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Factors influencing consumer purchase of higher welfare assured pig meat products in Ireland and the UK

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Factors Influencing Consumer Purchase of Higher Welfare Assured Pig Meat Products in Ireland and the UK

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A thesis submitted as fulfilment of the requirements for the degree of Master of

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Abstract

Intensive farming systems are viewed unfavourably and there is evidence of concern for pig welfare. Several countries have established higher welfare assurance schemes to enable concerned consumers to make informed purchases. This research investigates the demand for higher welfare assured pig meat products in Ireland. Having successfully established a higher welfare pig assurance scheme in the UK, UK pig meat consumers were included in the study for comparison and as a potential future export market. An extended theory of planned behaviour model was used to form an online survey which was distributed to Irish (n = 408) and UK (n = 404) pig meat consumers in October 2022 with the aim of identifying constructs that significantly predicted consumers' intention to purchase higher welfare pig meat. An orthogonal array of nine pig meat product profiles were also included in the survey to estimate the importance and utility of assurance labels, price and product type and to group consumers with similar utilities. Sociodemographic characteristics, purchase frequency and pig meat product food choice motive questions were also included in the survey to help profile consumers with low and high behavioural intention and in the different consumer clusters. The results from UK and Irish consumers were similar and therefore the countries were analysed together. Consumers with high behavioural intention to purchase higher welfare pig meat products were more likely to have a strong feeling of moral responsibility, to think that pig welfare and local production is important, to associate higher welfare pig meat with other positive qualities, to be influenced by their social circle and were less likely to feel higher welfare products were out of their budget. Conjoint analysis revealed that assurance labels were the most important attribute to consumers, with the pig welfare label having the highest utility. Utility estimates of the total sample were used to generate three consumer clusters using k-means cluster analysis. The clusters were labelled based on their characteristics as: 'indifferent' (68%), 'like labels' (23%) and 'pro pig welfare' (9%). Both the 'like labels' and 'pro pig welfare' clusters had a higher behavioural intention to purchase higher welfare pig meat products, were more knowledgeable about pig production and welfare and disagreed more that 'welfare is not a priority' compared to the 'indifferent' cluster. These findings are suggestive of a potential market for higher welfare products in Ireland and can be used to aid industry stakeholders in effectively developing and marketing future Irish pig meat products. In addition, the communication of these product attributes will be important for success in the UK export market.

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Harrison, M. E. (2023, May 9 and 11) *Irish Consumers' Motivations and Preferences for Buying Higher Welfare Certified Pork/Pig Meat Products* [Conference presentation]. Teagasc Pig Open Days 2023. Teagasc Moorepark, Fermoy, Co. Cork and Ballyhaise Agricultural College, Ballyhaise, Co. Cavan, Ireland.

Abbreviations

ANOVA	Analysis of Variance
BI	Behavioural Intention
CVM	Contingent Valuation Method
DCE	Discrete Choice Experiment
EU	European Union
PBC	Perceived Behavioural Control
PCE	Perceived Consumer Effectiveness
RSPCA	Royal Society for the Prevention of Cruelty to Animals
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
UK	United Kingdom
VBN	Value Belief Norm theory
WTP	Willingness to Pay

Chapter 1

Introduction

Pig meat production is the third biggest agricultural sector in Ireland after beef and milk production (Teagasc, 2023). The Irish pig industry contributed €1.5bn to the Irish economy in 2022, with over 8,000 people employed either directly or indirectly within the production-to-processing chain (Irish Farmers' Association, 2022). In the National Pig Census 2022, the total Irish pig population was estimated to be more than 1.6 million pigs, with around 8% of them being breeding pigs (DAFM, 2022b). Ireland produced approximately 332,580 tonnes of pig meat in 2022 (Trading Economics, 2023). Pig meat products form a staple part of many Irish consumers' diets; in 2021 pig meat made up over one third of the total meat eaten by Irish consumers (Central Statistics Office, 2022).

1.1. Irish Pig Meat Export Market

Ireland also has an impressive export market for pig meat and it is the second biggest meat export market in Ireland after beef (Bord Bia, 2023b). Over 68% of the volume of pig meat produced in 2022 was exported and was valued at €540 million (Bord Bia, 2023b; Trading Economics, 2023), with the biggest proportion going to China (Bord Bia, 2023b). Exports to the UK were valued at nearly 18% of the Irish pig meat export value in 2022. Although this is a significant sum, the volume of Irish pig meat exported to the UK has decreased in recent years; in 2015 the Irish Pig Meat export market the UK was worth 61% of the total value (Bord Bia, 2016). Developing more added value UK markets for Irish pig meat could help retain or improve the value of the UK export market post Brexit.

1.2. Pig Production in Ireland

The Irish pig industry is highly specialised and has increased its production levels significantly in recent years through strategies such as improvements in nutrition, sow genetics and performance (Boyle et al., 2022). Nearly all pigs in Ireland are raised in large-scale farms with an average herd size of >1000 pigs (DAFM, 2022b). They are reared in indoor, climate controlled, slatted floored systems with sows bred throughout the year (i.e. not seasonally) to create a continuous flow of pigs to the slaughterhouse (European Pork & Poultry, 2022). In 2022, over 40% of the national herd was kept on less than 3% of Irish pig farms; these large farms each accommodated over 10,000 pigs (DAFM, 2022b). Commercial scale outdoor pig production in Ireland has been trialled in the past, but it was not feasible due to the amount of rainfall and soil type in Ireland (Teagasc, 2008). Moreover, outdoor systems proved unprofitable due to reduced productivity, increased feed waste and a lack of sufficient premium for the products produced at the time (Teagasc, 2008). Although nearly 1,300 pig herds in Ireland have 50 pigs or less, with some of those being some successful small-scale ‘free range’ pork enterprises (Ethical Farming Ireland, 2023), these herds represent only 2.5% of the total Irish pig population (DAFM, 2022b).

1.3. Irish Pig Producers

In recent times, the Irish pig industry has struggled with staff shortages, high feed, energy and labour costs, and low pig meat prices. Irish pig farmers are currently reliant on imported feed ingredients such as soya beans since production is not possible in Ireland. Therefore, until an alternative can be grown more locally, Irish pig farmers are reliant on international trade from places such as Argentina, Brazil and the USA (Lewis, 2018). Feed makes up around 70% of production costs (Halleron, 2021), thus even slight cost increases can make a big difference to the profitability of Irish pig farms; indeed, composite feed prices increased by 41% between May 2021 and May 2022 (Teagasc, 2022). At the same time, pig meat prices fell in the latter half of 2021 to prices lower than in the two preceding years and didn’t start rising again until the second quarter of 2022 (Bord Bia, 2023c). This

combination of low pig prices and high input costs left many farms with consistently negative margins during 2021 and 2022 (Shahbandeh, 2022) and led to some farmers leaving the industry, resulting in a reduction in the national herd size (DAFM, 2022b).

Although pig prices have now risen considerably in 2023 (Bord Bia, 2023c) and pig farmers are beginning to recover from the economic crisis, they may still be vulnerable to such financial deficits in the future. One way to overcome this vulnerability is to focus on consumer-driven production practices such as higher welfare, and marketing pig meat products to meet consumers' heterogeneous needs. This could provide willing Irish pig farmers with opportunities to increase their income through new premium target markets. Thus, diversification within the Irish pig meat market through the creation of speciality products could create a more stable long-term income for Irish pig farmers amidst future price fluctuations.

1.4. Opportunities for Pig Meat Market Diversification

Opening new markets in the Irish pig industry was also one of the aims of the 2020 Programme for Government (Department of the Taoiseach, 2020). One option is to explore the possibility of introducing a pig welfare assurance scheme for commercial pig farms in Ireland. Certified labels on meat packaging are a widely recognised way of communicating high production and processing standards to consumers in many countries. Such a scheme could communicate guaranteed higher standards of animal welfare, antimicrobial guardianship, or sustainability to conscientious consumer segments. The COVID-19 pandemic and climate crisis have highlighted the interdependence of human and animal health to consumers. In a study published in 2021, over 40% of the study's participants from Ireland and Northern Ireland agreed they had become more aware of antibiotic resistance and the connection between human and animal health since the beginning of the COVID-19 pandemic (Regan et al., 2021). One third of participants also concurred that they now look more than they did previously for animal welfare information on food product labelling (Regan et al., 2021).

There is also a breadth of evidence suggesting an increasing consumer concern for farm animal welfare on an Irish and international scale. For instance, European citizens have been voicing their concern for farm animal welfare through initiatives such as ‘End the Cage Age’ which requests the phasing out of cages on farms, including farrowing crates for sows (Compassion in World Farming, 2023). This initiative gathered sufficient citizen support to warrant a public hearing at the European Commission in April 2021 (European Commission, 2021).

A high level of concern for pig welfare was identified in Irish and Northern Irish consumer focus groups (Sweeney et al., 2022). In addition, the 2016 Animal Welfare Eurobarometer, revealed over 50% of Irish participants said that they would be willing to pay more for products sourced from animal welfare friendly production systems and looked for animal welfare friendly labels on products at least some of the time (European Commission, 2016). Thus, existing evidence is suggestive of Irish consumer demand for market diversification through an animal welfare assurance scheme.

1.5. Assurance Schemes

Currently, there is no dedicated animal welfare assurance scheme for pig meat in Ireland. Most of the Irish pig meat sold in Ireland has the Bord Bia Quality Assurance mark, this is currently the only pig meat assurance scheme in Ireland. Pig meat produced under the Bord Bia Pig meat Quality Assurance Scheme assures consumers and retailers that the certified pig meat is truly Irish and is produced to the standards described in the scheme (Bord Bia, 2023d). This scheme is voluntary and all Irish commercial pig producers can apply. Certified members are independently audited every 18 months (Bord Bia, 2023d). Several countries such as the Netherlands, Denmark, Germany, Switzerland and the UK already have animal welfare assurance schemes within their pig sectors (Heinola et al., 2021), all of which have a significant market share. In the UK, several assurance schemes include animal welfare as a quality attribute such the Red Tractor quality assurance label (Red Tractor, 2023), the RSPCA Assured label (which is an animal welfare focussed label (RSPCA Assured, 2016)), and organic schemes such as the Soil Association Certification (Soil Association, 2023). The European

Commission is also currently looking into creating its own umbrella animal welfare label (European Commission, 2023). Therefore, it is timely to investigate whether Ireland could develop its own pig welfare assurance scheme.

1.6. Aims and Objectives

The first aim of this research is to perform an extensive literature review that will inform the development of the theoretical framework that will be used for a consumer survey. The survey has two main aims, the first of which is to evaluate the variables that influence consumers' intention to purchase higher welfare pig meat products. The second aim is to estimate how much consumers value pig welfare/sustainability labelling, pricing and product type in relation to pig meat products and to segment consumers into groups based on how much they value the different product attributes. The UK has established a successful farm animal welfare dedicated assurance scheme. As the UK is Ireland's closest neighbour and a significant importer of Irish pig meat, consumers from this country will also be included in the survey both as a benchmark to compare to Irish consumers and to explore future export opportunities. If the evidence gained through this research suggests there is consumer demand for an Irish pig welfare assurance scheme, it could help secure the long-term robustness and sustainability of this industry in the face of fluctuating production costs and evolving consumer concerns.

Chapter 2

An Examination of Factors Influencing Consumer Demand for Higher Welfare Meat

Abstract: Many countries have introduced higher welfare farm assurance labels to address consumer concerns about farm animal welfare and how their food has been produced. This review identifies the methods used to evaluate consumer intention to purchase and willingness to pay for higher welfare labelled products. Various extended versions of the theory of planned behaviour have been used to identify what psychological factors determine consumers' intention to purchase higher welfare products. A range of methods have been used to gauge consumer willingness to pay and choice experiments appeared to be the most common. The review also identified additional points to consider when planning this type of research and can be used as a tool to assess the feasibility of a higher welfare assurance label in a country (e.g. Ireland) where such a label does not yet exist.

2.1. Introduction

The World Organisation for Animal Health has defined animal welfare as “the physical and mental state of an animal in relation to the conditions in which it lives and dies” (OIE, 2021). Welfare improvements for farm animals can be driven by a range of stakeholders, from producers to food companies and governments (Christensen et al., 2019). These welfare improvements can result in benefits such as better production efficiency and animal health, and enhanced corporate social responsibility credentials (Christensen et al., 2019). The consumer also has a role to play in driving the improvement of farm animal production systems through their product purchases (Christensen et al., 2019). Indeed, the 2016 Eurobarometer animal welfare survey reported that citizens increasingly

want to know about farm animal production conditions with 82% of European citizens indicating that farm animal welfare “should be better protected than it is now” (European Commission, 2016). This could indicate a consumer demand for more transparent product labelling regarding husbandry systems and welfare standards.

Council Directive 2008/120/EC outlines the legal minimum welfare standards that pig producers must comply with in the EU. These include requirements for management factors such as stocking density, access to enrichment materials, feed and water provision, etc. In Ireland, this has been transposed into Statutory Instrument 311 of 2010 which sets animal welfare standards similar to those in the EU directive. The Pigmeat Quality Assurance Scheme run by the Irish Food Board, Bord Bia, is currently the only pig farm assurance scheme in Ireland. Until recently, the welfare standards set in this scheme did not exceed those set by the law.

In countries other than Ireland, there are labelling schemes that solely focus on welfare, albeit with variation in the standards set (Heinola et al., 2021). An example is the UK’s Royal Society for the Prevention of Cruelty to Animals (RSPCA) Assured scheme, which requires welfare standards to be adhered to that exceed those prescribed by law (e.g. lower stocking density, provision of more rooting and enrichment materials, increased feeder space, loose farrowing pens etc. (RSPCA Assured, 2016)).

The success of the scheme is evidenced by the continued growth of RSPCA Assured product sales, which increased by 26.5% in 2021 (RSPCA Assured, 2021). This level of success relies upon several factors, not least that key stakeholders, including meat processors and retailers, are prepared to market and sell products that comply with the scheme (Thorslund et al., 2017). Thus these stakeholders need to be re-assured that a cohort of consumers believe animal welfare is important, and that they are willing to pay a premium price for these products to ameliorate the additional costs involved in producing higher welfare meat (Thorslund et al., 2017). Animal welfare is considered a ‘credence’ attribute in relation to animal products, since it is based on how the animal product has been produced and cannot be directly experienced by the consumer. Information and labels on packaging allows for the communication of this credence attribute to consumers, therefore enabling informed decision

making about welfare standards relative to price prior to purchase (Ford, 1988; Sans & Sanjuán-López, 2015) .

For this review we initially undertook an extensive review of the literature from 2011 to 2021. The aim was two-fold. Firstly, to gain an understanding of the factors influencing consumer intentions and behaviour in relation to purchasing higher animal welfare meat products by reviewing the use of the theory of planned behaviour and extended versions of this, in higher welfare product studies. Secondly, to review the methods that hold potential to determine consumer willingness to pay for animal welfare as a product attribute, such as discrete choice experiments and contingent valuation method surveys. Finally, the importance of these beliefs, perceptions and willingness to pay considerations was discussed with regard to the implementation of a potential animal welfare scheme.

2.2. Consumer Surveys Investigating Intention to Purchase Higher Welfare Products

2.2.1. Introduction to the Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB), is a behavioural model based on the concept that a person's actions are the outcomes of their intentions or motivations (Ajzen, 1985). The TPB stemmed from the Theory of Reasoned Action (TRA). The two main determinants in the TRA are '**attitude**' and '**subjective norm**' (Ajzen, 1985). Behavioural intention and its determinants are referred to as theoretical constructs and they can be measured using sets of statements in the questionnaire.

2.2.1.1. Attitude

A person's attitudes are determined by their beliefs about the outcomes associated with a behaviour; this is termed their 'behavioural beliefs'. In the context of higher welfare products, attitudinal statements often centre on the consumers positive or negative attitudes towards buying meat produced to high animal welfare standards, and the characteristics they associate with animal welfare such as healthiness and quality (Gracia, 2013; Hoeksma et al., 2017; Jamieson et al., 2015; McEachern et al.,

2007; Saijo et al., 2019; Washio et al., 2020). Unsurprisingly, there is evidence that positive attitudes towards higher welfare meat significantly positively influences consumers' behavioural intention to purchase this meat (Beldad & Hegner, 2020; Gracia, 2013; Hoeksma et al., 2017; Washio et al., 2020). In fact, the attitude construct was found to be one of the most influential constructs in some studies (Jamieson et al., 2015; Yeh & Hartmann, 2021). Some TPB surveys explored consumer attitudes to other topics such as animal welfare in addition to their attitudes towards purchasing higher welfare products. Most attitudinal constructs were found to have a direct significant positive effect on behavioural intention, however, McEachern et al. (2007) found that both consumer attitudes to meat safety, animal welfare, quality assurance schemes, and the media, all had a significant but indirect positive effect on behavioural intention via other constructs. McEachern et al.'s (2007) study's use of a structural equation model allowed them to estimate indirect influences through other model constructs as well as direct influences on behavioural intention.

2.2.1.2. Subjective Norm

The term 'subjective norm' refers to how a person's beliefs about whether influential people in their life think they should perform a specific behaviour (for instance to buy higher welfare meat) or not affects that person's performance of a behaviour. These beliefs are termed 'normative beliefs'.

Although subjective norm's influence on behavioural intention is usually positive, the strength of this influence has been shown to vary across studies, and even between different consumer groups within studies (Beldad & Hegner, 2020; Jamieson et al., 2015; McEachern et al., 2007). For example, Yeh and Hartmann (2021) found that subjective norms only had a significant influence on the behavioural intention of 'Price Sensitive Consumers' in their study exploring what drives German consumer's preferences for animal welfare as a cured ham product attribute.

2.2.1.3. Perceived Behavioural Control

After the development of the TRA, there was a realisation that external factors beyond a person's control can obstruct their ability to execute their initial intentions (Ajzen, 1985), and that this could influence their overall intention to perform that behaviour. Thus, '**perceived behavioural control**' (PBC) was added to the TRA as a third determinant of behavioural intention, to create the TPB (Figure 2.1). PBC relates to how simple or challenging a person perceives a behaviour is to perform (Ajzen, 1991). Like the other two determinants, a person's PBC is determined by their beliefs, referred to as 'control beliefs', these can be formed from personal experience, the experiences of influential people in their lives, and/or other secondary information sources (Ajzen, 1991). With regard to higher welfare products, consumers may perceive their capacity to pay for (Washio et al., 2019) or access products (Beldad & Hegner, 2020), or their ability to understand labels (McEachern et al., 2007), as challenges that affect their ability to purchase such products. The influence of this construct on behavioural intention varies greatly depending on the study population and which aspects of PBC are included in the studies. For example, studies that included statements regarding limited financial capacity/ budget showed a significant negative influence (Washio et al., 2020) or non-significant influence (Beldad & Hegner, 2020) on behavioural intention. Whereas PBC constructs that included statements about consumers' confidence in their ability to purchase and in the ease of purchasing higher welfare products tended to have a positive significant influence on behavioural intention (Hoeksma et al., 2017; Yeh & Hartmann, 2021).

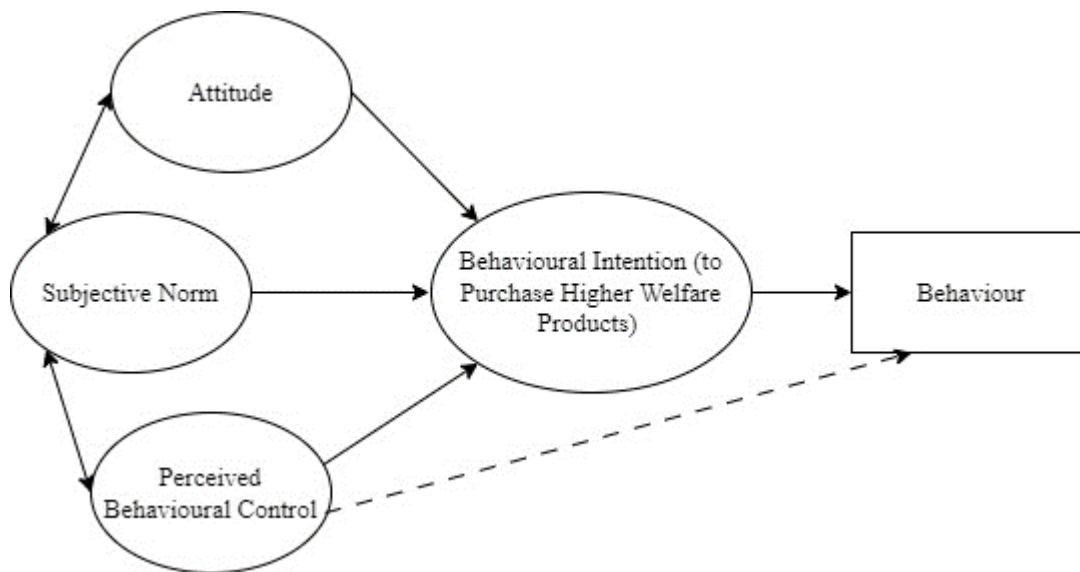


Figure 2.1. Adaptation of Ajzen’s Theory of Planned Behaviour figure from their 1991 journal paper (Ajzen, 1991).

2.2.2. Theory of Planned Behaviour Extensions for Animal Welfare Products

Supplementary predictors can be added to the TPB model if there is evidence that they account for a significant part of the variance in the intention to perform the behaviour (Ajzen, 1991). Consumer surveys on the subject of higher welfare animal products have explored the use of these additional predictors to help increase their models’ ability to predict consumer’s intention to purchase these products. Examples of additional constructs used are described below.

2.2.2.1. Moral Obligation

Because there is an ethical component to purchasing higher welfare animal products ‘**moral obligation**’ has sometimes been added to TPB centred models. Beldad and Hegner (2020) used Ajzen’s (1991) definition of moral obligation (a “personal feeling of moral obligation or responsibility to perform, or refuse to perform, a certain behavior”) and found it had a strong effect on Dutch consumers intention to purchase higher welfare animal products both directly, and indirectly as a predictor of attitude. McEachern et al. (2007) found that adding moral obligation to their TPB model increased its ability to explain the variance in consumer behaviour towards buying the ‘Freedom

Food' (now RSPCA Assured) animal welfare brand of meat. A survey investigating consumer preference for animal welfare labelled cured ham in Germany (Yeh & Hartmann, 2019, 2021) used an analogous construct called (personal) '**moral norm**'. Moral norm is a person's belief that it is morally right or wrong to perform a specific behaviour and the subsequent feelings of obligation associated with the behaviour. They found that it significantly positively informed attitudes in their model (Yeh & Hartmann, 2021).

2.2.2.2. Human Values and Personal Norms

Human values can be defined as “desirable, trans-situational goals varying in importance that serve as guiding principles in people's lives” (Schwartz, 2006; Sonoda et al., 2018). Values are relatively stable and so have been considered a predictor of behaviour (Sonoda et al., 2018). Hoeksma et al. (2017) used the **Value Belief Norm theory** (VBN), which was developed by Stern (1994; 2000), in addition to the TPB, in their study investigating Dutch consumers' willingness to purchase mobile slaughter unit meat. The VBN theory is based on a causal chain of three types of human values (Biospheric, Altruistic and Egoistic values), three types of beliefs (New Ecological Paradigm, Awareness of Adverse Consequences and Ascribed Responsibility) and personal norm. VBN had mostly been used in the context of environmentalism prior to this study. Hoeksma et al. (2017) found that personal norms accounted for a significant amount of variation relative to all the other constructs in VBN and that personal norms positively influenced consumer's intention to purchase mobile slaughter unit meat products. In fact, attitude and personal norm were considered the strongest determinants (Hoeksma et al., 2017). **Personal norms** “determine whether a person should or should not engage in the behavior in question to prevent the negative outcomes from happening” (Hoeksma et al., 2017; Stern, 1999). Personal norm appears to be related to the definitions for both moral obligation/norms and attitudes in that it accounts for a feeling of obligation and considers consumers beliefs about the consequences of the behaviour.

2.2.2.3. Human Emotions – Empathy and Sympathy

A survey researching consumer intention to purchase high animal welfare beef in Japan introduced **‘empathy’ and ‘sympathy’** for farmers and for beef cattle as an extension to their TPB based model (Washio et al., 2020). Empathy can be defined as someone’s emotional response to something which is based more on someone else’s situation than their own (Albiero et al., 2009; Hoffman, 1990). The feeling of sympathy involves more differentiation between the person and who/what they are sympathising with (Stern, 1994; Washio et al., 2020). They found that feelings of empathy and sympathy promoted consumers’ willingness to purchase animal friendly beef products (Washio et al., 2019, 2020). However, Washio et al. (2020) also included ‘empathy for farmers and livestock’ in their explanation of animal welfare friendly products, therefore participants may have associated the statements with the explanation when answering the survey.

2.2.2.4. Self-Identity

Gracia (2013) added **self-identity**, defined as “the consumers level of concern about animal welfare practices in the meat production system” to their TPB based model, which was used to investigate what determines the purchase of animal welfare friendly meat products by Spanish consumers. They found that a higher level of concern positively influenced consumer intention to purchase animal welfare friendly meat.

2.2.2.5. Consumer Attitudes Towards Farm Animal Welfare

Rather than adding self-identity to their model, some, mainly TPB based, studies have extended their attitudinal determinant to incorporate concern for or **attitudes toward animal welfare** by using scales, or by assessing the importance of animal welfare relative to other product attributes (de Graaf et al., 2016; Vanhonacker & Verbeke, 2009). Jamieson et al. (2015) and Nocella et al. (2012) created their own scales based on focus group research. Jamieson et al. (2015) developed 14 farm animal welfare statement pairs based on four themes – pain and suffering, spaces/behavioural freedom,

consumer responsibility/ ability to improve farm animal welfare, and perceived importance of farm animal welfare. After subjective norms, that study found the attitudinal themes ‘responsibility/ability’ and ‘importance of farm animal welfare’ had the strongest positive influences on behavioural intention. Cornish et al. (2020) used Herzog et al.’s (2015) validated 10 part Animal Attitude Scale (AAS-10) which uses an empathy based scoring system and covers a wide range of animal welfare related topics from animal testing to hunting. They found respondents with high attitude empathy scores, and therefore pro-welfare attitudes, were more likely to purchase different types of higher welfare products (Cornish et al., 2020).

2.2.2.6. Knowledge

Consumers’ **knowledge** of farm animal welfare, speciality production systems (Garcia-Gudino et al., 2021) and assurance labels has been assessed in some higher welfare animal product surveys. Jamieson et al. (2015) tested adolescents from the UK’s knowledge about welfare issues in chickens, cattle, sheep, pigs and animal welfare product labelling, and reported a lack of familiarity with both farm animal welfare issues, and animal welfare product labels. Beldad and Hegner (2020) investigated the animal welfare label knowledge of Dutch consumers. They found that consumers’ knowledge level influenced their sense of trust and moral obligation to purchase animal welfare meat products (Beldad & Hegner, 2020).

2.2.2.7. Trust

Since animal welfare is a credence attribute, consumers require a certain level of **trust** in the claims made by assurance labels (Sans & Sanjuán-López, 2015). Bociz’s (2017) literature review relating to consumer trust mentioned consumer intention/willingness to perform a behaviour as a core part of trust, as well as the consumer’s confidence/expectation/belief in the food operators. Thus, a high degree of trust has been associated with confidence/belief in those responsible for achieving said standards and a willingness to purchase the product (Wu et al., 2021). In addition, a study exploring

Japanese consumers intention to purchase beef products with a welfare label found that trust in welfare labels and in the producers who provide the meat for these labels had a positive significant influence on purchase intention (Washio et al., 2020).

2.2.2.8. Perceived Consumer Effectiveness

As well as identifying trust as an appropriate TPB extension for future research, Yeh and Hartmann (2019) recommended a construct called ‘perceived effectiveness’. **Perceived Consumer Effectiveness (PCE)** is an analogous extension, defined as “the extent to which individuals believe that their actions make a difference in solving a problem” (Ellen et al., 1991; Vanhonacker & Verbeke, 2009). Vanhonacker and Verbeke (2009) found a positive correlation between Flemish consumers with high PCE and high pro-welfare purchasing behaviour of chicken meat and eggs.

Using extended TPB models has enabled researchers to identify previously unexplained causes of variance, and scientifically quantify how much different factors influence consumers’ intention to buy higher welfare animal products. The large number of model extensions and their overlapping themes gives an insight into the complex web of psychological components involved in consumers consciously contemplating whether to buy higher welfare products. However, for a higher welfare farm assurance scheme to work, consumers also need to be willing to pay a premium price for higher welfare products. This economic perspective cannot be captured from using an extended TPB model alone.

2.3. Consumer Willingness to Pay Studies

The additional costs involved in developing and maintaining a higher welfare production system need to be partly absorbed by consumers who are willing to pay a sufficient premium for the resultant products. Consumer Willingness To Pay (WTP) can be defined as “the price premium or maximum price an individual is willing to sacrifice to obtain a certain benefit or to avoid undesirable

characteristics” (Breidert et al., 2006; Clark et al., 2017). According to Lancaster’s approach to consumer theory, every product is made up of a particular combination of characteristics; how much consumers value a product is based on the perceived value of the sum of these characteristics (Lancaster, 1966). Therefore, it is the product’s characteristics or attributes rather than the product itself that influences a consumer’s intention to buy and willingness to pay. Incorporating willingness to pay into consumer research enables researchers to create more realistic purchasing scenarios and evaluate consumer product attribute preferences.

2.3.1. Methods used in Willingness to Pay Experiments

Non hypothetical willingness to pay research methods include experimental auctions and real choice experiments. The auctions involve rounds of bidding on products with specific attributes whereas real choice experiments involve rounds of choice scenarios with each round having at least two products with varying attributes and attribute levels. In these methods, there are often real economic consequences for the participants and sensory product attributes can also be evaluated. Non-hypothetical methods may have the potential to improve the quality of data collected but this comes at a financial and temporal cost and relies on the products being readily available (Van Loo, 2011). Thus, hypothetical WTP experiments are more commonly conducted.

Discrete Choice Experiments (DCEs) are a commonly used type of hypothetical choice experiment. Clark et al.’s (2017) meta-analysis suggests there has been a shift towards the use of choice experiments compared to other methods such as Contingent Valuation Methods (CVMs). In CVMs, participants are asked what the maximum amount they would be willing to pay for hypothetical products would be (Mulder & Zomer, 2017). This shift towards choice experiments could be because giving the consumer a choice of products is cognitively easier for them to process than directly asking how much they would be willing to pay, or whether they would be willing to pay a specific amount for something (Johnston et al., 2017). Yang and Hong (2019) used a CVM and reported that some participants found it difficult ascribe a financial value to higher welfare chicken meat. In addition,

DCE can estimate the value of individual attributes rather than the product as a whole (Johnston et al., 2017).

However, when Mulder and Zomer (2017) used both a CVM and choice experiment in their study, they found the choice experiment gave a much higher WTP value. With such a range in WTP values in their experiment, it could draw the accuracy of hypothetical estimates into question. To help reduce the overestimation of WTP in hypothetical surveys, cheap talk scripts have been used (e.g. (Frey & Pirscher, 2018; Otieno & Ogutu, 2019; Yeh & Hartmann, 2021). These scripts describe how the hypothetical situation might cause bias, gives reasons why respondents may choose differently in a hypothetical versus a real scenario, and then asks the respondents to make choices as if it were a real scenario (Cummings & Taylor, 1999). Indeed meta-analyses of WTP studies confirmed that these scripts reduced stated WTP (Clark et al., 2017; Lagerkvist & Hess, 2010). Shortening the script can be adopted to help to resolve any risk of over-correction of bias (Morrison & Brown, 2009).

2.3.2. The Impact of Differing Product Attributes and Determinants of Willingness to Pay for Higher Welfare Products

Studies either described the standard of welfare that the animals which produced a particular product received (e.g. low, standard/conventional or high), or explained specific production characteristics (e.g. the use of cages or crates/stalls, stocking density etc.). Including details of individual welfare characteristics allows identification of the aspects of improved welfare that consumers are most willing to pay for. For instance, Mulder and Zomer (2017) found Dutch consumers had a particularly high WTP for outdoor access for broiler chickens. In their meta-analysis, Lagerkvist and Hess (2010) found that if animal welfare improvements through increased amenities (resources for the animals) were explicitly mentioned, this had a powerful positive impact on WTP. Those authors also stated that different welfare characteristics were often viewed as interdependent of each other. This is in line with other research which suggests participants prefer identifying animal welfare as a single holistic concept (Clark et al., 2017; Frey & Pirscher, 2018) .

2.3.3. Comparing Animal Welfare with Other Product Attributes in WTP Studies

In both the real product market and hypothetical research scenarios, the animal welfare attribute is competing with different combinations of other attributes that products have to offer. It is important to establish how animal welfare is valued compared to other attributes (e.g. environmental labelling (Sonoda et al., 2018)). In WTP studies, this is assessed by allowing consumers to choose from products with different combinations of attributes, whether in choice experiments or as part of a questionnaire (Denver et al., 2022; Otieno & Ogutu, 2019; Xu et al., 2019). Cross cultural differences appear to be of notable influence regarding which product attribute consumers consider most important. For example, studies involving Chinese consumers found that, in addition to price, attributes such as food safety (Lai, 2018), traceability and appearance (Chen et al., 2021; Xu et al., 2019) were of greater importance than animal welfare. This may stem from concern regarding food borne illness in that country (Lai, 2018). On the other hand, Swedish consumers viewed a product being produced in Sweden as a very valuable product attribute (Humble et al., 2021). That study also found that Swedish consumers inferred higher welfare standards for products that were locally/nationally produced, and this was a key aspect in their perception of product characteristics relating to animal welfare. Indeed, Swedish consumers had a lower WTP for an imported Danish animal welfare label than German consumers (Denver et al., 2022). In Lagerkvist and Hess's (2010) meta-analysis, they found a negative relationship between high legislative regulation of animal welfare and WTP for a farm animal welfare label. Sweden's high legislative standards of farm animal welfare may help explain the consumer prioritisation of Swedish products (and reduced WTP for a welfare label) since they feel farm animals are already well protected by the law.

2.3.4. Additional Variables Included in WTP for Farm Animal Welfare Consumer Surveys

A consumer's willingness to pay is not just based on the product attributes on offer but is also influenced by many non-product/attribute related factors. These include sociodemographic

characteristics, purchasing habits, knowledge and understanding of animal welfare and of higher welfare products, perceived consumer effectiveness, trust, values and moral norms, attitudes, perceived behavioural control and subjective norms (Frey & Pirscher, 2018; Nocella et al., 2012; Sans & Sanjuán-López, 2015; Sonoda et al., 2018; Yang & Hong, 2019; Yeh & Hartmann, 2021). These variables are often used to profile consumers and further understand the heterogeneity of consumer preferences. In addition to classifying consumers, adding the TPB constructs to DCE surveys, resulted in an improved understanding of the behavioural processes involved in consumers deciding their WTP for higher welfare animal products (Nocella et al., 2012; Yeh & Hartmann, 2021).

For consumer choice-driven policies to be effective, marketing strategies should involve segmenting and targeting consumers (Vanhonacker & Verbeke, 2013). For example, Sonoda et al. (2018) found that consumers that preferred animal welfare labels were more likely to be older females who valued security and were open to change. Indeed, it is commonly found that sociodemographic variables significantly influence people's willingness to pay for high welfare meat products (Clark et al., 2017; Lagerkvist & Hess, 2010). Although, this was not unanimously found to be the case (Gracia et al., 2011; Lai, 2018).

2.4. Key Determinants of Consumer Behaviour in Relation to Higher Welfare Products

In both intention to purchase and WTP studies, consumers attitudes, moral obligation/norm/values, and personal norms were some of the strongest explanatory variables when it came to understanding the results (Frey & Pirscher, 2018; Hoeksma et al., 2017; Jamieson et al., 2015; Nocella et al., 2012; Sans & Sanjuán-López, 2015; Yeh & Hartmann, 2021). This highlights the parallels between what determines consumer's purchase intentions and WTP and emphasises how farm animal welfare's relevance extends beyond just being considered as a product attribute, and is regarded as an immensely ethical issue (Lagerkvist & Hess, 2010). At a foundational level, a persons' attitudes can be based on their personal value orientation, which is the criteria people use to select and justify actions and to evaluate people and events (Schwartz, 1992). Yunes et al. (2018) discussed how the

longevity of citizen criticism towards controversial intensive farm animal production practices could be explained by the fact that moral values impact attitudes more than knowledge does. Although an individual's values may evolve over time, they tend to be relatively stable (Sonoda et al., 2018). For instance, if an individual's moral values do not agree with animals being confined, then justifying the reasons for using farrowing crates is unlikely to change their belief that animals should not be confined. Therefore, they would often still not consider the practice to be acceptable (Sonntag et al., 2019).

2.5. Additional Considerations

2.5.1. Consumer Perception of Good Welfare and Farming Production Characteristics

From a retailer perspective it is important to establish what the consumer's perception of good farm animal welfare is (Vanhonacker & Verbeke, 2013) and their attitudes towards farming characteristics, because consumers' perceptions of what higher welfare means influences their buying behaviour (Denver et al., 2021).

Consumers tend to perceive 'naturalness', whereby pigs can live in a natural setting and are free to perform their natural behaviours (Lassen et al., 2006), as equating to good pig welfare (Boogaard, 2011; Weible et al., 2016). Consumers and citizens value production characteristics such as outdoor access, with a preference for pasture over concrete or slatted flooring, a wallowing area, access to natural daylight and fresh air, litter/straw bedding, a rooting area and ample space for each pig to move (Boogaard, 2011; Christoph-Schulz & Rovers, 2020; Schütz et al., 2020; Sonntag et al., 2019; Weible et al., 2016). They even preferred environmental enrichment made from natural material compared to man-made toys (Schütz et al., 2020). Indeed, when German consumers were informed of the negative welfare consequences of pigs having outdoor access (e.g. the risk of parasitic infestation), they retained a positive perception towards this more natural option (Sonntag et al., 2019).

If consumers and citizens solely envision romanticised outdoor versions of welfare friendly farming systems, which are comparable to only the highest tier assurance scheme standards, they may be at

risk of misinterpreting what different labels mean by higher welfare assured (Jamieson et al., 2015). Thus, it is valuable to establish what is currently understood and perceived with regard to animal welfare labels (Weible et al., 2016).

Providing higher welfare product survey participants with information about exactly what a welfare label means may prevent the resultant data being based on consumers' potentially misaligned perceptions. However, the value of this is dependent on the objectives of the survey; for example, Bergstra et al. (2017) chose not to provide their participants with additional information as they wanted data on participants' current, unaltered attitudes and understanding. In addition, providing information does not guarantee that the participant will read it or interpret the described concepts correctly and that it will influence their perception (Grunert, 2005). A way round this could be to conduct focus groups to identify consumer perception with regards to farm animal production and welfare prior to embarking on a survey (e.g. (Christoph-Schulz & Rovers, 2020; Sonntag et al., 2019; Weible et al., 2016)). If researchers perform surveys in person, participants can ask for clarification, if necessary, particularly if animal welfare labelling is a new concept (Otieno & Ogutu, 2019). With online studies, participants can be given the option of accessing information if needed (Yunes et al., 2018). Another option is to provide a proportion of respondents with information about what the welfare label means in terms of production standards as part of the survey, to see if there is a difference in results between the two groups (Cornish et al., 2020).

Overall, the increased price consumers are willing to pay for improved welfare appears to be relatively small (Clark et al., 2017). It is unlikely that these small hypothetical premiums would cover the input costs associated with the public's ideal natural outdoor pig production systems.

Nevertheless, there are some consumer/citizen preferences that could potentially be attainable even in conventional indoor systems such as those in Ireland, to increase their socio-cultural sustainability (Boogaard, 2011). These include characteristics such as increased space/reduced stocking density, fresh air, natural daylight and the provision of some sort of natural rooting material, bedding or enrichment. Indeed some existing pig welfare assurance schemes do permit enriched indoor systems (e.g. RSPCA Assured, UK; Beter Leven, Netherlands (Heinola et al., 2021)).

2.5.2. Limitations in using Intention to Purchase and Willingness to Pay Studies

In addition to generalised limitations such as non-representative survey samples, there are other limitations to the methods discussed in this review. People do not necessarily buy and consume products that match their attitudes (Vandresen & Hötzel, 2021). This is known as the ‘attitude-behaviour gap’ (Harvey & Hubbard, 2013), or more broadly speaking, the ethical consumption gap (Bray et al., 2010). In addition, hypothetical TPB models can only predict up to consumers intention to perform the behaviour and cannot say with any certainty that consumers with strong positive intentions will actually perform the behaviour (Ajzen, 1985; Hoeksma et al., 2017; Washio et al., 2020). They may in fact fail to perform it; this is known as the behavioural-intention gap (Cazacu et al., 2014).

There are a variety of reasons why the attitude and intention behaviour gaps exist. People might find it hard to interpret what different food product labels mean (Mulder & Zomer, 2017), or fail to trust producer compliance with the higher welfare standards indicated by a label (Yang & Hong, 2019). Meat eating consumers may act as citizens when asked about their opinion on animal welfare but act differently when they are taking on the role of a meat product purchaser/consumer. This concept of citizen-consumer duality has been highlighted in several studies (e.g. (Vanhonacker, 2007)). Consumers may also feel they should not be held personally responsible to financially support animal welfare improvements through their grocery shopping habits, when it is a complex topic most consumers know little about (Yang & Hong, 2019).

Habitual buying behaviour also influences consumer’s purchasing intentions (Ajzen, 1985). Someone may say that in the future they intend to buy higher welfare animal products, but may slip into old habits and make a decision at the point of purchase in a heuristic rather than systematic manner (Chaiken, 1980). Alternatively, survey participants may answer a survey as if they had a high intention to purchase, willingness to pay for or concern for animal welfare, so they can be viewed as more socially acceptable. This is termed social desirability bias (Lund et al., 2021). This is less of an

issue in internet surveys since there is not a person asking the questions (Kreuter et al., 2009). Warm-glow bias, where participants feel good providing morally satisfying answers, may also affect survey results (Washio et al., 2020). Both biases can make the results suggest animal welfare is more important to consumers than it is and price less important (Cornish et al., 2020; de Graaf et al., 2016).

2.6. Conclusions

This review has identified several additional constructs included in TPB based models used for higher welfare product surveys and found that many of these significantly influenced behavioural intention. Constructs relating to consumers attitudes, moral obligation/norm/values, and personal norms were observed to have a particularly strong influence. Secondly, the review acknowledged the different methods used for surveys investigating consumers' WTP for higher welfare meat products and found choice experiments to be the predominant method used. Integrating the TPB psychological constructs into WTP surveys has enabled researchers to gain a better understanding regarding their motivations behind their WTP and thus a better grasp of consumer segments and target markets, and perceived purchase barriers. In addition, it is important to consider what consumers perceive as good welfare, the effect of information provision in surveys and the limitations of hypothetical methods. This review can be used to aid researcher's in deciding how best to evaluate consumer demand for higher welfare animal derived products.

Chapter 3

An Exploration of the Factors Influencing Irish and UK Consumers' Intention to Purchase Higher Welfare Pig Meat Products

Abstract: There is evidence of consumer interest in how animal derived products are produced and concern regarding farm animal welfare. To better understand and cater to these consumers, it is important to explore what is driving their behaviour. This study investigated which factors significantly predicted Irish and UK consumers' intention to purchase higher welfare pig meat products and whether consumers with different levels of intention ranked different pig meat product attributes as more or less important. An online survey was developed based on the theory of planned behaviour (TPB) model with additional extensions. In addition, nine conceptual product images were generated using an orthogonal design for inclusion in the survey to determine consumer preferences for assurance labels, price and product type. The survey was completed by pig meat purchasers in Ireland (n=408) and the UK (n=404). Binary logistic regression found that five of the model constructs 'moral responsibility', 'welfare is important', subjective norm, 'pig meat qualities', and 'budget', and two product characteristics, 'pig-friendly' and 'produced locally', significantly influenced consumers behavioural intention to purchase higher welfare pig meat. Consumers with a high behavioural intention were also more likely to purchase the product profiles with pig welfare labels. Overall, the responses of Irish consumers were not significantly different from UK consumers. As higher welfare assured pig meat is established in the retail market in the UK, this suggests that there could also be a market for high welfare labelled pig meat in Ireland.

3.1. Introduction

The European public has concern for farm animal welfare and a desire for more transparency in the meat production industry (European Commission, 2016). Several characteristics of intensive farming (e.g. restriction of movement, barren environments, high stocking densities) have recently come under scrutiny via both European citizen initiatives (e.g. ‘end the cage age’(Compassion in World Farming, 2023)), and via European Commission requests for updates and clarification on scientific knowledge, which have been recently published by EFSA (Nielsen et al., 2023; Nielsen et al., 2022). Over the last few decades, assurance schemes to ensure higher farm animal welfare have been developed in different countries to cater to this concern. These schemes use certification labels on product packaging to communicate that their products have been produced from animals managed on higher welfare certified farms.

The pig industry plays an important role in the Irish agricultural sector, and ranks third in agricultural output (Boyle et al., 2022). Nevertheless, the industry experiences significant fluctuations in expenditure and income on an ongoing basis, being highly exposed to international commodity super cycles with regard to feed and pig prices (Duggan, 2022). The introduction of a higher welfare pig farm assurance scheme could help to combat these fluctuations, by adding value to and helping to differentiate pig meat in a relatively homogenous market. Currently, most Irish pig meat holds the Bord Bia Quality Assurance label, however this is a broad quality label and the welfare standards stated in the scheme are not markedly higher than those outlined in national (Statutory Instrument 311 of 2010) and European legislation (Council Directive 2008/120/EC).

The UK’s Royal Society for the Prevention of Cruelty to Animals (RSPCA) has developed welfare assurance schemes for several farm animal species, including pigs, which are represented by the ‘RSPCA Assured’ label. The standards set in these schemes surpass those required by UK law (RSPCA Assured, 2016). Since the RSPCA launched the scheme for pigs and laying hens in 1994 (initially labelled ‘Freedom Food’), it has continued to grow. RSPCA Assured product sales increased by 26.5% from 2020 to 2021, with some retailers and food service businesses now selling 100%

RSPCA assured pork products (RSPCA Assured, 2021, 2023). Indeed, approximately 23% of pigs farmed in the UK were covered by the scheme in 2021 (RSPCA Assured, 2021).

To begin to assess the feasibility of a similar scheme for pigs in Ireland, it is important to understand the factors that influence Irish consumers' intention to purchase higher welfare pig meat products, and whether there is a proportion of consumers who are likely to purchase them. Furthermore, as a key export market for Irish pig meat and a country with an existing higher welfare pig farm assurance scheme, UK consumers are helpful to consider, both in comparison to Irish consumers and as a possible future export market of higher welfare Irish pig meat. Previous studies have successfully used extended theory of planned behaviour (TPB) models to explore what underpins consumers' intention to purchase higher welfare products (e.g. (Beldad & Hegner, 2020; Washio et al., 2020; Yeh & Hartmann, 2021)). The TPB model proposes that a person's intention to perform a behaviour (behavioural intention) is determined by three constructs; attitudes, subjective norms and perceived behavioural control (PBC) (Ajzen, 1985; Ajzen, 1991). Further significant determinants of behavioural intention to purchase higher welfare meat have been identified using extended TPB models; these include 'moral obligation', 'trust' and 'knowledge' (e.g. (Beldad & Hegner, 2020; Washio et al., 2020; Yeh & Hartmann, 2021)). Other methods have been used to help further predict consumer purchasing preferences and willingness to pay for meat products, including discrete choice, contingent valuation, and conjoint analysis (Clark et al., 2017; Janssen et al., 2016).

The main objectives of this chapter are firstly to identify the constructs that significantly influence Irish and UK consumers' intention to purchase higher welfare pig meat products, and secondly, to gauge the relative importance of pig welfare as a product attribute.

3.2. Materials and Methods

3.2.1. Survey Design and Recruitment

Ethical approval was granted for this study by the Medicine, Health and Life Sciences Faculty Research Ethics Committee of Queen's University Belfast (MHLS 22_117) and the approval letter is

included in Appendix I. A paper version of the survey was initially completed by the colleagues and family of the author to ensure that the statements were understandable to consumers. Then, following procurement procedures, a market research company ‘Empathy Research, Dublin, Ireland’ was appointed to administer the online questionnaire to a quota sample of Irish and UK ‘pig meat purchasers’ in October 2022. These consumers were part of Empathy Research’s existing consumer panel. Before the survey commenced on the online platform, participants were asked to read an information sheet and consent to participating in the survey. Participants were then provided with definitions of ‘pig meat products’, ‘standard pig farms’ and ‘higher welfare assurance labels’ to ensure a standardised understanding of the terminology used.

3.2.2. Theoretical Model and Survey Design

An extended TPB model (Figure 3.1) was developed based on an extensive literature review (Chapter 2). Sets of statements were then used to represent the model constructs and form the survey. The number of survey statements used for each construct is shown in Figure 3.1. Where available, validated survey statements were chosen to represent each model construct (shown in Table 3.1.). Questions were tailored for Irish and UK participants, to account for the pre-existence of higher welfare assured meat products in the UK and the lack of such a scheme in Ireland. For more details see Table 3.1 in the results section; the full survey with both Ireland and UK edits is also available in Appendix II. At the end of the survey, nine images of pig meat product profiles were included to predict future purchasing behaviour beyond the original ‘behavioural intention’ construct (see section 3.2.2.3).

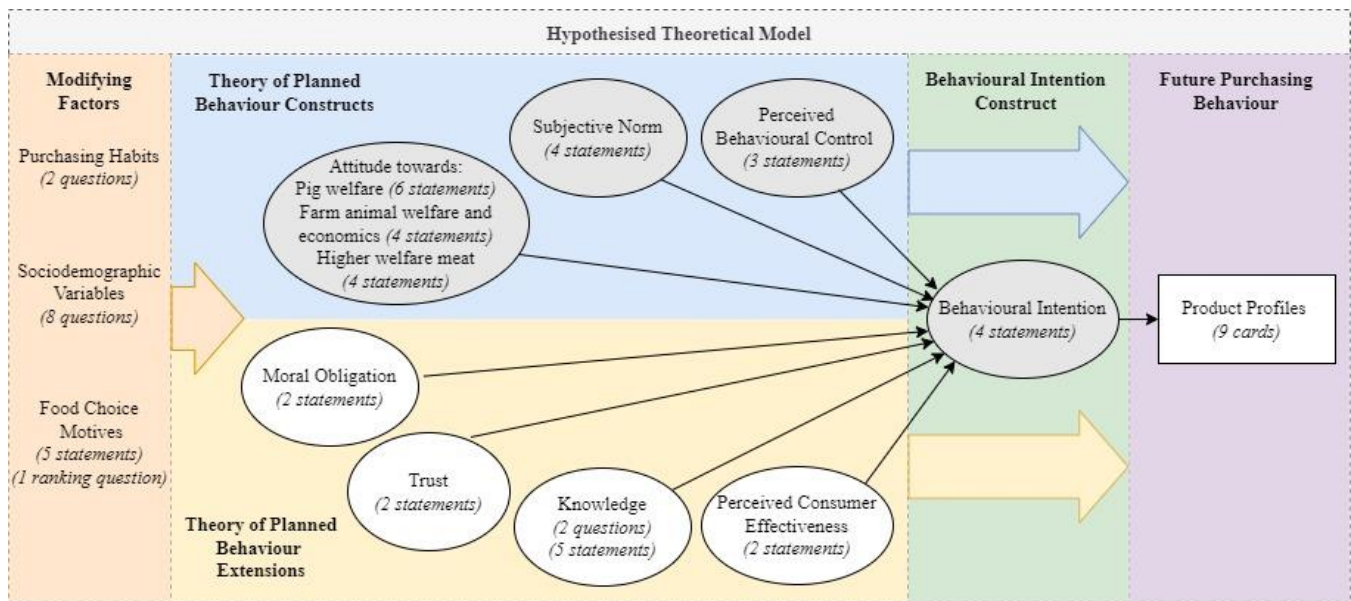


Figure 3.1. The hypothesised theoretical model developed to explore what factors influence consumers' intention to purchase higher welfare pig meat in Ireland and the UK. The model was constructed using the Theory of Planned Behaviour and four extensions. Thin black arrows represent the hypothesised relationships between the constructs. Thicker coloured arrows show that one group of factors/constructs is expected to affect another.

3.2.2.1 The Theory of Planned Behaviour

For this study, the first construct of the TPB model, 'attitude', refers to consumers' behavioural beliefs concerning the consequences of purchasing higher welfare pig meat products. In addition, consumer attitudes about pig welfare, and the importance of farm animal welfare and economics in general, are also relevant, and as such were also included as attitudinal constructs. Overall, 14 statements were included for this construct. The second construct, 'subjective norm' considers a consumer's normative beliefs regarding the social pressure to buy/not buy higher welfare products. For this construct, four statements were included. Finally, 'perceived behavioural control' (PBC) refers to a consumer's control beliefs regarding how difficult/easy it is to purchase higher welfare pig meat, taking into account external factors beyond their control (Ajzen, 1985). The survey considered potential barriers affecting consumer beliefs regarding PBC; consumers' general sense of control over buying the products, their financial limitations, and their understanding of product labelling. As per the TPB model, all three constructs were predicted to influence behavioural intention (BI). Consumers' 'behavioural intention' (BI) was measured using four statements relating to how likely

they would be to purchase higher welfare meat, with a higher score indicating an increased intention to purchase higher welfare pig meat in the future.

3.2.2.2 Theory of Planned Behaviour Model Extensions

Four additional determinants of BI were also included as extensions to the primary TPB model. Moral obligation (Beldad & Hegner, 2020; McEachern et al., 2007; Yeh & Hartmann, 2021), trust (Beldad & Hegner, 2020; Washio et al., 2020), and knowledge (Beldad & Hegner, 2020; Jamieson et al., 2015) have all previously been found to have a positive significant influence on BI in TPB based surveys considering consumer intention to purchase higher welfare products. The fourth additional construct, perceived consumer effectiveness (PCE), does not appear to be common in previous TPB based consumer intention to purchase higher welfare product surveys, however, a study did recommend the use of the construct in future research (Yeh & Hartmann, 2021). Furthermore, PCE was used in a Flemish consumer profiling study and was found to have a positive association with pro-welfare behaviour (Vanhonacker & Verbeke, 2009). These four constructs each comprised of two statements. In addition, 'knowledge' also included five true or false questions. Although other constructs such as 'Empathy and Sympathy' were found to have a significant influence on behavioural intention to purchase higher welfare meat products in the literature review, the above constructs were prioritised based on the consistent strength of their previous influence and perceived relevance to the study.

Participants were asked whether they agreed or disagreed with each statement in the survey using a 7-point Likert scale, with 1 representing 'strongly disagree' and 7 representing 'strongly agree'. The only exception was for 'knowledge', where a 7-point scale ranging from 'I know nothing' to 'I am an expert' was used to subjectively assess consumer knowledge of farm animal welfare and pig farming, followed by five true or false questions, which were used to objectively gauge consumers level of knowledge regarding pig welfare and farming practices.

3.2.2.3 Modifying Factors

To compare the characteristics of consumers with different levels of BI towards higher welfare pig meat; purchasing habits, sociodemographic variables (indicated in Table 3.2.), and food choice motives, were included in the survey as modifying factors. The food choice motive questions, adapted from Verain et al. (2021), were structured as follows: participants were firstly asked how important they thought five product attributes (e.g. produced locally) were on a 7-point Likert scale, with 1 being 'not at all important' to 7 being 'very important'. They were then asked to rank eight product attributes (e.g. 'high animal welfare', 'available where I shop' and 'cheap') with 1 being most important and 8 being least important.

3.2.2.4 Future Purchasing Behaviour

In addition to evaluating what influences consumers' intention to purchase higher welfare pig meat products, future purchasing behaviour was assessed using an orthogonal array of nine pig meat product profiles. Three product attributes were evaluated: the product type (ham, bacon or pork chops), the product price (standard price, or 15 or 40% increase) and assurance labelling (pig welfare, sustainability or no label). The standard price for each product was determined using the Irish and UK market averages at the time for cooked ham, bacon rashers and pork chops. Images of each of the nine product profiles were designed specifically for this survey using the author's own photographs which were edited on Canva software (examples provided in Figure 3.2). More information regarding these profiles can be found in section 4.2.1.1. Participants were asked to rate the images from 0 to 10 with 0 being 'would definitely not purchase' and 10 being 'would definitely purchase'.



Figure 3.2. Examples of Irish and UK pig meat product profiles used to evaluate the pig meat product attributes: product type, price and assurance labelling.

3.2.4. Statistical Analysis

The survey data was received from Empathy Research as an SPSS file after their quality control checks such as ensuring only completed surveys were included in the data file. IBM SPSS Statistics version 27 was used to perform all statistical analyses. Factor analysis was performed using principal component analysis with varimax rotation to explore whether participants' responses to the groups of statements chosen for each construct loaded well together. Cronbach's alpha was used as an indicator

of reliability of the construct, and a value of ≥ 0.70 was deemed acceptable (Tavakol & Dennick, 2011). An updated model was created based on the factor analysis results (see Figure 3.3). From then on, each construct was represented by the mean Likert scale score of the statements within that construct. This was apart from the 'knowledge' construct, this score was equivalent to the average number of correct answers across the five true or false questions used for this construct. Only the five true or false knowledge questions were used in the analysis, as the author felt this gave a closer reflection of consumers actual knowledge compared to the two subjective knowledge statements also included in the survey.

Few significant differences were found between the mean TPB construct scores of UK and Irish consumers, all of these differences were relatively small and not very meaningful, thus they were subsequently analysed as one population (please see Appendix IV for more details). Pearson correlations were then performed to examine the relationships between model constructs. The behavioural intention (BI) construct was divided into a low and high BI group using the median score as the point of separation. Cross tabulations and chi-square analysis were performed on the sociodemographic variables and purchase frequency to compare whether these variables differed significantly between the low and high BI groups. Mean scores for each of the constructs in the model as well as mean scores for food choice motives and product purchase likelihoods were also compared across the low and the high behavioural BI groups. Statistical differences were identified using one-way ANOVA. ANOVA was used because of the large survey respondent size and the fact that most of the dependent variables appeared relatively normally distributed from the histograms. Pearson correlation scores of product profile purchase likelihood scores and model constructs were then assessed. Finally, binary logistic regression analysis was performed to investigate what variables best predicted high BI group membership. Separate analyses were initially performed on the different groups of variables (sociodemographic characteristics, extended TPB construct mean scores and the food choice motives importance scale questions). Only the variables that were found to be statistically significant (or with a P-value close to 0.05 in the case of trust) in the initial models were used in the intermediate and then final binary logistic regression model. For the binary logistic regression

analysis, multicollinearity was considered in light of the correlation scores ($0.498 \leq r \leq 0.608$) between some of the independent variables (constructs ‘moral responsibility’, ‘welfare is important’, ‘pig meat qualities’ and ‘subjective norm’). However, the standard errors from the binary logistic regression were not especially large and when the independent variables from Table 3.7 were imputed into an equivalent linear model in SPSS, the VIF and tolerance values were all below 2.5 and 1 respectively. This suggests that the effect of multicollinearity is strong enough to be of concern (Midi et al., 2010).

3.3. Results

3.3.1. Factor Analysis

In total, 812 pig meat consumers aged between 18-64 years completed the survey, with 408 from Ireland, and 404 from the UK. Table 3.1. shows the resultant constructs after factor analysis was completed. For the attitudinal constructs, the ‘pig meat qualities’ statements loaded well. However, two of the three attitudinal constructs (‘pig welfare’ and ‘farm animal welfare and economics’) did not load as anticipated. Instead, after the removal of one statement (“I think that pigs in Ireland/UK are already reared to achieve high standards of welfare”) all the positive welfare statements and negative welfare statements loaded together as two constructs and were named ‘welfare is important’ and ‘welfare is not a priority’ (see Appendix III for the factor analysis table of all the attitude statements).

In addition, one BI statement (“I would not buy higher welfare pig meat if I saw it for sale in the shop”) and one subjective norm statement (“Most people who are important to me don't care about the welfare standards of the meat I buy”) were removed from the respective constructs as they did not load well. For the PBC construct, the Cronbach’s alpha was unacceptably low (0.187). Thus, the three PBC statements were analysed as individual constructs (‘purchase control’, ‘budget’ and ‘understanding labels’). The two PCE (Perceived Consumer Effectiveness) statements also did not load well. However, one of the PCE statements loaded well with the two moral obligation statements and improved the construct reliability, thus a new construct called ‘moral responsibility’ was

developed by combining these three statements. The PCE statement not used was “One person alone can do very little for the animal's welfare”.

Table 3.1. Factor loadings and Cronbach's Alpha scores for psychological constructs being used to explore what motivates consumers to purchase higher welfare pig meat products in Ireland and the UK.

	Constructs	Statements (and the original sources)	Component Matrix	Cronbach's Alpha	
TPB	Welfare is Important	It is important for farmed pigs to be able to express their natural behaviour (de Graaf et al., 2016).	0.781	0.799	
		I think that it is good to buy high welfare meat products (Beldad & Hegner, 2020).	0.779		
		I think that the current requirements for pig protection and welfare should be improved on <u>Irish/UK</u> farms (Garcia-Gudino et al., 2021).	0.754		
		It is important that the pig meat products I normally eat have been produced in a way that pigs have not experienced pain or suffering (Sorensen et al., 2012).	0.720		
		Farmers should be paid more for having higher welfare production standards on their farms (Developed by authors of this paper).	0.618		
		Not enough consideration is given to the welfare of farm animals these days (Jamieson et al., 2015).	0.612		
	Attitudes	Welfare is Not a Priority	It is fine to rear pigs in conditions where their normal behaviours are restricted (Jamieson et al., 2015).	0.823	0.752
			There are much more important issues in the world to think about than farm animal welfare (Schütz et al., 2020).	0.782	
			It doesn't matter if a farmed pig experiences pain (Jamieson et al., 2015).	0.777	
			Production efficiency should be the first priority of the farmer (de Graaf et al., 2016)	0.646	
	Pig Meat Qualities		I think that pig meat products from higher welfare farms <u>would be/are</u> higher quality than those from standard pig farms (Garcia-Gudino et al., 2021).	0.873	0.839
			I think that pig meat products from higher welfare farms <u>would be/are</u> tastier than those from standard pig farms (Garcia-Gudino et al., 2021).	0.875	
			I think that pig meat products from higher welfare farms <u>would be/are</u> healthier than those from standard pig farms (Garcia-Gudino et al., 2021).	0.862	
	Subjective Norm		Most of my close friends and family generally buy animal products produced in line with higher animal welfare standards instead of animal products in accordance with legal standards (Yeh & Hartmann, 2019).	0.813	0.808
Most people who are important to me would want me to buy higher welfare meat (Hoeksma et al., 2017).			0.866		
People in my life whose opinions I value think that it is important to be able to identify the			0.871		

		welfare standards involved in producing the food which I consume (Jamieson et al., 2015).		
Perceived Behavioural Control	Purchase Control	Whether I buy higher welfare meat products is entirely up to me (Gracia, 2013; Yeh & Hartmann, 2019).	0.685	
	Budget	Higher welfare meat products in general are beyond my budget (Washio et al., 2020).	0.952	0.187
	Understanding Labels	For me, recognising and understanding assurance labels on food packaging is easy (McEachern et al., 2007).	0.660	
Behavioural Intention		I <u>would/will</u> make a conscious effort to buy higher welfare pig meat products <u>if they were available/in the future</u> (Beldad & Hegner, 2020; Yeh & Hartmann, 2019).	0.845	
		From now on, I will make an effort to identify the welfare standards of the farm animals used in the production of my food (Jamieson et al., 2015).	0.873	0.807
		I would buy higher welfare assured pig meat even if it was more expensive than the lower welfare alternative (Washio et al., 2020).	0.835	
TPB Extensions	Moral Responsibility	I feel it is my moral duty to buy higher welfare meat products whenever they are available (Beldad & Hegner, 2020).	0.856	
		I feel it is wrong to buy meat products are not from higher welfare farms (Beldad & Hegner, 2020).	0.808	0.749
		Refusing products that do harm to the animal's welfare is a good way to change the production system (Vanhonacker & Verbeke, 2009).	0.782	
	Trust in Labels	I trust the labels and information on meat product packaging (Beldad & Hegner, 2020; Washio et al., 2020).	0.878	
		<u>If there was an assurance label for higher welfare pig meat products, I feel I could trust this label/I believe that higher welfare assurance labels on meat products are trustworthy</u> (Beldad & Hegner, 2020; Washio et al., 2020).	0.878	0.699

The statements differed slightly between countries since the UK already has higher welfare labelled pig meat available to consumers. Text only used in the Irish survey is underlined and text only used in the UK survey is in *Italics*. Scales used for statements was a Likert scale with 1 being 'Strongly Disagree' and 7 being 'Strongly Agree'. TPB: Theory of Planned Behaviour.

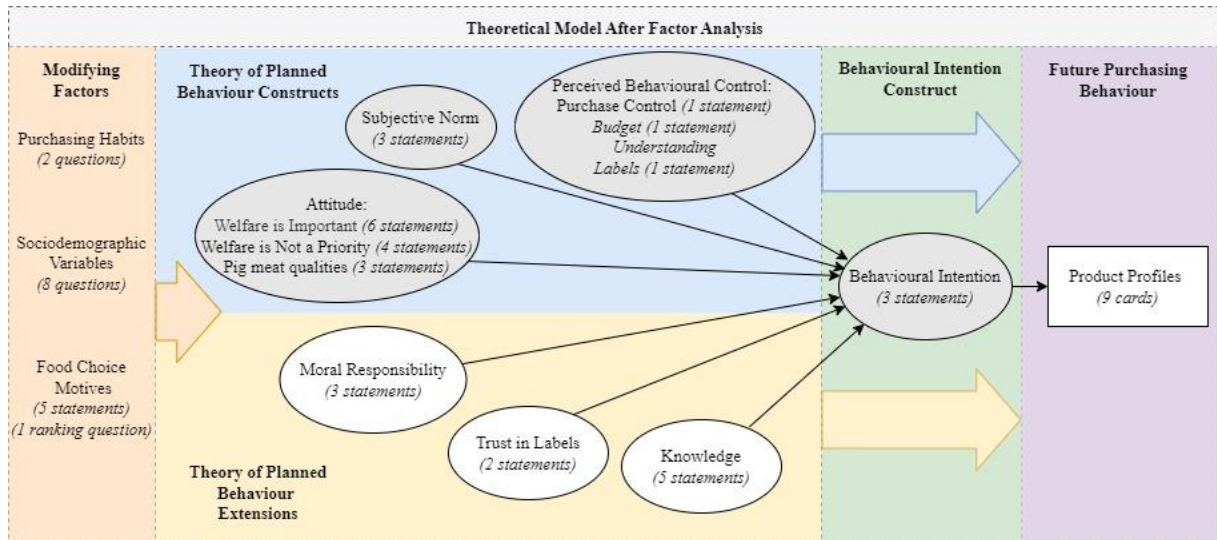


Figure 3.3. The updated constructs and number of statements in the theoretical model based on the factor analysis results. It was developed to explore what influences consumers in Ireland and the UK's intention to purchase higher welfare pig meat. Note, although knowledge was not included in the factor analysis (as it is based on the mean sum of scores for the true or false questions) it has been included in the updated model as it is still predicted to influence behavioural intention.

3.3.2. Comparing Sociodemographic Characteristics and Behavioural Intention

The sociodemographic profile of the quota sample of survey participants is shown in Table 3.2. There was a good representation across categories apart from gender, where women were overrepresented, and social class, where ABC1F+ (the lower to upper middle class) was also overrepresented. Gender was the only variable where there was a difference between the high and low BI groups ($P < 0.05$); more females were found to have a higher behavioural intention to purchase higher welfare pig meat than males.

Table 3.2. Distribution of sociodemographic characteristics and pig meat purchase frequency of the total survey sample and between groups with high and low behavioural intention to purchase higher welfare pig meat products in Ireland and the UK.

Sociodemographic variables		Quota %		Total		BI Group %		Chi-Sq
		ROI	UK	n	%	Low BI	High BI	
Country	Ireland	50		408	50	50	51	ns
	UK		50	404	50	50	49	
Gender	Male	42	47	316	39	44	35	*
	Female	58	53	496	61	57	65	
Age group	18-34 years	27	31	263	32	35	30	ns
	35-49 years	41	39	335	41	41	41	
	50-64 years	32	30	214	26	24	28	
Area Type	Large urban			323	40	41	39	ns
	Small urban			322	40	42	38	
	Rural			167	21	18	23	
Relationship Status	Single			254	31	32	31	ns
	Married/co-habiting			503	62	60	64	
	Separated			52	6	7	6	
Education Level	Low			43	5	6	5	ns
	Mid			389	48	50	47	
	High			372	46	45	48	
Social Class	ABC1F+	56	52	500	62	65	59	ns
	C2DEF-	44	48	312	38	36	41	
Pig Meat Product Purchase Frequency	Twice a month			153	19	20	18	ns
	Once a week			420	52	51	52	
	>Twice a week			239	29	29	30	

BI = Behavioural Intention, *** = P<0.001, ** = P<0.01, * = P<0.05, ns = non-significant

3.3.3. Pearson Correlations between Extended TPB Constructs

BI was significantly correlated with all model constructs (Table 3.3). All correlations were positive except for ‘welfare is not a priority’ and ‘budget’. Moral responsibility had the strongest correlation with BI ($r = 0.710^{***}$). ‘Welfare is important’, ‘pig meat qualities’ and ‘subjective norm’ all correlated with BI with scores above 0.500. In addition, similar strength positive correlations were found between the constructs ‘moral responsibility’, ‘welfare is important’, ‘pig meat qualities’ and ‘subjective norm’ ($r = 0.498$ to 0.608 ; $P < 0.001$ for all). Knowledge level generally had the weakest correlations with other constructs.

Table 3.3. Pearson correlation scores between the constructs (developed post factor analysis) being used to explore what factors influence consumers' intention to purchase higher welfare pig meat in Ireland and the UK.

Extended TBP Constructs		Attitudes			Perceived Behavioural Control			Subjective Norm	Behavioural Intention	TPB Extensions	
		Welfare is Important	Welfare is Not a Priority	Pig Meat Qualities	Purchase Control	Budget	Understanding labels			Moral Responsibility	Trust in Meat Labels
TPB constructs	Attitudes ^a	Welfare is Not a Priority	-.442***								
		Pig Meat Qualities	.560***	-.224***							
	Perceived Behavioural Control ^a	Purchase Control	.379***	-.116***	.310***						
		Budget	-.073*	.237***	ns	ns					
		Understanding labels	.243***	ns	.273***	.275***	-.085*				
	Subjective Norm ^a	.498***	-.150***	.499***	.218***	-.088*	.322***				
Behavioural Intention ^a	.623***	-.322***	.599***	.234***	-.278***	.318***	.567***				
TPB Extensions	Moral Responsibility ^a	.608***	-.319***	.516***	.167***	-.201***	.302***	.534***	.710***		
	Trust in Meat Labels ^a	.375***	ns	.405***	.270***	ns	.373***	.381***	.445***	.443***	
	Knowledge ^b	.176***	-.165***	.109**	ns	ns	ns	ns	.111**	.094**	-.069*

*** = P<0.001, ** = P<0.01, * = P<0.05, ns = non-significant. (2-tailed). Scales used: a = Likert scale with 1 being 'Strongly Disagree' and 7 being 'Strongly Agree', b = True/ False questions.

3.3.4. Comparison of Extended TPB Constructs and Food Choice Motive Scores between High and Low Behavioural Intention Groups

Mean scores for the extended TPB model constructs and food choice motives across the high and low BI groups are shown in Table 3.4. The high BI group had higher scores for the constructs representing positive attitudes towards the importance of pig welfare and the qualities associated with higher welfare pig meat, than the low BI group, whereas the opposite was the case for the construct pig 'welfare is not a priority' ($P < 0.001$ for all). In addition, the high BI group had a higher score for 'moral responsibility' and a better understanding of and more trust in labels ($P < 0.001$) than the low BI group. The PBC construct scores indicate that the low BI group felt they had less control over buying higher welfare products, and agreed more that higher welfare meat is beyond their 'budget' than the high BI group. The consumers in the high BI group scored more highly in the true/false knowledge questions, although the level of difference between groups was lower than in the other constructs ($P < 0.05$).

For the Likert scale importance statements relating to food choice motives, the high BI group had higher scores than the low BI group for all five pig meat product attributes ($P < 0.001$ for all). Significant differences were also found between the groups for the food choice motives ranking question for all product attributes apart from 'Locally produced'. Consumers in the high BI group ranked 'High animal welfare' to be most important and 'cheapness' to be least important. In contrast, products being available where they shop and 'cheapness' were ranked as the two most important attributes for the low BI group. 'Organically produced' was ranked as one of the least important attributes in both groups.

Table 3.4. Mean scores and standard deviations of psychological constructs and modifying factors between groups with high and low behavioural intention (BI) to purchase higher welfare pig meat products in Ireland and the UK.

Variables		Total	Low BI	High BI	ANOVA P - Values	
		n=812	n=372	n=440		
		Mean ± SD	Mean ± SD	Mean ± SD		
TPB Constructs	Welfare is Important	5.27 ± 0.96	4.71 ± 0.87	5.74 ± 0.75	***	
	Attitudes ^a Pig Meat Qualities	5.13 ± 1.15	4.51 ± 1.05	5.65 ± 0.96	***	
	Welfare is Not a Priority	3.09 ± 1.20	3.39 ± 0.98	2.84 ± 1.30	***	
	Perceived Purchase Control	5.3 ± 1.39	4.97 ± 1.46	5.57 ± 1.26	***	
	Behavioural Understanding labels	4.7 ± 1.34	4.31 ± 1.12	5.03 ± 1.42	***	
	Control ^a Budget	4.42 ± 1.40	4.73 ± 1.11	4.16 ± 1.55	***	
	Subjective Norm ^a	4.71 ± 1.14	4.13 ± 0.92	5.20 ± 1.08	***	
TPB Extensions	Trust in Meat Labels ^a	4.94 ± 1.11	4.48 ± 1.03	5.33 ± 1.01	***	
	Moral Responsibility ^a	4.82 ± 1.14	4.14 ± 0.90	5.39 ± 0.99	***	
	Knowledge ^b	2.67 ± 1.41	2.53 ± 1.37	2.78 ± 1.44	*	
Modifying factors	Traded fairly	5.42 ± 1.16	4.85 ± 1.12	5.90 ± 0.96	***	
	Food Choice Motives- Importance Scale ^c	Eco production	5.35 ± 1.22	4.77 ± 1.16	5.83 ± 1.05	***
		Pig-friendly	5.33 ± 1.31	4.60 ± 1.28	5.95 ± 0.97	***
		Eco packaging	5.3 ± 1.25	4.74 ± 1.22	5.78 ± 1.08	***
		Produced locally	5.01 ± 1.22	4.55 ± 1.16	5.39 ± 1.15	***
	Food Choice Motives- Importance Ranking ^d	High animal welfare	3.31 ± 2.11	4.20 ± 2.11	2.56 ± 1.81	***
		Available where I shop	4.00 ± 2.34	3.61 ± 2.28	4.33 ± 2.34	***
		Locally produced	4.38 ± 2.09	4.36 ± 2.12	4.40 ± 2.08	ns
		Appropriate cuts and package sizes	4.4 ± 2.01	3.99 ± 1.97	4.75 ± 1.98	***
		Low environmental impact	4.7 ± 2.02	4.93 ± 2.01	4.51 ± 2.02	**
		Cheap	4.81 ± 2.59	3.71 ± 2.44	5.74 ± 2.34	***
		Limited use of antibiotics	4.92 ± 2.33	5.35 ± 2.32	4.55 ± 2.28	***
		Organically produced	5.48 ± 2.12	5.85 ± 2.04	5.17 ± 2.14	***

*** = P<0.001, ** = P<0.01, * = P<0.05, ns = non-significant. Scales used: a = Likert scale with 1 being ‘Strongly Disagree’ and 7 being ‘Strongly Agree’, b = True/ False questions, c = Likert scale with 1 being ‘Not at all important’ and 7 being ‘Very Important’, d = Statements ranked from 1 (the most important) to 8 (the least important). P-values comparing the high and low BI groups were calculated using one-way ANOVAs.

3.3.5. Pig Meat Product Profiles

Mean purchase likelihood scores for the nine pig meat product profiles are shown in Table 3.5, for both the total sample and high and low BI groups. Overall, purchase likelihood scores were lowest for non-labelled products and highest for pig welfare labelled products. Scores significantly differed between the low and high BI groups for all product profiles except for the standard price pork chops with a sustainability label. Consumers in the high BI group had higher mean purchase likelihood scores for all three products with a pig welfare label, whereas consumers in the low BI group had significantly higher mean purchase likelihood scores for all three non-labelled pig meat products. Numerically, the product profile with the highest score, in both BI groups was the standard price bacon with a welfare label.

Table 3.5. Mean purchase likelihood scores and standard deviations of pig meat product profiles between groups with low and high behavioural intention to purchase higher welfare pig meat products in Ireland and the UK.

Product Attributes			Total	Low BI	High BI	P-values
Label	Product type	Price increase	n=812 (100%) Mean ± SD	n=372 (46%) Mean ± SD	n=440 (54%) Mean ± SD	
None	Pork Chops	40%	4.49 ± 2.77	4.77 ± 2.75	4.24 ± 2.77	**
	Bacon	15%	5.06 ± 2.79	5.33 ± 2.52	4.83 ± 2.97	***
	Ham	Standard	5.20 ± 2.87	5.56 ± 2.62	4.90 ± 3.04	**
Sustainability	Pork Chops	Standard	6.33 ± 2.49	6.19 ± 2.41	6.44 ± 2.56	ns
	Bacon	40%	6.29 ± 2.44	5.81 ± 2.42	6.69 ± 2.39	***
	Ham	15%	6.43 ± 2.43	6.05 ± 2.42	6.75 ± 2.39	***
Pig welfare	Pork Chops	15%	6.71 ± 2.59	6.09 ± 2.49	7.23 ± 2.55	*
	Ham	40%	6.64 ± 2.56	5.87 ± 2.41	7.29 ± 2.50	***
	Bacon	Standard	7.17 ± 2.40	6.44 ± 2.42	7.78 ± 2.20	***

*** = P<0.001, ** = P<0.01, * = P<0.05, ns = non-significant. Scale used for all questions: 0 to 10 with 0 being 'would definitely not purchase' and 10 being 'would definitely purchase'. P-values comparing the high and low BI groups were calculated using one-way ANOVAs.

Correlations between the different pig meat product profiles and the extended TPB constructs are shown in Table 3.6. Although most correlations were significant, overall, the relationships were relatively weak (all < 0.400). The strongest positive correlations were between the three welfare labelled products and BI and moral responsibility (ranging from 0.308 – 0.377; P < 0.001 for all). 'Welfare is important' also possessed one of the strongest positive correlations with welfare labelled ham that was 40% more expensive than standard pricing, whereas 'welfare is not a priority' was most strongly correlated with the standard price ham with no welfare label.

Table 3.6. Pearson correlation scores between nine pig meat product profiles and the constructs exploring what factors influence consumers' intention to purchase higher welfare pig meat in Ireland and the UK.

Extended TBP Constructs		Product Profiles ^e								
		No Label			Sustainability Label			Pig Welfare Label		
		Ham Standard price	Bacon 15% increase	Pork Chops 40% increase	Pork Chops Standard price	Ham 15% increase	Bacon 40% increase	Bacon Standard price	Pork Chops 15% increase	Ham 40% increase
TPB	Welfare is Important	-.161***	-.150***	-.182***	.090*	.118***	.155***	.281***	.256***	.302***
	Attitudes ^a Welfare is Not a Priority	.301***	.244***	.273***	ns	ns	ns	-.144***	-.173***	-.148***
	Pig Meat Qualities	-.154***	-.106**	-.108**	.117***	.163***	.187***	.249***	.187***	.245***
	Purchase Control	ns	ns	ns	ns	.118***	.089*	.144***	ns	.089*
	Perceived Behavioural Control ^a Budget	.207***	.174***	.118***	ns	-.076*	ns	-.076*	-.136***	-.195***
	Understanding labels	ns	ns	ns	.088*	.112**	.108**	.102**	.078*	.140***
	Subjective Norm ^a	-.097**	ns	ns	.139***	.127***	.216***	.222***	.214***	.254***
Behavioural Intention ^a	-.189***	-.162***	-.116***	.125***	.156***	.217***	.328***	.308***	.377***	
TPB Extensions	Moral Responsibility ^a	-.167***	-.129***	-.106**	.135***	.139***	.197***	.319***	.309***	.372***
	Trust in Labels ^a	ns	ns	ns	.129***	.205***	.207***	.231***	.233***	.267***
	Knowledge ^b	-.141***	-.109**	-.099**	ns	ns	ns	ns	ns	ns

*** = P<0.001, ** = P<0.01, * = P<0.05, ns = non-significant. (2-tailed). Scales used: a = Likert scale with 1 being 'Strongly Disagree' and 7 being 'Strongly Agree', b = True/False questions, e = 0 to 10 with 0 being 'would definitely not purchase' and 10 being 'would definitely purchase'.

3.3.6. Binary Logistic Regression Analysis

Table 3.7 shows the constructs included in the final binary logistic regression model, and those which significantly predicted high BI in this model. Both attitude constructs had positive B values and odds ratios (Exp(B) values) that were significantly over one, which meant that they positively predicted consumers likelihood of being in the high BI group. ‘Welfare is important’ had a higher odds ratio, this indicates a greater influence. Subjective norm also positively predicted the likelihood of being in the high BI group, whereas the PBC construct ‘Budget’ had a negative B value and an odds ratio significantly lower than one. This indicates that the more a person feels higher welfare pig meats are outside their budget, the less likely they are to be in the high BI group. The highest odds ratio was from moral responsibility; this value (1.901) suggests that for each mean unit increase of agreement on the seven-point Likert scale, a person is nearly two times more likely to be in the high BI group. Finally, consumers finding the product attributes ‘pig friendly’ and ‘produced locally’ more important also positively increased the likelihood of being in the high BI group although to a lesser extent than the other significant predictors in the model. Trust was not a significant predictor of BI in the final model.

Table 3.7. Binary Logistic Regression Analysis of factors influencing the likelihood of consumers having a high behavioural intention to purchase higher welfare pig meat products in Ireland and the UK.

	Variables	B	Exp(B)	95% C.I. for		Sig.
				Lower	Upper	
TPB^a	Attitudes					
	Welfare is Important	0.604	1.830	1.350	2.481	0.000
	Pig Meat Qualities	0.440	1.553	1.245	1.938	0.000
	Subjective Norm	0.450	1.568	1.250	1.968	0.000
TPB Extensions^a	Perceived Behavioural Control					
	Budget	-0.422	0.656	0.555	0.774	0.000
TPB Extensions^a	Moral Responsibility	0.642	1.901	1.459	2.476	0.000
	Trust	0.201	1.223	0.991	1.510	0.061
Modifying factors^b	Food Choice Motives-Importance Scale					
	Pig-friendly	0.264	1.302	1.053	1.610	0.015
	Produced Locally	0.209	1.232	1.033	1.471	0.021
	Constant	-11.867	0.000			0.000

Cox & Snell R Square = 0.438%, Nagelkerke R Square = 0.585. Scales used: a = Likert scale with 1 being ‘Strongly Disagree’ and 7 being ‘Strongly Agree’, b = Likert scale with 1 being ‘Not at all important’ and 7 being ‘Very Important’.

3.4. Discussion

This study used an extended version of the TPB model to ascertain what factors significantly influence Irish and UK consumers' intention to purchase higher welfare pig meat products. The model was extended a step beyond BI by using images of pig meat product profiles to gauge potential future purchasing behaviour. These results provide valuable insight in evaluating the demand for higher welfare pig meat in Ireland.

There was little difference in the mean construct scores between consumers in both countries, and thus we considered both populations as one in our analysis. The mean scores of the extended TPB model constructs, modifying factors and product profile purchase likelihoods nearly all differed significantly between the high and low BI groups. With striking differences found between the importance both groups placed upon pig welfare and labels, the qualities higher welfare meat possesses, their moral responsibility and the importance of price. These results were supported by the results of the binary logistic regression and correlation analyses. The most significant predictors of high behavioural intention to purchase higher welfare pig meat products in the binary logistic regression model were the constructs 'moral responsibility', 'welfare is important', subjective norm, 'pig meat qualities' and 'budget', and the product characteristics 'pig-friendly' and 'produced locally'. All the key findings were reasonably consistent across the different analyses investigating BI. Following on from this, BI had some of the strongest correlations with the 'pig welfare' labelled product profiles relative to the other extended TPB model constructs, and consumers with high BI were also more likely to purchase the pig welfare labelled pig meat product profiles.

3.4.1. Sociodemographic Variables and Behavioural Intention

Gender was the only sociodemographic variable found to be different between high and low BI groups, with a higher proportion of females in the high BI group. Other studies also found that females are more likely to intend to purchase higher welfare products (Cornish et al., 2020; Hoeksma

et al., 2017). It has been widely reported that females tend to have more empathy and concern for animal welfare (e.g. (Clark et al., 2017; Cornish et al., 2016; Dowsett et al., 2018)).

Some previous studies found associations between consumers' BI to purchase higher animal welfare products and other sociodemographic characteristics such as rural/urban location, economic and educational status (McEachern et al., 2007; Vanhonacker & Verbeke, 2009). However, the lack of association between these sociodemographic characteristics and BI in the current study is similar to other, more recent research (de Graaf et al., 2016; Gracia, 2013).

3.4.2. Predictors of High Behavioural Intention

'Moral responsibility' was the strongest predictor of behavioural intention to purchase higher welfare pig meat products and had the strongest correlations with the pig welfare labelled product profiles. Likewise, Beldad and Hegner (2020) and Hoekmsa et al. (2017) investigated Dutch consumers intention to purchase animal welfare-friendly and mobile slaughter unit meat products, respectively, and found 'moral obligation' and a similar construct called 'personal norm' had the strongest influence on BI. Other intention to purchase higher welfare meat product studies that used a moral obligation/norm related construct also found it significantly positively influenced BI, although it was not consistently the most influential construct and its influence was not always direct (McEachern et al., 2007). Yeh and Hartmann (2021), who researched German consumers intention to purchase and willingness to pay for cured ham, found that higher personal moral norms had a significant positive influence on their attitude construct. In the current study, the strength of the moral responsibility construct may have been enhanced by the addition of a statement originally belonging to the PCE construct (refer to Table 3.1 for statement). This is because the combined construct encompassed both their perceived responsibility towards animal welfare when making a purchasing decision and their sense of moral/ethical obligation to purchase higher welfare products.

The pig welfare related attitude constructs 'welfare is important' and 'pig meat qualities', and food choice motives 'pig-friendly' and 'high animal welfare' also had a strong association with and

influence on high BI. These results are in accordance with other studies that also found that consumers BI to buy higher welfare products was significantly positively influenced by the extent to which they regard animal welfare as important (de Graaf et al., 2016; Jamieson et al., 2015). Similar studies investigating the positive attributes associated with higher welfare products found that consumers perceiving animal welfare to be associated with attributes such as superior health, taste and quality had a significant positive influence on BI (de Graaf et al., 2016; Gracia, 2013; Merlino, 2019; Washio et al., 2020). This suggests that consumers appreciate the added value associated with higher welfare products.

The pressures exerted by a consumer's social circle, 'subjective norm', was also shown to have a moderately strong correlation with BI, to have a higher significantly higher mean score in the high BI group and to significantly positively influence their intention to purchase higher welfare pig meat in the final binary logistic regression model. This result is in line with some other studies (Gracia, 2013; Hoeksma et al., 2017; Jamieson et al., 2015), although Yeh and Hartmann (2021) found that this was only the case for 'price sensitive consumers' and not 'Product and Process Quality Supporters'. In addition, one study found that 'subjective norm' had an indirect effect on BI via attitudes and 'moral obligation' (Beldad & Hegner, 2020). An older study found that subjective norm did not have an effect on BI (McEachern et al., 2007), but it could be postulated that in 2007, there may have been less social pressure surrounding ethical issues such as animal welfare.

Although 'trust' was not found to be one of the strongest positive influencers of BI, its role is still worth consideration. The results of this study are akin to other studies such as Washio et al. (2020) who found trust to have a relatively small but significant effect on BI.

Budget, a PBC construct, was found to be the main negative predictor of high behavioural intention to purchase higher welfare pig meat and to have a significantly higher mean score in the low BI group. Cheapness was also significantly more important to consumers in the low BI group. Washio (2020) also found their PBC construct, which included affordability, also had a significant negative impact on BI. In contrast, Beldad and Hegner (2020) found that 'financial capability' did not affect BI.

However, the authors speculated this may have been because the consumers were imagining the most affordable one-star label in the Netherland's existing multi-level animal welfare label.

In the current study, the knowledge construct was found to have a weak, often insignificant relationship with BI. Some studies did find knowledge to have an, albeit small and often indirect, significant, positive effect on BI (Beldad & Hegner, 2020; Jamieson et al., 2015; McEachern et al., 2007). While a direct significant relationship between knowledge and BI was not observed using binary logistic regression analysis, some previous studies have found that knowledge informed other determinants of BI in the model, such as the importance consumers placed on pig welfare, trust, and feelings of moral obligation to purchase higher welfare products (Beldad & Hegner, 2020; McEachern et al., 2007).

3.4.3. Pig Welfare Relative to Other Production Attributes

When the mean purchase likelihood scores of various product profiles were compared between the BI groups, the high BI group favoured pig welfare labelled the most, followed by sustainability labelled pig meat products. This pattern was also observed in the total survey sample, although not as clearly. This suggests that overall, Irish and UK consumers might value pig welfare labelling above sustainability labelling. Free range and EU animal welfare labels were also preferred over a carbon footprint label in a study evaluating Belgian consumers preferences for meat sustainability labels (Van Loo et al., 2014). Even when German citizens were surveyed about meat taxation, there was more support for an animal welfare compared to a climate change mitigation levy (Perino & Schwickert, 2023).

The organic label was the least preferred label in Van Loo et al.'s (2014) study. This fits with the low ranking of the 'organically produced' attribute in this survey; consumers in both the high and low BI groups ranked 'organically produced' as one of the least important pig meat product attributes. This is somewhat surprising given that higher animal welfare and organic production systems are perceived as related (Font-i-Furnols, 2019). However, this result may link to price/consumer's budgets and their

perception of pig meat as a value protein, versus organic products being associated with being expensive.

The ranking of other sustainability related attributes followed a similar pattern to what was seen in a study on animal welfare labelling published by the European Commission where more consumers prioritised having more information about antibiotic usage compared to environmental sustainability (e.g. carbon footprint) (ICF, 2022).

3.4.4. Implications

The lack of difference between the Irish and UK survey results is suggestive of similar motivations and intention to purchase higher welfare products in Ireland and the UK. UK consumers are already exposed to the RSPCA assured label on their pig meat products, whereas there is currently no comparable welfare-focussed label in Ireland. The similar results in both countries could imply an equivalent market for higher welfare pig meat in Ireland.

The findings of this study emphasise the sense of moral weight that consumers with a high intention to purchase higher welfare pig meat feel, which could be utilised in potential marketing campaigns for high welfare pig products. In addition, the attitudinal determinant ‘pig meat qualities’, and ‘subjective norm’, were found to have a significant positive influence on BI. Thus, it could be worth highlighting the evidence-based quality attributes associated with higher welfare pig meat, and how this type of meat is growing in popularity.

Since accessibility and convenience are important to consumers, it is important that higher welfare pig products should be available in mainstream retailers. In addition, ‘budget’ was found to have a significant negative influence on BI and although consumers in the high BI group ranked ‘cheap’ as least important out of eight product attributes, the higher priced product profiles still had a lower mean purchase likelihood score compared to standard priced products in the high BI group. It is worth considering how much of the additional cost associated with producing higher welfare pig meat

should be absorbed by the consumer and which other stakeholders should be financially responsible for allowing improved welfare systems to become a viable business option.

3.4.5. Limitations

The study's limitations must be considered when interpreting the results. Firstly, the gender female and social class ABC1F+ was slightly overrepresented compared to the 'pig meat purchaser' quota set by the market research company. In addition, several limitations exist because of the hypothetical nature of the study. For example, attitude-behaviour and intention-behaviour gaps mean that concern for pig welfare concern and a positive intention to buy higher welfare pig meat products does not necessarily reflect consumers actual buying behaviour.

The design of the survey also has limitations. For instance, limiting the number of model constructs and product attributes considered means there are other constructs (e.g. empathy) or attributes (e.g. freshness) that could have had a significant influence on BI or be ranked as important that weren't included in the survey. In addition, apart from the product profiles, none of the questions in the survey were randomised.

3.4.6. Future Recommendations

Future studies could extend the research questions of this study and investigate what consumers perceive to be good pig welfare, their understanding around what a higher pig welfare label means and who consumers consider most responsible for farm animal welfare. In addition, Irish consumer preferences and willingness to pay for pig meat products with different value adding characteristics could be further explored. 'Real-world' studies could also be developed from this current hypothetical study (e.g., test marketing of products).

For a higher welfare pig farm assurance scheme to work in Ireland, the perspective of other industry stakeholders such as farmers, meat processors and retailers should also be considered in future research.

3.5. Conclusions

This study identified the extended TPB model constructs and food choice motives that significantly influenced Irish and UK consumers' intention to purchase higher welfare pig meat products and explored the relative importance of 'pig welfare' compared to other product attributes. No major differences were found in the mean construct scores between consumers from both countries. 'Moral responsibility', 'welfare is important', 'pig meat qualities', 'subjective norm' and 'budget' were found to be important predictors of BI. In addition, the importance of the pig meat product attributes, 'pig-friendly' and 'produced locally' significantly predicted high BI group membership. The consumers in the high BI group also had higher purchase likelihood scores for pig welfare labelled product profiles. This research provides theoretical behaviour data that can be used to help guide the direction of future pig meat market diversification. In addition, by better understanding consumer motivations, new product developments can be more effectively targeted to them.

Chapter 4

Pig Meat Consumers from Ireland and the United Kingdom: Using Conjoint and Cluster Analysis to Identify their Preferences for Higher Welfare Labelled Pig Meat Products

Abstract: Consumers are becoming more conscious of how their food is produced, and there is evidence of increasing concern for farm animal welfare. This study explored the importance pig meat consumers place on assurance labels (none, welfare or sustainably produced), price (standard price, 10% increase, and 40% increase) and product type (ham, bacon, and pork chops). An orthogonal array of nine conceptual pig meat product profiles was developed using combinations of these attributes. Consumers (n=766) from both the UK and Ireland were asked to rate each product from 0 ('would definitely not purchase') to 10 ('would definitely purchase'). Conjoint analysis was performed to estimate the utility and importance placed on the different attributes and levels. Cluster analysis was then performed based on consumer's utility estimates, both consumers from Ireland and the UK were used in one analysis due to the lack of difference between the two countries. Three consumer clusters were identified from the total sample; 'indifferent' consumers (68%), 'like labels' consumers (23%) and 'pro pig welfare' consumers (9%). These data were then combined with the survey data described in Chapter 3, and cross tabulations, mean score comparisons and multinomial logistic regression analysis was carried out. Consumers in both the 'like labels' and 'pro pig welfare' cluster were less likely to think 'welfare is not a priority' and more likely to have higher 'behavioural intention' to purchase higher welfare pig meat products and more 'knowledge' of pig welfare and production compared to the 'indifferent' cluster. In addition, consumers in the 'like labels' cluster were less likely

to perceive that higher welfare products are out of their budget and ‘pro pig welfare’ consumers had a positive albeit small utility for the price attribute. These findings are indicative of a market for higher welfare pig meat products in Ireland and indicate a potential willingness to pay more for them. However, further studies are required to quantitatively estimate the value of any premium.

4.1. Introduction

Pig meat plays a key role in Irish consumer’s diets, constituting one-third of the total meat eaten by Irish consumers in 2021 (Central Statistics Office, 2022). However, a proportion of Irish consumers are conscious of how their animal-based products are produced (Mc Mahon, 2019; Regan et al., 2018) and concerned for the welfare of farmed pigs (Sweeney et al., 2022). There is also a desire from the Irish public for more transparency and information regarding farm animal welfare (European Commission, 2016; Sweeney et al., 2022). By focusing on addressing consumer concerns and providing them with the information they desire, the socio-cultural sustainability and economic resilience of the Irish pig industry could be improved (Boogaard, 2011).

It has been suggested that a dedicated farm animal welfare assurance label on meat products could be an appropriate response to help address these issues for Irish and Northern Irish consumers (Sweeney et al., 2022). Labels are useful tools in allowing product attributes that would not otherwise be appreciated by consumers (credence attributes), such as animal welfare, to be communicated in a certified manner on product packaging (Sans & Sanjuán-López, 2015). They have been found to be a preferred method by consumers to attain information regarding animal welfare on meat (Merlino, 2019).

Pig welfare assurance schemes and labels have already been developed in other European countries (Heinola et al., 2021). As mentioned in Chapter 3, the UK have an RSPCA (Royal Society for the Prevention of Cruelty to Animals) Assured certification scheme that is dedicated to assuring higher welfare standards for several farm animal species including pigs (RSPCA Assured, 2016). The sales of these products and recognition of the RSPCA Assured label has continued to increase in recent

years (Lenik, 2021; RSPCA Assured, 2021). Whilst most Irish pig meat products are certified by the Bord Bia quality assurance scheme, the welfare standards are not significantly higher than what is stated in national (Statutory Instrument 311 of 2010) and European legislation (Council Directive 2008/120/EC).

To evaluate the potential demand for higher welfare assured pig meat in Ireland, it is valuable to understand how important pig welfare is to consumers as a product attribute. Janssen et al. (2016) performed a meta-analysis to evaluate the relevance of animal production systems in consumers meat and milk preferences and purchasing decisions. They found that the main methods used in consumer preference and willingness to pay for higher welfare products studies were choice experiments, conjoint analysis, contingent valuation, and auctions. Consumer heterogeneity is common when exploring consumer demand for higher welfare meat products (de Jonge & van Trijp, 2012; Janssen et al., 2016) Preference-based market segmentation of consumers is a useful way to identify and profile groups of consumers with similar preferences for pig meat product attribute in an otherwise heterogeneous total sample.

Although recent research from the island of Ireland has investigated consumer perceptions of farm animal welfare and their attitudes towards higher welfare food (Hyland et al., 2022; Sweeney et al., 2022), to the author's knowledge, consumer preferences for a pig welfare label and the relative importance of welfare as a pig meat product attribute has not yet been explored in Ireland. The first chapter investigated what psychological constructs significantly influenced Irish and UK consumers' intention to purchase higher welfare pig meat products and whether having a high or low intention altered how they ranked different attributes and how likely they were to purchase different products. By using the same product profiles, this chapter aims to estimate the value Irish and UK pig meat consumers place on a 'pig welfare' label, 'sustainability' label and no label, relative to the value placed on product price and type. In addition, this chapter aims to identify and characterise consumer segments based on how much they value pig welfare as a product attribute. The different segments of consumers can be further characterised using the variables described in the previous chapter to help

determine potential future pig meat product marketing implications.

4.2. Materials and Methods

4.2.1. Data Collection and Study Design

Ethical approval for the study was granted by the Medicine, Health and Life Sciences Faculty Research Ethics Committee of Queen's University Belfast (MHLS 22_117), the statement of approval is included in Appendix I. After the questionnaire's clarity was reviewed by a handful of consumers, the market research company 'Empathy Research, Dublin, Ireland' was hired to recruit a quoted panel of 408 Irish and 404 UK adult 'pig meat purchasers' to complete an online survey during October 2022. The survey comprised of questions based on the extended theory of planned behaviour model, sociodemographic characteristics, food choice motives and nine product profile purchase likelihood questions (described in Chapter 3). The product profiles were further analysed in this chapter. Consent was obtained from all participants prior to starting the survey.

4.2.1.1. Product profiles

Three product attributes, each with three levels, were considered for inclusion in the study; they were product type, price and assurance label (Table 4.1). Only a few conjoint studies were found to include meat type or cut as an attribute (Martinez Michel et al., 2011; Schnettler et al., 2014; Scozzafava et al., 2016). Product type was included in this study since there is evidence that the carcass balance/market for a range of higher welfare meat cuts is a concern for processors (Franz et al., 2010) thus it is important to explore whether consumers had a preference for particular cuts of welfare assured pig meat. The product types ham, bacon and pork chops, were chosen based on product popularity data and to represent the range of fresh and processed pig meat products available to consumers. The standard price for each product type was estimated using market data from a range of supermarkets in Ireland and the UK. The assurance label types were chosen based on the research aims. Following this, an orthogonal array of nine pig-meat product profiles were generated in SPSS

using a fractional factorial design of the three attributes and three attribute levels. Each product profile in the resultant orthogonal array was made up of a unique combination of attribute levels, displayed in Table 4.1. The product profile images were made specifically for the survey from photographs the author took of existing premium pig meat products that were then edited on Canva to mimic what higher welfare pig meat products might look like on retailer shelves. The hypothetical assurance logos were designed digitally by the author (see examples in Figure 3.2). A hypothetical label was used for both countries, even though the UK has their existing RSPCA assured label, to avoid cognitive bias from label recognition and allow for a direct comparison of results between countries.

Table 4.1. The pig meat product attributes and levels chosen for a survey exploring the importance of pig welfare as a product attribute in Irish and UK consumers and the nine product concepts generated using an orthogonal design.

Attribute Types and Levels			
Attribute Levels	Assurance Label	Product Type	Price
1	No Label	Ham	Standard
2	Sustainability	Bacon	15% increase
3	Pig welfare	Pork chops	40% increase
Profile Number	Orthogonal Array of Profiles Generated		
1		Pork Chops	40% increase
7	No Label	Bacon	15% increase
9		Ham	Standard
5		Bacon	40% increase
2	Sustainability	Ham	15% increase
3		Pork Chops	Standard
4		Ham	40% increase
6	Pig welfare	Pork Chops	15% increase
8		Bacon	Standard

Actual prices were presented in the product profiles but are not listed in the table due to the UK and Ireland having different currencies and standard prices for the different pig meat products.

4.2.1.2. Information Provided to Participants

After completion of the first part of the survey (described in Chapter 3) participants were provided with a cheap talk script which reminded them of their usual grocery budget, this script can be found in Appendix II. In addition, definitions were given for the ‘higher welfare assurance label’ and ‘sustainably produced label’ prior to viewing the product profiles. This was to ensure a uniform understanding of the labels used. The higher welfare assurance label was defined as “a label used on

products that come from farms that have been certified to have met the assurance scheme's high standards of welfare. These standards are higher than the minimum standards set in the law". The sustainably produced label was defined as "a label used on products that come from farms that have been certified to have met the assurance scheme's sustainability standards. The standards include different aspects of sustainability such as how much the production of the product impacts the environment and the business's ethics". Participants were then shown the nine product profiles and asked to rate each product from 0 ('would definitely not purchase') to 10 ('would definitely purchase'), and the resultant scores are described as purchase likelihood scores. The order in which the participants viewed the profiles was randomised.

4.2.2. Data Analysis

IBM SPSS Statistics version 27 was used to perform all statistical analyses. Prior to performing the analyses, 46 of the 812 participants were excluded because they scored all nine product profiles the same. Conjoint analysis was performed on the participants purchase likelihood scores of the nine product profiles using the conjoint procedure via the conjoint command syntax. Product type and assurance label were inputted as discrete factors and price as a linear (less) factor. Utility estimates (part-worths) for each attribute level, and the importance scores for each attribute type were generated.

Cluster analysis was then performed using the utility estimates for each attribute and level. Initially, to identify a suitable number of clusters, dendrograms from hierarchical cluster analysis (Ward method) and the outputs from two-step cluster analysis were considered for both the total sample, and separate 'Ireland' and 'UK' samples. The differences between the UK and Ireland were minimal and the two-step output suggested a three-cluster solution with fair cluster separation, thus the K-means cluster procedure was then used to generate a 3-cluster solution of the total sample. These clusters had adequate cluster sizing and interpretability and significantly different utility estimates. The clusters

were named based on the salient differences in the utility estimates driving the membership of each cluster.

The clusters were then compared and characterised using consumers' sociodemographic characteristics, purchase frequency and their extended theory of planned behaviour model construct and food choice motive scores (please see section 3.2.2 for more details regarding these variables). Cross-tabulation of sociodemographic characteristics and purchase frequency was performed to identify significant differences (Pearson's chi-square) in the profiles of the cluster groupings. Mean scores for the product profile purchase likelihoods, for each of the model constructs, and for food choice motives importance questions were then compared across clusters with statistical differences identified using one-way ANOVAs. Dunnett T3 post hoc tests were then used to identify differences between clusters. This test was chosen as it does not assume equality of variance and the Levene's test suggested a lack of homogeneity of variance between clusters for some variables. To ensure the suitability of parametric tests on the data, the distribution of the data for all the dependent variables was examined. Although most histograms appeared relatively normally distributed, the Shapiro Wilks tests suggested that all the variables were not normally distributed. Thus, a non-parametric test (Kruskal-Wallis) was also performed on the data and no meaningful differences were found between the ANOVA with Dunnett T3 test and the Kruskal-Wallis test. Because of the large survey sample size and lack of differences between tests, the ANOVA was used as the test of choice.

The importance ranking of eight different pig meat product characteristics were also compared across clusters. Finally, multinomial logistic regression analysis was performed to identify significant predictors of cluster membership. The dependent variables were the clusters, with the 'indifferent' cluster being the largest and therefore the reference category. In the initial model, the following were included as independent variables: sociodemographic characteristics and purchase frequency were included as factors, and the extended theory of planned behaviour constructs and food choice motive importance scale questions were included as covariates. A final model was then created with only the significant variables from the first model.

4.3. Results

4.3.1. Conjoint Analysis

Table 4.2 displays the conjoint analysis results for the total sample and a comparison of mean utility estimates between countries. Overall, assurance labels were found to be the most important attribute to consumers; accounting for over 47% of the product's importance. The different assurance labels were found to have opposing utility estimates, with no label having the lowest (-1.18) and the pig welfare label having the highest utility score (0.85) of all attributes and levels measured in the study. Product type was the second most important attribute. However, there was a much smaller difference in utilities between the different product types used - bacon was found to have the highest utility estimate (0.14) and pork chops were found to have the lowest (-0.21). Price was estimated to be the least important of the three product attributes. All price utility estimates were negative and got progressively more so as the price increased.

Differences between the utility estimates of Irish and UK consumers were also explored. The product type bacon was found to have a higher utility for Irish consumers ($P < 0.05$), whereas having no assurance label ($P < 0.05$) and price ($P < 0.01$) were found to have lower utility estimates for Irish consumers.

Table 4.2. Pig meat product attribute utility estimates and average importance to the overall sample and to Irish and UK consumers.

Attributes	Levels	Country						P-value IRE vs. UK
		Total		United Kingdom		Ireland		
		Utility Estimates ± SD	Averaged Importance (%)	Utility Estimates ± SD	Averaged Importance (%)	Utility Estimates ± SD	Averaged Importance (%)	
Constant		6.46 ± 2.08		6.40 ± 1.84		6.53 ± 2.28		ns
Assurance Label	No Label	-1.18 ± 1.65		-1.06 ± 1.58		-1.31 ± 1.71		*
	Sustainability	0.33 ± 1.01	47.28	0.28 ± 0.93	46.04	0.38 ± 1.08	48.50	ns
	Pig Welfare	0.85 ± 1.41		0.78 ± 1.35		0.92 ± 1.47		ns
Product Type	Ham	0.06 ± 1.05		0.10 ± 1.02		0.03 ± 1.08		ns
	Bacon	0.14 ± 0.99	34.20	0.07 ± 1.02	35.58	0.21 ± 0.95	32.84	*
	Pork chops	-0.21 ± 1.12		-0.17 ± 1.08		-0.24 ± 1.16		ns
	Standard	-0.23 ± 0.73		-0.15 ± 0.68		-0.30 ± 0.78		
Price	15% Increase	-0.45	18.52	-0.30	18.38	-0.61	18.66	**
	40% Increase	-0.68		-0.45		-0.91		

Pearson's R = 0.999, Sig. < 0.001, Kendall's tau = 0.944, Sig. < 0.001

*** = P<0.001, ** = P<0.01, * = P<0.05, ns = non-significant. The P-values were calculated using one-way ANOVAs comparing the utility estimates between Irish and UK consumers. Because price was inputted as a linear (less) factor, the utility scores were only compared as one linear variable between countries, thus there are only standard deviations and a P-value for one price variable. Scale used for product profiles: 0 to 10 with 0 being 'would definitely not purchase' and 10 being 'would definitely purchase'.

4.3.2. Cluster Analysis

4.3.2.1. Cluster Centres

Figure 4.1 shows the final three cluster solutions generated from the utility estimates of the total sample of participants. The clusters were named 'indifferent' (cluster 1), 'like labels' (cluster 2) and 'pro pig welfare' (cluster 3). The 'indifferent' cluster represents the largest segment of consumers (n = 523; 68%). For this cluster, the utility estimates for the different attributes and levels barely deviated beyond zero; these participants found little value in any of the attributes, hence the name 'indifferent'. For this cluster, the utility estimate with the greatest deviation from 0 was for price (-0.30), this was more negative than the other two clusters. The second cluster contained nearly a quarter of the total sample (n = 177; 23%) and was named the 'like labels' cluster. These consumers had a very strong negative utility for 'no label' (-3.45), and positive utilities for both the sustainability and in particular,

the pig welfare label. The ‘pro pig welfare’ cluster was comprised of the smallest group of consumers (n = 66; 9%). Out of the three clusters, this cluster had the largest positive utility estimate for the ‘pig welfare’ label (3.21). However, unlike the ‘like labels’ cluster, there was a negative utility estimate for the sustainability label. They were the only cluster to have a positive utility estimate for price, although the value was very small (0.07). The utility estimates for different product types varied between clusters, although all were relatively small values. Out of the three product types, the ‘indifferent’ cluster had the highest utility for bacon, the ‘like labels’ cluster had the highest utility for pork chops and the ‘pro pig welfare’ cluster had the highest utility for ham.

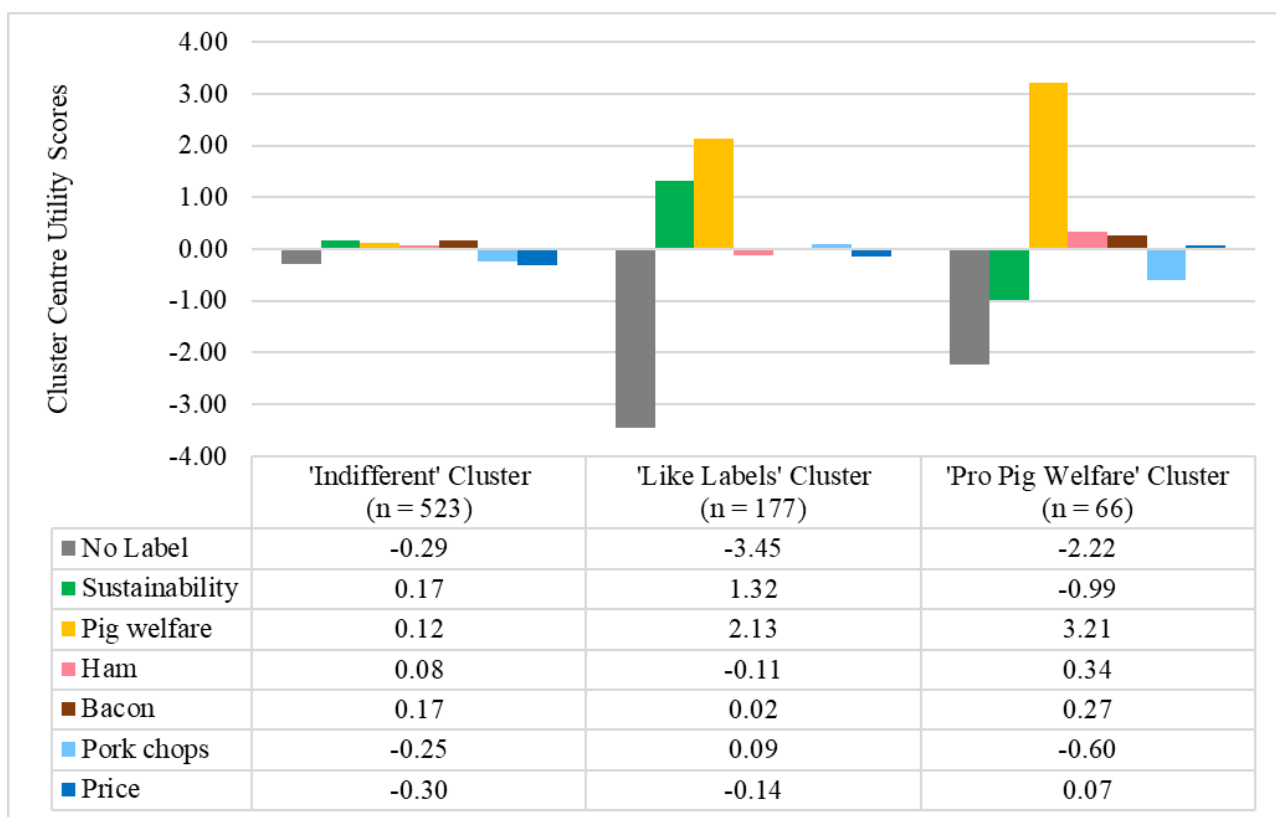


Figure 4.1. Combined chart and table of the cluster centres generated from K-means cluster analysis based on the utility estimates of selected pig meat product characteristics in a combined sample of Irish and UK consumers.

4.3.2.2. Profiling the Clusters

The sociodemographic profiles of the different clusters were compared in Table 4.3. Significant differences were found between the clusters with regard to country, purchase frequency, gender and location (e.g. urban/suburban/rural). Within the ‘like labels’ cluster, there was a larger proportion of

Irish than UK consumers. The pattern of pig meat product purchase frequency was that a slightly larger proportion of 'indifferent' consumers shopped less frequently, a higher proportion of 'like labels' consumers purchased pig meat 1-3 times a week than in the other clusters, and a higher proportion of 'pro pig welfare' consumers purchased pig meat more than 4 times per week than in the other clusters. The proportion of females was lower in the 'indifferent' cluster than in the other two clusters. Finally, a greater proportion of consumers who live rurally were found in the 'like labels' and 'pig welfare' clusters compared to the 'indifferent' cluster, whereas a higher proportion of urban consumers were found in the 'indifferent' cluster than the other two clusters.

Table 4.3. Distribution of sociodemographic characteristics of the total sample of Irish and UK pig meat product consumers and between three cluster groups.

	Variables	Total		Clusters (%)			Chi-Sq
		n	%	Indifferent	Like Labels	Pro Pig Welfare	
Country	United Kingdom	379	49	52	41	48	*
	Ireland	387	51	48	59	52	
Purchase Frequency	< Once a fortnight	143	19	21	15	14	*
	1-3 times a week	587	77	75	83	76	
	> 4 times a week	36	5	5	2	11	
Gender	Male	296	39	43	27	32	***
	Female	470	61	57	73	68	
Social Class	ABC1F+	476	62	64	60	53	ns
	C2DEF-	290	38	36	40	47	
Age	18-34 years old	253	33	35	30	29	ns
	35-49 years old	314	41	42	38	44	
	50-64 years old	199	26	24	32	27	
Education	Low	38	5	6	3	3	ns
	Mid	370	49	47	52	53	
	High	350	46	47	45	44	
Relationship Status	Single/not living together	241	32	33	28	33	ns
	Married/Co-habiting	476	62	62	66	58	
	Separated/Widowed	46	6	6	6	9	
Location	Urban	305	40	44	29	38	***
	Suburban/Rural Town	305	40	41	40	33	
	Rural	156	20	16	31	29	

*** = P<0.001, ** = P<0.01, * = P<0.05, ns = non-significant.

Tables 4.4 and 4.5 compare the mean scores of a range of variables used in the previous study chapter across and between each cluster. Table 4.4 compares the mean purchase likelihood scores of the nine product profiles. Consumers typically had a higher purchase likelihood score for labelled products. The ‘indifferent’ cluster had less of a range of scores across all nine product profiles (5.23 - 6.66 out of 10) than the other two clusters. The scores for ‘no label’ products in this cluster were significantly higher than for the other two clusters, with the ‘like labels’ cluster having the lowest purchase likelihood scores. Out of the three clusters, the ‘like labels’ cluster had significantly higher purchase likelihood scores for products with a ‘sustainably produced’ label than the other clusters, although within that cluster, the ‘pig welfare’ labelled product profiles had even higher scores. Interestingly, the ‘pro pig welfare’ cluster were the least likely to purchase products with ‘sustainably produced’ label. Out of all the scores in the table, the two highest purchase likelihood scores were from the ‘pro pig welfare’ cluster, with the highest being the pig welfare labelled standard price bacon (8.86/10.00).

Table 4.4. Compares the mean purchase likelihood scores of the product profiles between clusters of consumers from a combined Ireland and UK sample.

Combinations of attributes that made up the product profiles			Clusters				P-value from ANOVA
			Total	Indifferent	Like Labels	Pro Pig Welfare	
			(n = 766)	(n = 523)	(n = 177)	(n = 66)	
			Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	
No Label	Pork Chops	40%	4.37 ± 2.72	5.23 ± 2.52 ^x	2.44 ± 2.02 ^y	2.71 ± 2.38 ^y	***
	Bacon	15%	4.98 ± 2.75	6.00 ± 2.31 ^x	2.54 ± 2.10 ^y	3.39 ± 2.74 ^y	***
	Ham	Standard	5.13 ± 2.85	6.23 ± 2.34 ^x	2.51 ± 2.10 ^y	3.44 ± 2.89 ^y	***
Sustainably Produced	Bacon	40%	6.28 ± 2.40	6.19 ± 2.36 ^x	7.13 ± 2.08 ^y	4.74 ± 2.64 ^z	***
	Ham	15%	6.43 ± 2.39	6.37 ± 2.35 ^x	7.16 ± 2.21 ^y	4.92 ± 2.44 ^z	***
	Pork Chops	Standard	6.32 ± 2.46	6.28 ± 2.34 ^x	7.50 ± 1.70 ^y	3.55 ± 2.84 ^z	***
Pig welfare	Ham	40%	6.65 ± 2.53	5.98 ± 2.46 ^x	7.84 ± 2.08 ^y	8.83 ± 1.71 ^z	***
	Pork Chops	15%	6.72 ± 2.56	6.06 ± 2.51 ^x	8.18 ± 1.85 ^y	8.12 ± 2.47 ^y	***
	Bacon	Standard	7.21 ± 2.35	6.66 ± 2.36 ^x	8.23 ± 1.84 ^y	8.86 ± 1.77 ^z	***

*** = P<0.001, ** = P<0.01, * = P<0.05, ns = non-significant. Scale used for product profiles: 0 to 10 with 0 being ‘would definitely not purchase’ and 10 being ‘would definitely purchase. Multiple comparisons of the mean purchase likelihood scores were made using the Dunnett T3 test and rows with different superscripts (x,y,z) denotes significant differences between clusters.

Table 4.5 shows that significant differences were found across the means scores of all the extended theory of planned behaviour constructs, apart from the 'purchasing control' and 'understanding labels' constructs. The 'indifferent' cluster had significantly lower mean scores for all the constructs apart from the 'welfare is not a priority' and 'budget' constructs - 'indifferent' consumers' had the highest scores for these constructs, although for budget, this score was not significantly different to the mean score of the 'pro pig welfare' cluster. For all constructs, there was no significant difference in the means scores between the 'like labels' and 'pro pig welfare' cluster.

Table 4.5 compares means scores for five pig meat product attribute importance scale questions across and between clusters. All five attributes were found to be less important in the 'indifferent' cluster than the other two clusters which were not significantly different from each other. Relative to the other product attributes, 'produced locally' had the lowest importance score across all three clusters. The characteristic 'traded fairly' scored the highest in the 'indifferent' and 'like labels' clusters, whereas 'pig friendly' scored the highest in the 'pro pig welfare' cluster.

The ranking food choice motives question mean ranking scores and ranks were compared across clusters in Figures 4.2 and 4.3 (and in Appendix V) respectively. Participants were asked to rank eight product attributes in order of importance with one being the most important and eight being the least important. All three clusters ranked 'high animal welfare' as the most important product attribute (i.e. it was ranked highest, indicated by having the lowest score). Both 'indifferent' and 'pro pig welfare' consumers next prioritised the product being available where they shop. Whereas 'like labels' consumers firstly prioritised the attributes that could be easily communicated via assurance labels or claims on product packaging ('limited use of antibiotics', 'locally produced' and 'low environmental impact'), except for 'organically produced', which was ranked as one of the least important attributes by all three clusters. The 'pig welfare' and 'like labels' clusters ranked 'cheap' as the least important, while 'indifferent' consumers ranked 'cheap' as the fourth most important product attribute.

Table 4.5. Compares the mean scores of the extended theory of planned behaviour constructs and food choice motive questions between clusters of consumers from combined Ireland and UK sample.

TPB constructs and extensions, and food choice motives		Clusters				P-value from ANOVA
		Total	Indifferent	Like Labels	Pro Pig Welfare	
		(n = 766) Mean ± SD	(n = 523) Mean ± SD	(n = 177) Mean ± SD	(n = 66) Mean ± SD	
Attitudes ^a	Welfare is Important	5.28 ± 0.95	5.05 ± 0.91	5.76 ± 0.84	5.83 ± 0.90	***
	Pig Meat Qualities	5.15 ± 1.13	4.94 ± 1.06	5.62 ± 1.10	5.55 ± 1.24	***
	Welfare is Not a Priority	3.08 ± 1.20	3.38 ± 1.14	2.49 ± 1.03	2.36 ± 1.25	***
Perceived Behavioural Control ^a	Purchase Control	5.30 ± 1.39	5.26 ± 1.31	5.38 ± 1.44	5.36 ± 1.77	ns
	Understanding labels	4.70 ± 1.34	4.63 ± 1.21	4.88 ± 1.52	4.77 ± 1.70	ns
Subjective Norm ^a	Budget	4.42 ± 1.40	4.64 ± 1.26	3.86 ± 1.55	4.18 ± 1.62	xy
	Behavioural Intention ^a	4.72 ± 1.13	4.56 ± 1.04	5.07 ± 1.15	5.02 ± 1.48	***
TBB Extensions	Trust in Meat Labels ^a	4.97 ± 1.12	4.66 ± 1.01	5.64 ± 1.00	5.62 ± 1.13	***
	Moral Responsibility ^a	4.95 ± 1.09	4.78 ± 1.09	5.39 ± 0.92	5.17 ± 1.16	***
	Knowledge ^b	4.82 ± 1.14	4.52 ± 1.03	5.47 ± 1.05	5.44 ± 1.23	***
Modifying Factor - Food Choice Motives ^c	Traded fairly	2.68 ± 1.42	2.52 ± 1.36	2.95 ± 1.53	3.18 ± 1.37	***
	Eco production	5.43 ± 1.15	5.18 ± 1.12	6.01 ± 0.98	5.91 ± 1.12	***
	Pig-friendly	5.37 ± 1.21	5.10 ± 1.19	5.99 ± 1.00	5.82 ± 1.09	***
	Eco packaging	5.35 ± 1.30	5.07 ± 1.24	5.96 ± 1.10	5.94 ± 1.45	***
Produced locally	5.31 ± 1.25	5.03 ± 1.24	5.96 ± 1.05	5.80 ± 1.04	***	
		5.00 ± 1.23	4.81 ± 1.20	5.45 ± 1.23	5.38 ± 1.08	***

*** = P<0.001, ** = P<0.01, * = P<0.05, ns = non-significant. Scales used: a = Likert scale with 1 being 'Strongly Disagree' and 7 being 'Strongly Agree', b = True/ False questions, c = Likert scale with 1 being 'Not at all important' and 7 being 'Very Important'. Multiple comparisons of the mean purchase likelihood scores were made using the Dunnett T3 test and rows with different superscripts (x,y,z) denotes significant differences between clusters.

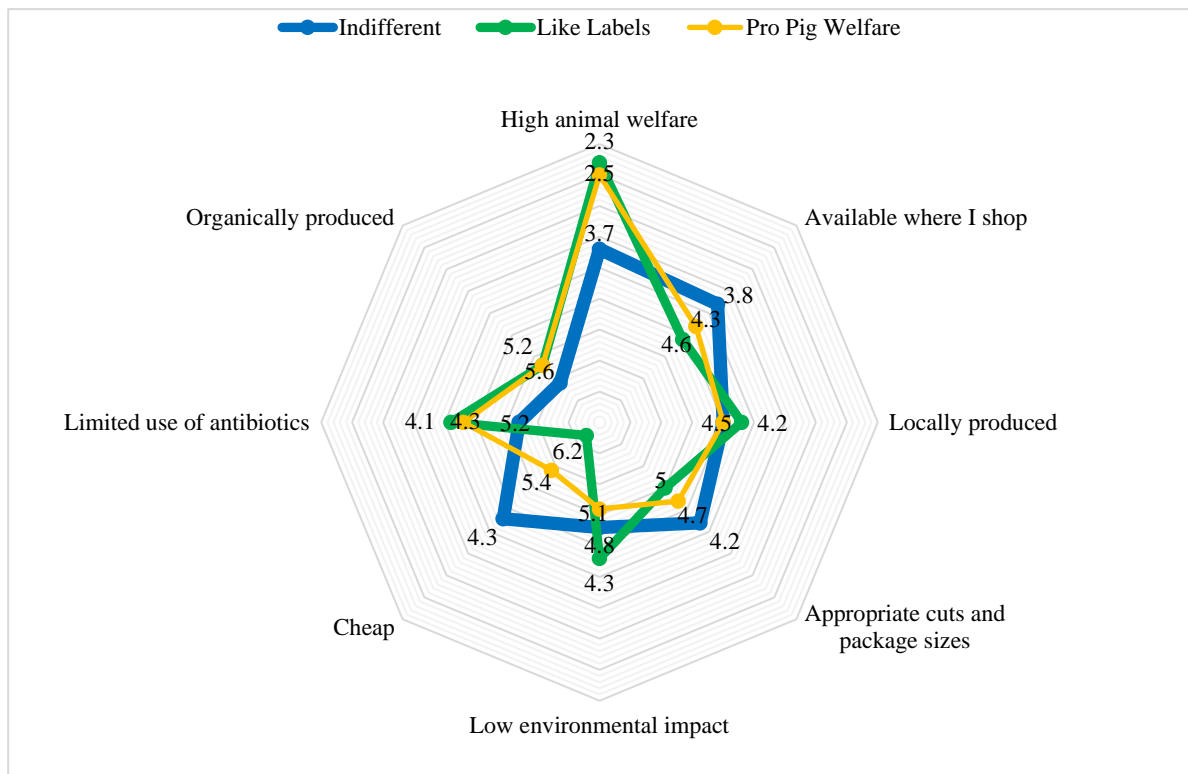


Figure 4.2. Compares the mean ranking scores of different pig meat product attributes across three consumer clusters from a sample of Ireland and UK consumers. The smaller the mean score, the more important the attribute was to that cluster of consumers.

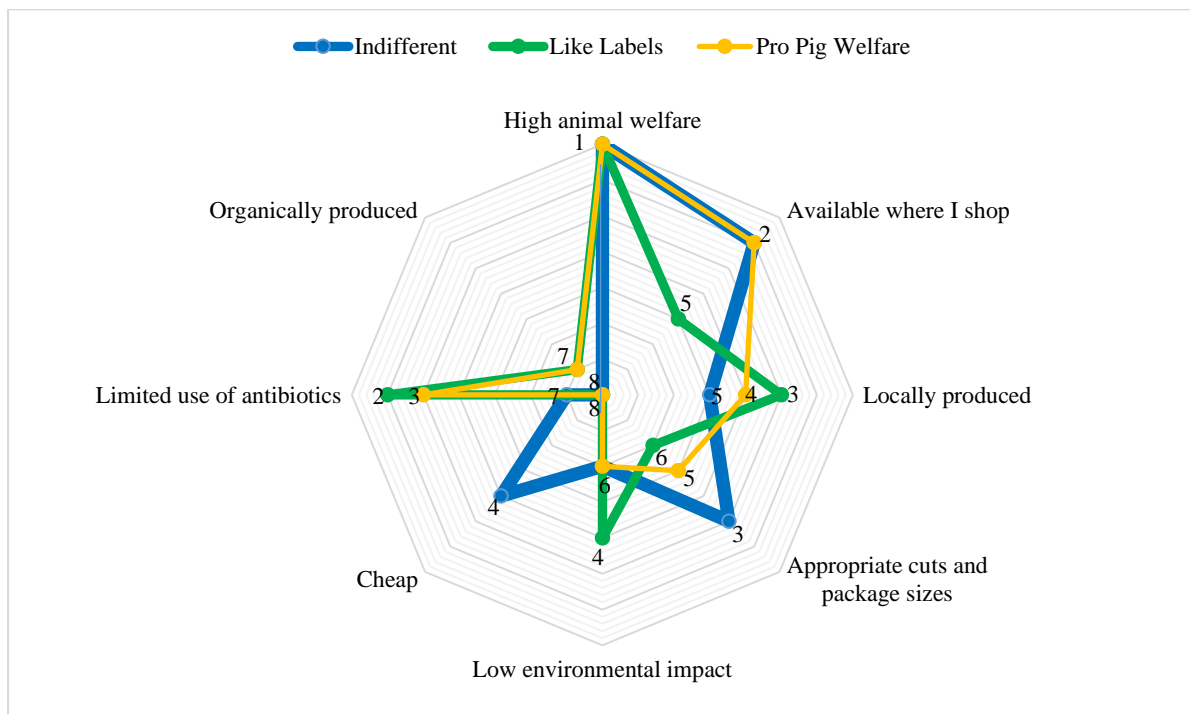


Figure 4.3. Compares the ranking of different pig meat product characteristics between three clusters of consumers from a combined Ireland and UK sample. Statements ranked from 1 (the most important) to 8 (the least important). Please see Appendix V for a table version of these figures.

4.3.3. Multinomial Logistic Regression Analysis

The multinomial logistic regression analysis results are shown in Table 4.6. The sociodemographic variables gender and area type were found to be significant predictors of 'like labels' cluster membership. Consumers in the 'like labels' cluster were significantly less likely to be male or live in an urban area compared to the 'indifferent' cluster. The purchase frequency of consumers was found to significantly predict consumers' likelihood of being in the 'pro pig welfare' cluster, with the more frequent pig meat product purchasers being more likely to be in the 'pig welfare' cluster compared to the 'indifferent' cluster.

The extended theory of planned behaviour constructs 'welfare is not a priority', 'behavioural intention' and 'knowledge' were found to significantly predict cluster membership for both the 'like labels' and 'pro pig welfare' clusters. Consumers in these clusters are less likely to feel like welfare is not a priority, are more likely to have a higher behavioural intention to purchase higher welfare pig meat products and more likely to have a higher level of knowledge about pig production and welfare, compared to the 'indifferent' cluster.

The other constructs 'budget', 'moral responsibility' and 'trust' were found to only be significant predictors of 'like labels' cluster membership. Consumers in this cluster were less likely to agree that higher welfare pig meat is out of their budget, are more likely to have a stronger sense of moral responsibility to purchase higher welfare pig meat and have more trust in assurance labels than consumers in the 'indifferent' cluster.

Table 4.6. Multinomial logistic regression analysis comparing what factors significantly predict the likelihood of Irish and UK pig meat consumers being in a particular cluster.

Predictors	Cluster 2: Like Labels						Cluster 3: Pro Pig Welfare					
	B	Sig.	Exp(B)	95% Confidence Interval for Exp(B)		B	Sig.	Exp(B)	95% Confidence Interval for Exp(B)			
				Lower Bound	Upper Bound				Lower Bound	Upper Bound		
Gender	Gender = Male (cp. Female)	-0.539	0.015	0.583	0.378	0.900	-0.306	0.325	0.737	0.401	1.354	
	Urban (cp. Rural)	-0.814	0.003	0.443	0.261	0.751	-0.555	0.127	0.574	0.281	1.171	
Area type	Suburban/Rural Town (cp. Rural)	-0.484	0.061	0.616	0.371	1.023	-0.578	0.117	0.561	0.272	1.156	
	Twice a month or less (cp. to >4 times per week)	-0.515	0.427	0.597	0.168	2.130	-2.338	0.000	0.097	0.028	0.338	
Purchase frequency	1 - 3 times a week (cp. to >4 times)	-0.003	0.997	0.997	0.305	3.260	-1.748	0.001	0.174	0.061	0.493	
	Budget ^a	-0.188	0.013	0.829	0.714	0.962	-0.022	0.832	0.978	0.798	1.199	
Extended TPB constructs	Welfare is Not a Priority ^a	-0.374	0.000	0.688	0.568	0.833	-0.591	0.000	0.554	0.416	0.736	
	Behavioural Intention ^a	0.428	0.003	1.534	1.155	2.039	0.520	0.013	1.682	1.117	2.532	
	Moral Responsibility ^a	0.344	0.010	1.411	1.088	1.831	0.350	0.060	1.419	0.986	2.044	
	Trust in Labels ^a	0.261	0.022	1.298	1.038	1.622	0.066	0.661	1.068	0.795	1.435	
	Knowledge ^b	0.160	0.027	1.174	1.019	1.353	0.248	0.016	1.282	1.048	1.568	

The reference category is: Cluster 1: Indifferent.

Model fit: Likelihood-Ratio Test: $\chi^2= 252.808$; $df = 22$; $Sig. < 0.001$

Pseudo R2: Cox and Snell = 0.281, Nagelkerke = 0.350, McFadden = 0.204

Scales for the Extended TPB construct statements: : a = Likert scale with 1 being ‘Strongly Disagree’ and 7 being ‘Strongly Agree’, b = True/ False questions.

4.4. Discussion

This study used a conjoint approach to gauge the relative value that Irish and UK consumers place on pig welfare as a product attribute, followed by cluster analysis to identify different groups of consumers with similar utility estimates for the different product attributes. The presence of an assurance label was found to be the most important attribute for consumers, followed by product type, and then price. Three clusters were generated and the majority of consumers fell into the ‘indifferent’ cluster. The second largest cluster consisted of consumers who ‘like labels’, and this was followed by a smaller cohort of ‘pro pig welfare’ consumers. Thus, both analyses indicate that assurance labelling is of importance to a significant cohort of Irish pig meat consumers.

4.4.1. Conjoint Analysis

It is interesting that according to the conjoint analysis results, assurance labels were found to be more important than product type and over two and a half times more important than price in the total sample, with Irish consumers having a particularly low utility for products without a label. Henschion et al. (2014) also found that the trend in meat consumers is that quality is becoming more important and price less important. This was evident in Duong et al. (2022)'s study, where attributes such as animal welfare and naturalness were ranked more important than price, however this was not the case in all studies or countries (Lin-Schilstra et al., 2022).

Although price was deemed to be the least important out of the three attributes, consumers still preferred the standard price compared to the 15% and 40% increased prices, with utility estimates clearly becoming more negative as the price increased for consumers in both countries, however, Irish consumers consistently had a lower utility for price. This trend of lower utilities with increasing price was also found in other studies investigating assurance labels (Sonntag et al., 2023). Irish consumer's particularly negative utilities for prices may be a result of the overall cost of living being higher in Ireland compared to the UK (Numbeo, 2023) and Irish consumers feeling the pinch more when grocery shopping. This could be a concern for their acceptance of price premiums for pig meat in the near future.

Overall, out of the three product types, consumers had the highest utility for bacon, with Irish consumers having a significantly higher utility for bacon than UK consumers. This is evident in national food consumption data from Ireland showing that pork and bacon is the most consumed meat by consumers (Irish Universities Nutrition Alliance, 2010).

4.4.2. Cluster Analysis

4.4.2.1. 'Indifferent' Cluster

The 'indifferent' consumer cluster contained over 68% of the total sample and was characterised by their weak utility estimates for all the attributes and levels that they were asked to consider, as well as

relatively neutral responses to most survey constructs and product profiles. Interestingly, Hyland et al. (2022) also recently identified a similar sized proportion of ‘indifferent’ consumers, characterised by their lower levels of concern for animal welfare. This study investigated Irish and Northern Irish consumers perception of farm animal welfare, and the gap between consumer attitudes and their purchasing behaviour of animal welfare products (Hyland et al., 2022). This finding is common, and several international studies have identified ‘indifferent’/‘ambivalent’/‘uninvolved’/ ‘unconcerned’ cohorts of consumers, who have a lack of concern for animal welfare when purchasing meat products (e.g. (Di Pasquale et al., 2016; Heise & Theuvsen, 2017; Tomasevic et al., 2020)). This is the case even when investigating consumer preferences for a wide range of pig production attributes, in addition to animal welfare (Krystallis et al., 2012; Meuwissen et al., 2007) .

Similar to the findings in the current study, a higher proportion of men were often found in the type of clusters that could be considered ‘indifferent’ (Heise & Theuvsen, 2017; Malek et al., 2018).

Consumers in this type of cluster also tended to have a lower level of knowledge about the farm animal welfare and production practices (Di Pasquale et al., 2016; Heise & Theuvsen, 2017; Malek et al., 2018).

Out of the three clusters in this study, ‘indifferent’ consumers most strongly agreed that higher welfare meat is out of their budget and had a slightly more negative utility estimate for price than the other clusters. They also placed more importance on the cheapness of pig meat products; for this cluster it was ranked fourth out of eight product attributes, whereas it was ranked last in both of the other clusters. Again, this result is similar to that of other studies, whereby ‘indifferent’ cohorts of consumers had a high regard for price, this was often reflected in a lack of willingness to pay for higher welfare meat products (Di Pasquale et al., 2016; Heise & Theuvsen, 2017) .

Nevertheless, an Australian study evaluating consumer concerns for farm animal welfare found that while the majority of meat consumers held neutral views towards farm animal welfare, a proportion of those consumers still purchased products with welfare claims (Malek et al., 2018). In addition, Hyland et al. (2022) also observed that although ‘indifferent’ Irish and Northern Irish meat consumers had a low concern for animal welfare, they were still motivated to, and felt they had the opportunity and

capability to buy high animal welfare foods. In the current study, there was no significant difference in consumers' sense of control over purchasing higher welfare meat or understanding of labels across clusters, and 'indifferent' consumers also prioritised convenience. Thus, if higher welfare certified pig meat products become readily available in Ireland, the 'indifferent' cluster may yet occasionally purchase these products.

4.4.2.2. 'Like Labels' Cluster

The 'like labels' consumer cluster consisted of just over 23% of the total sample. They were characterised by their very strong negative utility estimate for the 'no labels' attribute as well as relatively strong positive utility estimates for both the 'pig welfare' and 'sustainably produced' labels. In addition, when asked to rank the eight pig meat product attributes, this cluster ranked 'high animal welfare', 'limited use of antibiotics', 'locally produced' and 'low environmental impact' as their top four most important attributes. All of these attributes have the potential to be quality assured and communicated as certification labels on pig meat product packaging. This cluster also had similar purchase likelihood scores for both the 'sustainably produced' and 'pig welfare' labels and a higher utility for the pig welfare label. Several studies carried out in other countries also identified similar groups of meat consumers (e.g. named as 'attribute/method of production/self conscious' consumers) that considered production methods that improve animal welfare, environmental friendliness and food safety to be of importance (e.g. (Grunert et al., 2018; Koistinen et al., 2013; Nilsson et al., 2006; Špička & Náglová, 2022)). In addition, Denver et al. (2023) found that consumer's willingness to pay for sustainable pork was propelled by their wish to improve pig welfare as well as to reduce their climate impact.

Verification is important to the type of consumer that favours labelling of products (Uzea et al., 2011), and they seem to base the trustworthiness of the origin of meat products on these production claims (Špička & Náglová, 2022). Indeed, in the current study, this 'like labels' cluster had the highest level of trust. There was also a higher proportion of Irish consumers in this cluster, which could be related

to the fact that Irish consumers perceive meat products produced in Ireland to be of a superior quality (Sweeney et al., 2022). Coming from a country where agriculture plays a significant economic role (DAFM, 2022a), Irish consumers may have a stronger connection to agriculture than those from the UK, which could manifest as trust. Budget also seems to be less of a concern for this cluster of consumers, as they were more likely to disagree that higher welfare products were out of their budget compared to the ‘indifferent’ cluster. As with the current study, other studies also found that there was a higher proportion of females who lived rurally within these groupings (Duong et al., 2022; Verbeke et al., 2010).

4.4.2.3. ‘Pro Pig Welfare’ Cluster

The ‘pro pig welfare’ consumer cluster comprised of 9% of the total sample. This cluster was characterised by particularly strong utility estimates for the ‘pig welfare’ label. They also had the highest purchase likelihood scores for ‘pig welfare’ labelled pig meat products. Several other studies also found groups of consumers with a strong preference for higher welfare meat products (e.g. (Di Pasquale et al., 2016; Hyland et al., 2022; Merlino et al., 2018; Miranda-de la Lama et al., 2019)). Evidence arising from these publications indicates that consumers with a preference for specific pig production characteristics and clusters with a strong concern for animal welfare also cared strongly about how the pigs were housed (e.g. in groups not individually, the type of flooring used, access to outdoors) and how the pigs were handled (Meuwissen et al., 2007; Uzea et al., 2011; Verbeke et al., 2010).

Somewhat surprisingly, this study found that the ‘pro pig welfare’ cluster bought pig meat products significantly more frequently than the ‘indifferent’ cluster. This was also found to be the case for ‘Animal and environment lovers’ in Duong et al. (2022)’s study. Latacz-Lohmann et al. (2019) also found that frequent purchasers of pork were also more likely to buy higher welfare, although it has more commonly been found that consumers who cared less about animal welfare consumed more pork (Merlino et al., 2018; Vanhonacker, 2007) and consumers who care more consume less (Sonntag et al., 2019; Verbeke et al., 2010). In the current study, consumers may have felt a stronger sense of

responsibility to support production systems that they think are better for the pig, since they purchase pig meat so frequently.

The 'Pro pig welfare' cluster was the only cluster to have a positive utility for price, which could suggest a willingness to pay for higher welfare pig meat. International studies investigating willingness to pay for higher welfare meat generally find that concerned consumers are willing to pay a premium for higher welfare meat or meat products with welfare related specific production attributes (e.g. (Di Pasquale et al., 2016; Miranda-de la Lama et al., 2019). Nevertheless, consumer concern does not always translate to the purchasing of higher welfare meat products. For example, Heise and Theuvsen (2017) found that some clusters of German consumers would like to purchase higher welfare products, but found them too expensive. Furthermore, Sweeney et al. (2022) found that although Irish and Northern Irish consumers were highly concerned for pig welfare, they did not tend to consider this when purchasing pig meat.

4.4.3. Implications, Future Suggestions and Limitations

Nearly one tenth of the total Irish and UK sample were found to have a strong preference for 'pig welfare' labelled pig meat products. This is indicative of a demand for higher welfare pig meat products in Ireland. In addition, although there were some differences in the utility estimates of UK and Irish consumers and slightly more Irish consumers were found in the 'like labels' cluster, they were similar enough to suggest that Irish consumers' preferences for pig meat products were comparable to UK consumers.

The 'like labels' cluster of consumers, who made up almost a quarter of consumers in this study, had a high level of knowledge of pig production and an intention to purchase higher welfare pig meat that was similar to the 'pro pig welfare' cluster, and thus this could be another potential target group of consumers. In addition, this cluster felt a strong sense of moral responsibility, and a high degree of trust in labels. It is positive to see that these consumers have trust in existing labels, as Vanhonacker and Verbeke (2013) suggested that there is a smaller likelihood of consumer dissatisfaction in these

kind of intangible production attributes once the foundations of trust have been built. Adding production claims or welfare levels to the existing Irish Bord Bia label could help to utilise and develop the trust Irish consumers have already built. Since this cluster also found other production attributes to be of importance, it would be interesting to explore whether using additional production attribute labels in combination with animal welfare holds a higher utility and willingness to pay (Akaichi et al., 2022; Vanhonacker & Verbeke, 2013). The right balance would need to be found between informing and confusing target consumers.

At the same time, it is important to consider the limitations of the current study when interpreting the results. Firstly, further research is necessary to gauge the economic feasibility of such a market, as the costs of production and certification of higher welfare pig meat in relation to the price of pig meat to the consumer were not considered. As with the previous chapter, a limited number of attributes were evaluated in the study, consumers may find other pig meat product characteristics more important than those included in this study. Previous studies found that consumer preferences and willingness to pay was for specific animal welfare related production attributes such as outdoor access and stocking density (Janssen et al., 2016), which were not specifically detailed in this project. It would be interesting to investigate if particular production attributes are motivating Irish consumers' preferences for the higher welfare labelled pig meat products, and whether being informed of these production characteristics would increase their willingness to pay.

Although there was value in including different pig meat product types and taking photographs of existing premium range pig meat products, this meant there was variation in the type and size of the packaging and labelling of the products. Since these characteristics were not completely controlled, they could have subconsciously effected consumer's purchasing decisions. In addition, the frequency that consumers purchased the specific product types was not assessed in the survey.

4.5. Conclusion

This study found that although most of the sample of Irish and UK pig meat consumers were indifferent to the attributes studied, two of the consumer clusters, which made up 32% of the sample, did have a strong preference for welfare labelled pig meat products. The larger of these clusters also found utility in the hypothetical sustainably produced label and prioritised a range of production attributes when purchasing pig meat products. These results suggest that assurance labelling is important to consumers and that there is a basis for Irish pig meat product market diversification using pig welfare and potentially other production claims. More research is needed to further evaluate consumer's willingness to pay for such claims and assess the economic feasibility of this potential market.

Chapter 5

Discussion and Conclusion

5.1. Introduction

This thesis provides previously unexplored insights into the intentions and preferences of pig meat consumers in Ireland and the UK and is valuable in enabling industry stakeholders to effectively develop and market products to meet consumer demand. This discussion chapter will further explore the possible implications of the results obtained, consider the market for labels, account for the viewpoints of different stakeholders and suggest future research questions.

Overall, the main findings from the survey showed that consumers sense of moral responsibility, the importance they placed on welfare, the positive qualities they associated with higher welfare pig meat, their social circle and viewing local production as important, all positively predicted high behavioural intention to purchase higher welfare pig meat products. Cluster analysis based on product attribute utility estimates revealed two consumer groups with higher behavioural intention that collectively consisted of 32% of the survey respondents and were subsequently named as ‘pro pig welfare’ and ‘like labels’ clusters. Both clusters more strongly disagreed that ‘welfare is not a priority’ and had more knowledge of pig welfare and production than the ‘indifferent’ cluster which had a lower behavioural intention to purchase higher welfare pig meat products. Low behavioural intention was also associated with perceiving high welfare products as out of their budget. Interestingly the ‘like labels’ cluster had further differentiating characteristics, they considered the sustainability label and other sustainability claims to be important in addition to pig welfare. They were also more likely to be female, were more trusting and had the highest sense of moral responsibility and lowest consideration for budget.

5.2. Marketing Higher Welfare Pig Meat Products to Consumers

In addition to the marketing suggestions provided in previous chapters, research suggests that for the consumers with an existing concern for pigs and a high intention to purchase higher welfare pig meat products (i.e. the ‘pro pig welfare’ and ‘like labels’ clusters), the provision of clear and concise information about how meat products were produced and what a label means could be helpful in increasing their quality perception, acceptability (Samant & Seo, 2016), purchase intentions (Epperson & Gester, 2021) and willingness to pay for higher welfare products (Alonso et al., 2020). It makes sense that consumers need to be aware that a label exists and understand what it means before the point of purchase (Xu et al., 2023) to be able to build trust in the label and make informed decisions. The information should not be confusing or conflicting and should show the value of higher welfare without negatively portraying standard products. In addition, it should be realistic so as to not give an overly idealistic or naturalistic view of the husbandry and production systems used on certified farms. Information could be communicated using digital platforms (Williams et al., 2023) or practical initiatives such as farm visits (Vanhonacker & Verbeke, 2013). Plus, schools could educate students about animal production more so as to inform the consumers of tomorrow and indirectly, the parents of today.

In contrast, not all consumers want to be informed about the animals that produced the meat they buy (Epperson & Gester, 2021; Leach et al., 2022). ‘Indifferent’ consumers, who consisted of 68% of the survey sample, had a lower knowledge score about pig production and welfare, and felt welfare was less of a priority than the other clusters. Consumers with low behavioural intention also felt less moral responsibility to purchase higher welfare products. This lack of interest may be due to the societal gap between citizens and food production, consumers’ intentional disengagement of morals when purchasing pig meat, and them strategically/wilfully ignoring any available information about where the meat came from (Epperson & Gester, 2021; Leach et al., 2022). All of which minimises purchasing effort (Verbeke, 2009) and avoids feelings of guilt (Bell et al., 2017) for these consumers. Therefore, providing information to this indifferent consumer is unlikely to drive behaviour change. They need to be firstly encouraged and motivated (Apostolidis & Mcleay, 2019) to take responsibility

for their purchasing habits by making more conscious, morally-engaged purchasing decisions, acknowledging that their decisions could cause harm, and associating their purchasing decisions with their self-identity (Bastian & Loughnan, 2017). Marketing strategies could aim to bestow a sense of responsibility by reminding consumers that they are making a positive difference when purchasing higher welfare pig meat products, and by highlighting how conscious consumerism is becoming more of a societal trend and that purchasing higher welfare products is something consumers could do to uplift their self and public image. Thorslund et al. (2017) indicated that pig welfare needs to be a continual political/societal topic for consumers to view it as important and something they need to take responsibility for.

5.3. Considerations for the Development of an Animal Welfare Label in Ireland

5.3.1. Existing Pig Meat Product Assurance Labels and Claims in Ireland

Bord Bia is the main governing body for meat, egg and fruit/vegetables/plant assurance schemes as well as the ‘Origin Green’ sustainability assurance label (of which the pig farm standard is still being developed) in Ireland (Bord Bia, 2023a; Origin Green, 2023). Other labels and packaging claims also exist such as ‘Guaranteed Irish’ and ‘DNA TraceBack’ claims, branding from secondary processors, images of the farmers that produce the meat and retailer’s premium range marketing which include the marketing of products from traditional breeds or novel processing methods. Existing labels and claims should be considered when planning a new Irish pig welfare dedicated assurance label.

5.3.2. The Potential for a Future Irish Pig Welfare Label

5.3.2.1. Consumers

Outcomes of this research suggest a demand for higher welfare labelled pig meat products exists and is similar among consumers from Ireland and the UK. Given there are established and successful higher welfare related labels (e.g., RSPCA Assured, Soil association) in the UK, similar behavioural

motivations and product preferences in both countries is a positive indication of a demand similar to that of the UK for higher welfare pig meat products in Ireland. However, consumers' willingness to pay a premium for higher welfare pig meat products is still unclear. Although price was found to be the least important of the three product attributes studied, the utility estimate for price was more negative for Irish than UK consumers. In addition, though the 'pro pig welfare' cluster had a minor positive utility for price, higher welfare products were not considered less out of their budget than in the 'indifferent' cluster. More research is necessary to investigate consumers' willingness to pay and the overall economic feasibility of a higher welfare assurance scheme.

5.3.2.2. Governing Body

The organisation managing an Irish higher welfare pig meat assurance scheme would need to be considered and explored in future research. Although Bord Bia is the governing body for existing Irish assurance schemes, the involvement of an animal protection organisation could aid consumer confidence in higher welfare assured products (Heinola et al., 2023). Citizens also perceive the government and retailers to be responsible for farm animal welfare (European Commission, 2016; Thorslund et al., 2017). The European Union (EU) Council have approved the concept of an EU-wide umbrella animal welfare label to harmonise the variable standards of existing animal welfare labels in EU countries (Council of the European Union, 2020) and since 2022, the EU Platform on Animal Welfare has further explored this proposal (European Commission, 2023). As an EU member, Ireland could adopt a future EU wide label on their animal derived food products. Although it is unknown when this could be implemented, Ireland could wait until its development, as such a label would be recognisable to consumers across the EU and beyond.

5.3.2.3. Other Stakeholders in the Value Chain

The consumer was the key stakeholder in this research, however all stakeholders in the pig meat value chain must be willing to participate in order for a higher welfare pig meat label to be established

(Franz et al., 2010). Stakeholder's participation in a new assurance scheme does not come without substantial effort and ultimately risk of market failure, which, due to perceived barriers, could mean the industry remains in a system 'lock-in' (Foxon, 2007; Purwins & Schulze-Ehlers, 2018). Future research would need to explore the viewpoints and role of each stakeholder in the development of a higher welfare label.

Retailers can influence consumer higher welfare product purchasing behaviour, for example by dictating the products they stock and establishing their own animal welfare criteria (Vogeler, 2019) and labels to satisfy consumers (Sørensen & Schrader, 2019) and stand out from other retailers (de Jonge & van Trijp, 2012). Research has shown that positioning strategies can also increase consumer willingness to pay for animal-friendly products (van Riemsdijk et al., 2023). Many of the consumer marketing initiatives would require effort from Irish retailers to employ. As such, Irish retailers would likely need to be assured that consumers are willing to pay a significant premium for the higher welfare product range year-round and not just on special occasions such as Christmas.

The processing of higher welfare pig meat may require separate processing facilities (Franz et al., 2010) which would be particularly costly if batches were small or infrequent. Processors would need assurance that a sufficient number of suppliers and customers exist who would be willing to pay a premium price for enough of a range of higher welfare pig meat cuts and products (Franz et al., 2010) for this venture to be a viable business idea (ICF, 2022). An Irish pig welfare label would also need to be recognised and sought after (ICF, 2022) in international markets, given Ireland exports over two thirds of its pig meat (Bord Bia, 2023b; Trading Economics, 2023).

Many Irish pig producers believe that pig welfare is related to whether the pig is growing well and appears healthy (Diana et al., 2021), thus they may not see a problem with the current standards of welfare. Producer motivations for signing up to a higher welfare assurance scheme could be due to potential economic prosperity, a desire to improve their image, or feeling pushed into it by rising social pressure (ICF, 2022; Purwins & Schulze-Ehlers, 2018; Schukat et al., 2019). However, the business case for upgrading their conventional production system to meet the standards of a dedicated animal welfare label is questionable given Irish pig farms are recovering from a financial crisis

(Gorton et al., 2023) and infrastructure investments could take decades to pay off. Without a guarantee of financial return, or an ‘industry leader’ who has successfully demonstrated the feasibility of a higher welfare commercial pig farming system in Ireland, the financial risk is significant.

5.4. Other Claims: Sustainability

A higher welfare pig meat product label is not the only possible route of differentiation for the Irish pig meat market. The sustainability label was also valued by the ‘like labels’ consumers, who represented almost a quarter of the sample and were also the most trusting, morally responsible consumers in the sample. However, ‘sustainability’ is a broad multidimensional term, and it could thus be difficult to develop a ‘meta-sustainability’ label that sufficiently considers all aspects of sustainability (e.g. carbon emissions, renewable packaging, fairly traded). The ‘like labels’ cluster considered several individual sustainable production attributes to be important (in addition to animal welfare) including the limited use of antibiotics, the product being locally produced and having low environmental impact. Currently the Irish ‘Origin Green’ label only communicates the title of the initiative on the logo, and mainly focusses on the environmental dimension of sustainability (Origin Green, 2023), future market avenues for differentiating various sustainability claims could be explored. Bundling individual sustainability claims could be an option, Sonntag et al. (2023) found that the addition of another positive sustainability claim on chicken breast and whole milk product packaging did not take away from the utility of the first sustainability claim. Combining claims could lead to a wider target segment of consumers and a greater WTP as consumers may perceive the products as more value for money.

There are factors to consider when using multiple sustainability claims on a singular product. Even though some claims are positively linked (e.g. higher animal welfare is associated with lower antibiotic usage (Rodrigues da Costa & Diana, 2022)), improving some sustainability parameters can have negative effects on others. For example, extensive higher animal welfare systems can negatively impact on carbon emissions (Halberg et al., 2010); these negative effects could cancel out the utility

of other sustainability claims on the label (Sonntag et al., 2023). Furthermore, overloading consumers with information from multiple labels could have a negative effect on their purchase decisions due to confusion, reduced trust and increased dissatisfaction (Latacz-Lohmann & Schreiner, 2019; Sonntag et al., 2023).

5.5. Evaluation of Methods Used

In the first study chapter, the extended theory of planned behaviour model developed for the consumer survey worked well in explaining the differences in consumer behavioural intention to purchase higher welfare pig meat. However, not all the groups of statements loaded well together to form constructs, and there is still scope for more variance to be explained. Integrating constructs from behaviour change frameworks such as the COM-B model may have enabled us to further understand how to motivate consumers to purchase higher welfare products. Behavioural intention was analysed as a binary variable, this could have oversimplified the distribution of scores in the construct. Similar research has used multi-regression analysis or structural equation modelling and this could have helped us gauge the relationships between each construct and not just their influence on behavioural intention.

The product profiles were used to take the study a step further than the theory of planned behaviour model's behavioural intention construct by mimicking purchasing decision scenarios. Indeed, consumers with higher behavioural intention to purchase high welfare pig meat were found have higher purchase likelihood scores for higher welfare labelled products and the ('pro pig welfare' and 'like labels') clusters with high utilities for the pig welfare labels also had higher behavioural intention. However, using singular rating profiles for conjoint analysis meant that a limited number of product attributes and levels could be included, and limited the survey's ability to calculate willingness to pay beyond the utility of importance of price. A method such as a discrete choice experiment may have provided more detailed insight into consumer willingness to pay.

Self-reported product purchasing behaviour of any existing higher welfare animal derived products was not assessed. This information may have been helpful in further discerning relationships between attitudes, behavioural intention and actual behaviour in this study as attitude-behaviour gaps have been frequently found in related literature (e.g. (Hyland et al., 2022; Miele, 2010)). Neither was consumers' recognition of existing assurance labels or perception of higher welfare standards asked in the survey. Thus, it cannot be said whether a higher welfare label that is feasible to farmers would address consumer expectations or concerns (Sørensen & Schrader, 2019). In addition, to enable effective communication of the meaning of a label, it is important to understand what consumers know and care about specifically (Latacz-Lohmann & Schreiner, 2019). The concept of a multilevel pig welfare label could also be explored in an attempt to accommodate for the heterogeneity of welfare and budget concern amongst consumers.

5.6. Conclusions

This thesis helps to explain what influences consumers from Ireland and the UK's behavioural intention to purchase higher welfare labelled pig meat products and found nearly a third of consumers strongly value a pig welfare label as a product attribute, which suggests an untapped market for these products. This indicates that there is an opportunity to further consider the next stages in developing an assurance scheme that would allow for diversification of the pig meat product market.

However, to fully elucidate the feasibility of a higher welfare assurance scheme in Ireland, all stakeholders along the value chain need to be willing to invest in the label introduction process and be somewhat assured of a financial return. Moreover, consumer awareness of the label and what it represents is essential. Although there are positive indicators of consumer willingness to pay for higher welfare assured Irish pig meat, this research would benefit from further evaluation of the threshold of consumers' willingness to pay and of what is economically achievable on commercial Irish pig farms, relative to the standards expected of a higher welfare assurance scheme.

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Appendices

Appendix I. Signed Ethical Approval Form



Date: 18 August 2022

To: Professor Niamh O'Connell

Faculty REC MHLS 22_117

Reference Number:

Full Title: People's motivations when buying pig meat products and their understanding of pig farming and welfare

Decision: **APPROVED**

Thank you for your application which was reviewed by the Faculty of Medicine, Health and Life Sciences Research Ethics Committee (Faculty REC) in accordance with the Proportionate Review process.

Your application was considered and some clarification and revisions were requested on 05 August 2022. You submitted the requested information on 16 August 2022.

The clarification and revisions have been reviewed and deemed satisfactory. The application has been **approved**.

Conditions of the Approval

The Faculty REC approval is subject to the following conditions:

- (i) The study must be conducted in accordance with all relevant legislation. All relevant management approvals from organisations involved in the research must be obtained.
- (ii) When the research involves human volunteers the study must be entered on the University's Insurance Database.
- (iii) Monitoring and auditing process must be complied with including submission of annual progress reports to the Faculty REC.
- (iv) Any face to face study activity is subject to the submission, approval and adherence to a COVID-19 Risk Assessment, as necessary.

It is the Chief Investigator's responsibility to ensure the study is conducted in accordance with the conditions stipulated.

Any future changes to any part of the submitted application, protocol or supporting documentation must be notified to the Committee prior to these changes taking place.

Approved Documents

The documents approved by the Faculty REC are listed in the table below.

Documentation Received	Version	Date
Application Form		Received 25 July 2022
Cover Letter Addressing Committee Comments (e-mail)		Received 16 August 2022
Research Protocol		Received 03 August 2022
Survey (inc Participant Information Sheet and Consent)		Received 16 August 2022
Peer Review		21 June 2022
Peer Review		23 June 2022

If you would like to discuss this further please contact the Research Ethics Officer, Mr Stefan

Curran, at facultyrecmhls@gub.ac.uk.

Yours sincerely



pp Professor Michelle McKinley

Chair, MHLS Faculty REC

Appendix II. Full Survey

Note: the survey was shown to consumers in an online format so would have looked slightly different to this, but the content was the same.

Participant Information Sheet:

Title of study: People's motivations when buying pig meat products and their understanding of pig farming and welfare

1. Invitation paragraph and purpose of the study

You have been invited to voluntarily participate in this study looking into people's motivations when buying pig meat products and understanding of pig farming and welfare. The survey will last approximately 20 minutes, and you can decide to withdraw from the survey at any time. Feel free to contact us for more information at the end of the survey.

2. Will my taking part in this study be kept confidential?

The data for this study will be collected by an established market research company and then stored securely on Teagasc and Queen's University Belfast project files. Only the researchers involved in the project will be able to access the data. All data in this study will be kept anonymous so your answers will not be traceable back to you. Any data from unfinished surveys will be deleted.

3. What will happen to the results of the research?

We intend to publish the research in an open-access research journal and it will also form part of a research student's dissertation. Participants are welcome to contact the research team if they wish to be sent a copy of the results when they are published.

4. Who is organising and funding the research?

Teagasc, the Agriculture and Food Development Authority in Ireland, is funding a research student to complete this project. The student is undertaking a Master of Philosophy postgraduate research degree with Queen's University Belfast.

5. Who has reviewed the study?

This study has been reviewed by the Medicine, Health and Life Sciences Faculty Research Ethics Committee of Queen's University Belfast.

6. Contact for Further Information

Chief investigator email address: niamh.oconnell@qub.ac.uk

Research student email address: mharrison15@qub.ac.uk

Principal Teagasc supervisor email address: keelin.odriscoll@teagasc.ie

This research will be conducted in compliance with data protection legislation. For more information about how we look after your information, how to access your rights and who to contact if you have any queries or concerns about data protection please visit the Queen's University Belfast website - www.qub.ac.uk/privacynotice/Research/ListofResearchPrivacyNotices/PrivacyNoticeforResearchParticipants

Thank you for your interest in this study and for taking the time to read through this information sheet.

Consent form:

Please tick box

I understand that by clicking next and submitting my responses I agree to take part in the study. I understand that I can withdraw by exiting the browser and once submitted I cannot withdraw my responses.

Definitions:

- **Pig meat product:** Is any product in which the main ingredient is derived from the carcass of a pig. For example, cooked and cured ham, bacon, sausage, salami, minced pork, pork shoulder, pork tenderloin and pork chops would all be classified as pig meat products.
- **Standard pig farm:** Also known as a conventional pig farm, this is the most common type of pig farm. It is a farm whose standards of pig welfare are set to meet the legal requirements. The law covers topics such as the minimum amount of space per pig, the light and noise levels and access to food and water.
- **Higher welfare assurance label:** This is a label used on products that come from farms that have been certified to have met the assurance scheme's high standards of welfare. These standards are higher than the minimum standards set in the law.

Screening questions:

Please tick the appropriate box.

					Yes	No
Are you between the ages of 18 and 64?						
	Once a month or less/ never	Twice a month/ once a fortnight	Once a week	2-3 times a week	4-6 times a week	Once a day or more
How often do you buy pig meat products e.g. ham pork, bacon sausages?						

If they do not fit within the desired age range and/ or buy pork less than twice a month, then they have not met the criteria for participating in the questionnaire.

Survey Questions:

Are you? (Select one)

Male	
Female	
Non-binary	

How old are you? (Please enter a whole number)

In which of the following counties do you currently live? (Select one)

Note: These are the Irish counties, the UK counties were used for UK consumers.

Antrim	
Armagh	
Carlow	
Cavan	
Clare	
Cork	
Derry/Londonderry	

Down	
Donegal	
Dublin	
Fermanagh	
Galway	
Kerry	
Kildare	
Kilkenny	
Laois	
Leitrim	
Limerick	
Longford	
Louth	
Mayo	
Meath	
Monaghan	
Offaly	
Roscommon	
Sligo	
Tipperary	
Tyrone	
Waterford	
Westmeath	
Wexford	
Wicklow	

Please indicate to which occupational group the chief income earner in your household belongs, or which group fits best. The chief income earner is the person in your household with the largest income; this could be yourself or another person in your household.

Higher Managerial/Professional/Administrative (i.e. Established Doctor; Dentist; Psychologist; Solicitor; Board Director in a large organisation (200+ employees); Top level civil servant or Public service employee; Business owner (10+ employees); Chartered Accountant; Architect, Pharmacist, Professor)	
Intermediate Managerial/Professional/Administrative (i.e. Newly qualified (under 3 years) Doctor; Solicitor, Board director in a small organisation; Middle manager in large	

organisation; Principle officer in civil service or local government; Business owner (<10 employees)	
Supervisory/Clerical/Junior Managerial or Professional/Administrative (i.e. Office worker; Student Doctor; Teacher, Nurse, Bank Official, Guard, Social Care Worker, Foreman with 25+ employees; Salesperson)	
Student	
Skilled manual worker (i.e. Pub or Bar worker; Skilled Bricklayer; Carpenter; Plumber; Electrician; Painter; Bus or Ambulance Driver; HGV driver; AA patrolman)	
Semi or unskilled manual work (Manual worker; Apprentice to the skilled trade; Labourer; Cleaner; Shop assistant; Waiter/Waitress; Caretaker; Park keeper; non-HGV driver)	
Casual worker - not in permanent employment	
Housewife / Home-maker	
Retired	
Farmer 1-49 acres	
Farmer 50+ acres	
Unemployed or not working due to long-term sickness	

Q1. Where do you normally buy pig meat products? (You can tick more than one).

Note: Options only used in the Irish survey are unlined and options only used in the UK survey are in italics.

<u>Supervalu</u>	
<u>Dunnes Stores</u>	
Tesco	
Aldi	
Lidl	
<u>Centra</u>	
Local butchers	
Farmers market / directly from the farmer	
M&S	
Other	
ASDA	
<i>Farmers market/ farm shop/ directly from the farmer</i>	
<i>Morrison's</i>	
<i>Sainsbury's</i>	
<i>Waitrose</i>	
<i>Co-op</i>	

Q2. We would like to know your attitudes towards pig welfare and meat products. Please indicate how much you agree or disagree with these statements, with 1 meaning 'strongly disagree' and 7 meaning 'strongly agree'.

	Strongly Agree	Agree	Some-what Agree	Neither Agree nor Disagree	Some-what Disagree	Disagree	Strongly Disagree
It is important that the pig meat products I normally eat have been produced in a way that pigs have not experienced pain or suffering.	1	2	3	4	5	6	7
It doesn't matter if a farmed pig experiences pain.	1	2	3	4	5	6	7
It is fine to rear pigs in conditions where their normal behaviours are restricted.	1	2	3	4	5	6	7
It is important for farmed pigs to be able to express their natural behaviour.	1	2	3	4	5	6	7
I think that the current requirements for pig protection and welfare should be improved on <u>Ireland/UK</u> farms.	1	2	3	4	5	6	7
I think that pigs in <u>Ireland/ the UK</u> are already reared to achieve high standards of welfare.	1	2	3	4	5	6	7

Q3. Now we would like you to consider your attitudes to farm animal welfare in general. Please indicate how much you agree or disagree with these statements, with 1 meaning 'strongly disagree' and 7 meaning 'strongly agree'.

	Strongly Agree	Agree	Some-what Agree	Neither Agree nor Disagree	Some-what Disagree	Disagree	Strongly Disagree
Not enough consideration is given to the welfare of farm animals these days.	1	2	3	4	5	6	7

There are much more important issues in the world to think about than farm animal welfare.	1	2	3	4	5	6	7
Production efficiency should be the first priority of the farmer.	1	2	3	4	5	6	7
Farmers should be paid more for having higher welfare production standards on their farms.	1	2	3	4	5	6	7
I think that it is good to buy high welfare meat products.	1	2	3	4	5	6	7

Q4. Next, we would like to know whether the people around you influence your meat purchasing habits. Please indicate how much you agree or disagree with these statements, with 1 meaning 'strongly disagree' and 7 meaning 'strongly agree'.

	Strongly Agree	Agree	Some-what Agree	Neither Agree nor Disagree	Some-what Disagree	Disagree	Strongly Disagree
Most of my close friends and family generally buy animal products produced in line with higher animal welfare standards instead of animal products in accordance with legal standards.	1	2	3	4	5	6	7
Most people who are important to me would want me to buy higher welfare meat.	1	2	3	4	5	6	7
People in my life whose opinions I value think that it is important to be able to identify the welfare standards involved in producing the food which I consume.	1	2	3	4	5	6	7
Most people who are important to me don't care about the welfare standards of the meat I buy.	1	2	3	4	5	6	7

Q5. We would now like to know what you think about higher welfare pig meat products. Please indicate how much you agree or disagree with these statements, with 1 meaning 'strongly disagree' and 7 meaning 'strongly agree'.

	Strongly Agree	Agree	Some-what Agree	Neither Agree nor Disagree	Some-what Disagree	Disagree	Strongly Disagree
I think that pig meat products from higher welfare farms <u>would be/are</u> higher quality than those from standard pig farms.	1	2	3	4	5	6	7
I think that pig meat products from higher welfare farms <u>would</u>	1	2	3	4	5	6	7

<u>be/are</u> tastier than those from standard pig farms.							
I think that pig meat products from higher welfare farms <u>would be/are</u> healthier than those from standard pig farms.	1	2	3	4	5	6	7

Q6. Next, we would like to know how much control you feel you have over buying higher welfare meat products. Please indicate how much you agree or disagree with these statements, with 1 meaning ‘strongly disagree’ and 7 meaning ‘strongly agree’.

	Strongly Agree	Agree	Some-what Agree	Neither Agree nor Disagree	Some-what Disagree	Disagree	Strongly Disagree
Whether I buy higher welfare meat products is entirely up to me.	1	2	3	4	5	6	7
Higher welfare meat products in general are beyond my budget.	1	2	3	4	5	6	7
For me, recognising and understanding assurance labels on food packaging is easy.	1	2	3	4	5	6	7

Q7. We would like to know how likely you would be to buy high welfare pig meat and other meat products in the future. Please indicate how much you agree or disagree with these statements, with 1 meaning ‘strongly disagree’ and 7 meaning ‘strongly agree’.

	Strongly Agree	Agree	Some-what Agree	Neither Agree nor Disagree	Some-what Disagree	Disagree	Strongly Disagree
I <u>would/will</u> make a conscious effort to buy higher welfare pig meat products <u>if they were available/in the future</u> .	1	2	3	4	5	6	7

I would not buy higher welfare pig meat if I saw it for sale in the shop.	1	2	3	4	5	6	7
From now on, I will make an effort to identify the welfare standards of the farm animals used in the production of my food.	1	2	3	4	5	6	7
I would buy higher welfare assured pig meat even if it was more expensive than the lower welfare alternative.	1	2	3	4	5	6	7

Q8. We would like to know how you feel about buying higher welfare meat products. Please indicate how much you agree or disagree with these statements, with 1 meaning ‘strongly disagree’ and 7 meaning ‘strongly agree’.

	Strongly Agree	Agree	Some-what Agree	Neither Agree nor Disagree	Some-what Disagree	Disagree	Strongly Disagree
I feel it is my moral duty to buy higher welfare meat products whenever they are available.	1	2	3	4	5	6	7
I feel it is wrong to buy meat products are not from higher welfare farms.	1	2	3	4	5	6	7
One person alone can do very little for the animal's welfare.	1	2	3	4	5	6	7
Refusing products that do harm to the animal's welfare is a good way to change the production system.	1	2	3	4	5	6	7

Q9. Next, we would like to know how much you trust product labelling. Please indicate how much you agree or disagree with these statements, with 1 meaning ‘strongly disagree’ and 7 meaning ‘strongly agree’.

	Strongly Agree	Agree	Some-what Agree	Neither Agree nor Disagree	Some-what Disagree	Disagree	Strongly Disagree
I trust the labels and information on meat product packaging.	1	2	3	4	5	6	7
<u>If there was an assurance label for higher welfare pig meat products, I feel I could trust this label/I believe that higher welfare assurance labels on meat products are trustworthy</u>	1	2	3	4	5	6	7

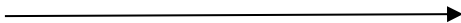
Q10. Now we would like to know how important these different production characteristics are to you when buying pig meat products. Please indicate how important for each characteristic is to you, on a scale of 1 which is 'not at all important' to 7 which is 'very important'.

	Not at all important	Not important	Some-what un-important	Neutral	Some-what important	Important	Very important
It is produced in a pig-friendly way.	1	2	3	4	5	6	7
It is traded in a fair way for all persons involved.	1	2	3	4	5	6	7
It is produced in an environmentally friendly way.	1	2	3	4	5	6	7
It is packaged in an environmentally friendly way.	1	2	3	4	5	6	7
It is produced locally.	1	2	3	4	5	6	7

Q11. Please rank in order of importance to you each of the following pig meat product characteristics with 1 being the most important and 8 being the least important.

Available in the store I usually shop in	
Appropriate cuts and package sizes	
Locally produced	
Low environmental impact	
Cheap	
High animal welfare standards	
Organically produced	
Limited use of antibiotics	

Q12. Please choose a number on the scale that you feel best reflects your level of knowledge about farm animal welfare and pig farming in Ireland. The higher the number, the more knowledge you feel you have.

	I know nothing	I am an expert
		
What is your level of knowledge about farm animal welfare?	1	2 3 4 5 6 7
What is your level of knowledge about pig farming in <u>Ireland</u> / <i>the UK</i> ?	1	2 3 4 5 6 7

Q13. Please indicate whether you think each of these statements about standard pig farming in Ireland are true or false.

	True	False
Most pigs in <u>Ireland</u> / <i>UK</i> have access to the outdoors.		
It is common for piglets to have the ends of their tails docked/amputated on standard farms.		
Pigs don't need mental stimulation; their needs are met as long as they have food, water and other pigs to socialise with.		
Most pregnant pigs give birth in metal crates and stay there until their piglets are old enough to be weaned.		
Most pregnant pigs are given plenty of materials such as straw so they can build a nest before they give birth.		

Imagine you are grocery shopping and would like to buy some pig meat. Please consider your grocery budget and the impact your purchase decisions would have on that budget when answering the next 9 questions. These questions will ask you how likely you would be to buy a product represented by an image. Some products will include a higher welfare assured or sustainability label. For reference, here are the definitions of what the labels mean:



Higher welfare assurance label: This is a label used on products that come from farms that have been certified to have met the assurance scheme’s high standards of welfare. These standards are higher than the minimum standards set in the law.



Sustainably produced assurance label: This is a label used on products that come from farms that have been certified to have met the assurance scheme’s sustainability standards. The standards include difference aspects of sustainability such as how much the production of the product impacts the environment and the business’s ethics.”

Please indicate how likely you would be to buy this product. On a scale of 0 to 10 with 0 being ‘would definitely not purchase’ and 10 being ‘would definitely purchase’.

Would definitely not purchase			Neutral				Would definitely purchase				
0	1	2	3	4	5	6	7	8	9	10	

Note: This was asked for each of the nine product profiles below, these product profiles were randomised for each participant. These are the nine Irish product profiles, the nine UK product profiles were exactly the same apart from the price was in GBP (£) and based on the standard UK price for the different pig meat cuts.









6 Unsmoked
Back Bacon
Rashers



€1.46
220g e



Sliced
Ham

6 SLICES

€ 1.57
125g e



Which of the following best describes your current relationship status? (Select one)

Single	
In a relationship (but not living together)	
Living with partner	
Married	
Separated	
Divorced	
Widowed	
Prefer not to say/Other	
Other	

Which of the following best describes the area in which you live? (Select one)

Urban city (e.g. Dublin City Centre, Galway City, Cork City Centre)	
Urban town (e.g. Dundalk in Louth, Fermoy in Cork)	
Suburban (e.g. Lucan in Dublin, Raheen in Limerick, Douglas in Cork)	
Rural town	

Rural Village	
Rural Countryside	

Which of the following best describes your current employment status?

Working full-time (35 or more hours per week)	
Working part-time (less than 35 hours per week)	
Contract, Temporary or Freelance Employee	
Self-employed full-time	
Self-employed part-time	
Unemployed and looking for work	
Looking after my home/family full-time	
Student (Full-time education, not working)	
Student (Working less than 30hrs per week)	
Student (Working more than 30hrs per week)	
Retired	
Unable to work	

Which of the following is the highest level of education you received?

Primary School Level	
Lower Secondary (Inter/Junior Certificate)	
Higher Secondary (Leaving Certificate)	
Post Leaving Certificate (e.g. VEC)	
Third Level Non-Degree (e.g. Diploma)	
Undergraduate degree (less than 2 years)	
Undergraduate degree (3 years)	
Undergraduate degree (4 or more years)	
Post graduate: Masters	
Post graduate: PhD	
Post graduate: other (non-Masters or PhD)	
None of the above	
Prefer not to say	

Appendix III. Factor Loadings of All Attitude Statements

Table showing factor loadings for all 14 attitude statements used in the survey investigating what psychological factors influence consumers' intention to purchase higher welfare pig meat in Ireland and the UK.

Survey Statements	Rotated Component Matrix				Mean Scale Score	Cronbach's Alpha	Cronbach's Alpha if Statement Deleted
	Component						
	1	2	3	4			
It is fine to rear pigs in conditions where their normal behaviours are restricted. *	0.796				5.3980		0.825
It doesn't matter if a farmed pig experiences pain. *	0.779				5.5393		0.828
There are much more important issues in the world to think about than farm animal welfare. *	0.741				4.5233		0.828
Production efficiency should be the first priority of the farmer.	0.585			0.409	4.1695		0.840
It is important that the pig meat products I normally eat have been produced in a way that pigs have not experienced pain or suffering.	0.447	0.507		-0.315	5.4681		0.822
It is important for farmed pigs to be able to express their natural behaviour.	0.411	0.606			5.5590		0.819
I think that the current requirements for pig protection and welfare should be improved on <u>Ireland/ UK</u> farms.		0.801			5.1880	0.839	0.824
Not enough consideration is given to the welfare of farm animals these days.		0.746		0.367	4.6523		0.830
Farmers should be paid more for having higher welfare production standards on their farms.		0.479	0.342		5.2076		0.833
I think that it is good to buy high welfare meat products.		0.579	0.418		5.4840		0.822
I think that pigs in <u>Ireland/ the UK</u> are already reared to achieve high standards of welfare. *				0.851	3.5147		0.853
I think that pig meat products from higher welfare farms <u>would be/are</u> higher quality than those from standard pig farms.			0.801		5.1658		0.822
I think that pig meat products from higher welfare farms <u>would be/are</u> tastier than those from standard pig farms.			0.870		5.0541		0.829
I think that pig meat products from higher welfare farms <u>would be/are</u> healthier than those from standard pig farms.			0.832		5.1376		0.828

*Indicates that the scores from the statement had been reversed prior to factor analysis.

Text only used in the Irish survey is underlined and text only used in the UK survey is in *italics*.

Values of less than 0.3 were not included in the table to enable clearer identification of components.

After the predicted constructs did not load well together, factor analysis was performed on all 14 of the attitude statements. From this, four components were generated, component four was not used in the survey analysis since it only contained one statement with a high loading score (I think that pigs in Ireland/ the UK are already reared to achieve high standards of welfare). Factor analysis was performed on the three remaining components (see Table 3.1. for more details) and these components were used as the three attitude constructs in the data analysis.

Appendix IV. Differences Between Consumers in the UK and Ireland

Although some differences between countries were identified, it was felt that these were not meaningful enough to justify performing separate analyses.

Survey extended theory of planned behaviour constructs, modifying factors and mean purchase likelihood scores that significantly differed between consumers from Ireland and the UK.

			Total		Country				P-Value ANOVA
			Mean	SD	United Kingdom		Ireland		
			Mean	SD	Mean	SD	Mean	SD	
TPB	Attitude	Welfare is Not a Priority ^a	3.09	1.20	3.19	1.23	2.99	1.16	*
Extended TPB	Trust in Labels ^a		4.94	1.11	4.86	1.12	5.03	1.09	*
	Knowledge ^b		2.67	1.41	2.48	1.36	2.85	1.44	***
Food Choice Motives	Importance Scale ^c	It is produced in a pig-friendly way.	5.33	1.31	5.23	1.34	5.43	1.27	*
		It is traded in a fair way for all persons involved.	5.42	1.16	5.28	1.18	5.55	1.12	**
		It is produced in an environmentally friendly way.	5.35	1.22	5.22	1.22	5.47	1.20	**
		It is packaged in an environmentally friendly way.	5.30	1.25	5.12	1.28	5.48	1.21	***
		It is produced locally.	5.01	1.22	4.83	1.22	5.18	1.20	***
	Importance Ranking ^d	Low environmental impact	4.70	2.02	4.54	2.08	4.87	1.96	*
		Limited use of antibiotics	4.92	2.33	5.22	2.24	4.62	2.38	***
Product Profiles ^e	Pork Chops - 40% increase - No label		4.49	2.770	4.12	2.742	4.86	2.751	***

The P-values were calculated using one-way ANOVAs comparing the mean scores between Irish and UK consumers. Scales used: a = Likert scale with 1 being 'Strongly Disagree' and 7 being 'Strongly Agree', b = True/ False questions, c = Likert scale with 1 being 'Not at all important' and 7 being 'Very Important', d = Statements ranked from 1 (the most important) to 8 (the least important), e = 0 to 10 with 0 being 'would definitely not purchase' and 10 being 'would definitely purchase'.

Appendix V. Food Choice Motives Mean Ranking Scores

This table shows the mean scores and ranks used to create Figures 4.2 and 4.3 and any significant differences in the mean scores across clusters.

Comparing the ranking of different pig meat product characteristics between clusters of consumers from combined Ireland and UK survey respondents.

Food Choice Motives: Importance Ranking	Clusters								P-Value ANOVA
	Total		Indifferent		Like Labels		Pro Pig Welfare		
	(n = 766)		(n = 523)		(n = 177)		(n = 66)		
	Mean ± SD	Rank	Mean ± SD	Rank	Mean ± SD	Rank	Mean ± SD	Rank	
High animal welfare	3.28 ± 2.10	1	3.72 ± 2.15	1	2.31 ± 1.57	1	2.45 ± 1.79	1	0.000
Available where I shop	4.01 ± 2.34	2	3.79 ± 2.32	2	4.57 ± 2.31	5	4.26 ± 2.37	2	0.000
Locally produced	4.41 ± 2.11	3	4.46 ± 2.17	5	4.23 ± 2.02	3	4.53 ± 1.83	4	0.397
Appropriate cuts and package sizes	4.42 ± 2.02	4	4.18 ± 2.00	3	5.00 ± 1.90	6	4.71 ± 2.14	5	0.000
Low environmental impact	4.70 ± 2.02	5	4.79 ± 2.03	6	4.29 ± 1.88	4	5.12 ± 2.08	6	0.003
Cheap	4.82 ± 2.59	6	4.27 ± 2.53	4	6.23 ± 2.21	8	5.41 ± 2.44	8	0.000
Limited use of antibiotics	4.90 ± 2.32	7	5.24 ± 2.29	7	4.14 ± 2.22	2	4.29 ± 2.19	3	0.000
Organically produced	5.45 ± 2.14	8	5.55 ± 2.14	8	5.24 ± 2.13	7	5.23 ± 2.15	7	0.163

Participants were asked to rank statements ranked from 1 (the most important) to 8 (the least important). The P-values were calculated using one-way ANOVAs comparing the mean scores between Irish and UK consumers.