niva, M. The impact of fat content, production methods and carbon footprint information on consumer preferences for minced meat. Food Quality and Preference, 29(2), 126-136(2013).	2013	Finland	Consumer	1623	Choice experiment (CE)	Cross-species
Kallas, Z., Gil, J. M., Panella-Riera, N., Blanch, M., Font-i-Furnols, M., Chevillon, P., ... & Oliver, M. A. Effect of tasting and information on consumer opinion about pig castration. Meat Science, 95(2), 242-249. (2013).	2013	Cross-country	Consumer	144	Questionnaires	Pigs
de Jonge, J., & van Trijp, H. C. The impact of broiler production system practices on consumer perceptions of animal welfare. Poultry science, 92(12), 3080-3095 (2013).	2013	Netherland	Students	191	Conjoint choice	Chicken
Pozo, V. F., Tonsor, G. T., & Schroeder, T. C. How choice experiment design affects estimated valuation of use of gestation crates. Journal of Agricultural Economics, 63(3), 639-655 (2012).	2012	US	Consumer	800	Choice experiment (CE)	Pigs
Uzea, A. D., Hobbs, J. E., & Zhang, J. Activists and animal welfare: Quality verifications in the Canadian pork sector. Journal of Agricultural Economics, 62(2), 281-304 (2011).	2011	Canada	Consumer	623	Conjoint choice	Pigs
Tonsor, G. T., & Wolf, C. A. On mandatory labeling of animal welfare attributes. Food Policy, 36(3), 430-437 (2011).	2011	U.S	Consumer	2001	Contingent valuation	Cross-species

Liljenstolpe, C. Demand for value-added pork in Sweden: a latent class model approach. Agribusiness, 27(2), 129-146 (2011).	2011	Sweden	Consumer	1250	Conjoint choice	Pigs
Van Loo, E. J., Caputo, V., Nayga Jr, R. M., Meullenet, J. F., & Ricke, S. C. Consumers' willingness to pay for organic chicken breast: Evidence from choice experiment. Food quality and preference, 22(7), 603-613 (2011).	2011	US	Consumer	976	Choice experiment (CE)	Chicken
Dentoni, D., Tonsor, G., Calantone, R., & Peterson, H. C. "Animal welfare" practices along the food chain: How does negative and positive information affect consumers?. Journal of Food Products Marketing, 17(2-3), 279-302 (2011).	2011	US	Students	394	Conventional experiment	Chicken
Norwood, F. B., & Lusk, J. L. A calibrated auction-conjoint valuation method: Valuing pork and eggs produced under differing animal welfare conditions. Journal of environmental Economics and Management, 62(1), 80-94 (2011).	2011	US	Consumer	50	Calibrated auction – conjoint	Pigs
Pouta, E., Heikkilä, J., Forsman-Hugg, S., Isoniemi, M., & Mäkelä, J. Consumer choice of broiler meat: The effects of country of origin and production methods. Food quality and preference, 21(5), 539-546 (2010).	2010	Finland	Consumer	1312	Choice experiment (CE)	Chicken
Olynk, N. J., Tonsor, G. T., & Wolf, C. A. Consumer willingness to pay for livestock credence attribute claim verification. Journal of Agricultural and Resource Economics, 261-280 (2010).	2010	US	Consumer	669	Choice experiment (CE)	Pigs
Krystallis, A., de Barcellos, M. D., Kügler, J. O., Verbeke, W., & Grunert, K. G. Attitudes of European citizens towards pig production systems. Livestock Science, 126(1-3), 46-56. (2009).	2009	Cross-country	Consumer	480	Conjoint choice	Pigs
Tonsor, G. T., Olynk, N., & Wolf, C. Consumer preferences for animal welfare attributes: The case of gestation crates. Journal of Agricultural and Applied Economics, 41(3), 713-730 (2009).	2009	US	Consumer	205		Pigs
Liljenstolpe, C. Evaluating animal welfare with choice experiments: An application to Swedish pig production. Agribusiness: An International Journal, 24(1), 67-84 (2008).	2008	Sweden	Consumer	1250	Conjoint choice	Pigs

Hoogland, C. T., de Boer, J., & Boersema, J. J. Food and sustainability: do consumers recognise, understand and value on-package information on production standards?. Appetite, 49(1), 47-57 (2007).	2007	Netherland	Grocery shoppers	371	Questionnaires	Chicken
Napolitano, F., Braghieri, A., Caroprese, M., Marino, R. O. S. A. R. I. A., Girolami, A., & Sevi, A. Effect of information about animal welfare, expressed in terms of rearing conditions, on lamb acceptability. Meat science, 77(3), 431-436 (2007).	2007	Spain	Consumer	145	Conventional experiment	Lamb
Carlsson, F., Frykblom, P., & Lagerkvist, C. J. Consumer willingness to pay for farm animal welfare: mobile abattoirs versus transportation to slaughter. European Review of Agricultural Economics, 34(3), 321-344 (2007).	2007	Sweden	Consumer	362	Choice experiment (CE)	Cross-species
Viske, D., Lagerkvist, C. J., & Carlsson, F. Swedish consumer preferences for animal welfare and biotech: A choice experiment (2006).	2006	Sweden	Consumer	285	Choice experiment (CE)	Pigs
Carlsson, F., Frykblom, P., & Lagerkvist, C. J. Consumer preferences for food product quality attributes from Swedish agriculture. AMBIO: A Journal of the Human Environment, 34(4), 366-370 (2005).	2005	Sweden	Consumer	710	Choice experiment (CE)	Cross-species
Bennett, R., & Blaney, R. Social consensus, moral intensity and willingness to pay to address a farm animal welfare issue. Journal of Economic Psychology, 23(4), 501-520 (2002).	2002	UK	Students	164	Contingent valuation	Pigs

Concluding Remark

If you have read this far, know that you have shown more persistence than most. And most likely, you are another PhD candidate as well. For that, keep believing in yourself and push on.

You got this!