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Consumers' willingness to pay for an animal welfare food label

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ABSTRACT

Consumers increasingly rate the ethical dimensions of food production, including animal welfare, as important to them but how these concerns influence their food choices remains unclear. To address this, a Discrete Choice Experiment assesses consumers' willingness to pay for chicken meat. The study aims to understand the effects of food labels (RSPCA Assured and Red Tractor), cause-related marketing campaigns, and price on consumers' willingness to pay. Drawing on a representative sample of 401 British consumers, we estimate a mixed logit model using the hierarchical Bayesian estimation method. The results for the full sample reveal a substantial price premium associated with the animal welfare label (RSPCA Assured); however, this is less pronounced than one of the cause-related marketing campaigns. A latent class analysis identifies two distinct market segments, price sensitive and concerned consumers, which differ on socio-economic and behavioural characteristics. Amongst price sensitive consumers, willingness to pay extra for an animal welfare label is negligible. Complementary, qualitative interviews reveal consumers' difficulties in comparing the varying standards that underpin quality assurance schemes.

1. Introduction

Consumers increasingly care about the environmental effects of what they eat (European Commission, 2020a) as well as the welfare of live-stock animals (Cao et al., 2021; Frewer et al., 2005). For instance, the last EU Barometer that surveyed attitudes towards animal welfare across EU member states ($n = 27,672$), indicated that 94% agreed with the statement that "it is important to protect the welfare of farmed animals" (European Commission, 2016). Moreover, 59% stated that they were willing to pay more for products sourced from animal welfare-friendly production systems (European Commission, 2016). Extant academic research also presents evidence regarding Willingness to Pay (WTP) for animal welfare, indicating that consumers value a larger surface space per animal, more bedding straw, less surgical interventions, and shorter transportation times (Clark et al., 2017; Gracia et al., 2011; Latacz-Lohmann and Schreiner, 2019).

However, consumers' limited understanding of animal welfare

standards and regulations and the myriad of food labels and other quality cues, contribute to consumers' confusion, often preventing them making informed choices (Verbeke, 2009). Moreover, consumers generally have minimal understanding of modern agri-food production systems, with typically no direct relationship with the farmers whose animals they ultimately eat and the farms on which livestock are kept (Camilleri et al., 2019; McInerney, 2004). Hence, for consumers, animal welfare is a credence attribute, which they cannot directly verify either prior to, or post consumption. Consequently, consumers, given their limited knowledge, process cues to make judgements and infer qualities relating to farm animal welfare. Those judgements and thus consumers' purchasing choices, if based on erroneous reasoning, may not reflect preferences, and hence may be subject to market failure (Harvey and Hubbard, 2013). McInerney (2004) argues that consumers can become victims of misleading and deceptive labelling, so that they misinterpret cues of animal welfare, for instance inferring that a particular label ensures more stringent farm animal welfare standards than is actually

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the case (Harvey and Hubbard, 2013). Following models of asymmetric information, where buyers cannot accurately distinguish between lower and higher quality goods (Akerlof, 1970), labels associated with weaker animal welfare requirements may crowd out more stringent ones. While farm animal welfare in the EU is subject to government regulation, various voluntary assurance schemes also exist, with different labels, claims and requirements (More et al., 2021; Sonntag et al., 2023) as well as cause-related marketing (CRM) (Anker et al., 2011), which heightens the potential for consumer confusion, deception, and market failure (Anker et al., 2011; Harvey and Hubbard, 2013).

This paper responds to calls for a better understanding as to how consumers react to food labels, including those focused on animal welfare (Cao et al., 2021), by assessing their WTP for chicken meat using a Discrete Choice Experiment (DCE). Specifically, the study aims to understand the effects of food labels (RSPCA Assured and Red Tractor), cause-related marketing campaigns, and price on consumers' willingness to pay. DCEs enhance understanding of consumers' processing and evaluation of quality cues by simulating real-life purchasing situations which force consumers to make trade-offs between varying attributes (Dardanoni and Guerriero, 2021; Demel et al., 2020; Tonsor et al., 2009). In this study, the DCE incorporates both an animal welfare focused label (RSPCA Assured) as well as a national farming label (Red Tractor) and CRM on-packaging claims relating to farmers and planting meadows. CRM campaigns typically lack third-party authentication, and their outcomes may lack clear definition, but nevertheless they can have a substantial effect on consumer behaviour (Lagomarsino and Lemarié, 2022; Smith and Higgins, 2000). Drawing on a representative sample of 401 UK consumers, we estimate a mixed logit model using the hierarchical Bayesian estimation method to understand how an animal welfare label on packaging affects consumers' WTP.

The study makes three main contributions. First, while previous research estimates WTP for specific farm animal welfare attributes, such as surface space per animal (Clark et al., 2017; Latacz-Lohmann and Schreiner, 2019), we address the need to understand consumer choices when they "are confronted with other types of information when shopping, including various quality seals and animal welfare certification schemes" (Grunert et al., 2018, p.128). The latter represents a more realistic shopping environment, where consumers make judgements when possessing limited knowledge and face a multitude of different labels, claims, and prices (More et al., 2021; Sonntag et al., 2023). Secondly, through Latent Class Analysis (LCA) we address the "need to capture consumer heterogeneity" (Clark et al., 2017, p.125) and the call of Latacz-Lohmann and Schreiner (2019, p.312) for research to better understand preference heterogeneity to generate "useful insights on preference similarities across and within groups". Finally, the paper contributes to policy debates regarding the current effectiveness of farm animal welfare labelling and the need for "animal welfare labelling to better transmit value through the food chain" (European Commission, 2020b, p.9).

2. Conceptual framework and development of hypotheses

The Total Food Quality Model of Grunert et al. (1996), identifies that prior to purchase consumers make judgements regarding the expected quality of a food based on cues, which are salient pieces of information. Cues can be either *intrinsic* to the product (such as the colour of a piece of meat or aroma of fruit) or *extrinsic* (e.g., price, origin, certification labelling). As animal welfare largely relates to credence attributes which cannot be effectively evaluated and verified by consumers either prior to, or post consumption and purchase, consumers' evaluation of farm animal welfare depends largely on extrinsic cues (McInerney, 2004). Such cues are very important in consumer decision-making regarding meat generally (Grunert, 1997; Grunert et al., 2015) and it is useful to distinguish between quality assurance and cause-related extrinsic cues.

2.1. Quality assurance cues

Quality assurance cues "provide a spatiotemporal and/or verifiable link to a reference point" (Ewing et al., 2012, p.382). In other words, quality assurance cues permit the evaluation of an object against a trusted reference to discern whether it is real or fake (Grayson and Martinec, 2004). The process of assuring whether an object is real or fake in regard to pre-specified qualities relies on 'cool' authentication (Cohen and Cohen, 2012) – an explicit, performative act declaring objects, sites, persons as real or genuine rather than fake, spurious or untrustworthy. Cool authentication typically depends on expertise and scientific knowledge and its legitimacy rests on the authenticating agent judgements being respected by others (Cohen and Cohen, 2012).

In the case of meat, quality assurance labels are ubiquitous (Lagerkvist and Hess, 2010; Sigurdsson et al., 2022). Such schemes, many of which are voluntary, indicate that products bearing the initiative's label are associated with a set of pre-specified outcomes and indicators. Producers and other food chain actors using such labels are usually inspected by a third party to ensure that the specified welfare requirements are met. For instance, chicken meat sold bearing the RSPCA Assured label must meet a set of requirements relating to rearing, handling, transport and slaughter/killing (RSPCA, 2017).

Empirical evidence indicates that EU consumers value, and are willing to pay a premium for, farm animal welfare attributes (European Commission, 2016; Gracia et al., 2011; Latacz-Lohmann and Schreiner, 2019). For instance, Latacz-Lohmann and Schreiner (2019) report positive estimates for consumers' WTP relating to more space per animal, more bedding and manipulative material and shorter transportation time, while Sonoda et al. (2018) found that almost 90% of consumers ($n = 846$) were interested in, and willing to pay extra for, beef with an animal welfare label. Denver et al. (2022) found Danish consumers were willing to pay a premium, albeit modest, for pork produced according to more stringent animal welfare requirements. Similarly, experimental auctions conducted in Spain ($n = 70$) revealed that consumers are willing to pay a premium for an EU animal welfare label for cured ham (Gracia et al., 2011). Consequently, it is expected that:

H1a: Farm animal welfare labels have a positive effect on consumers' WTP for chicken meat.

Generally, consumers welcome on-package labelling regarding farm animal welfare and believe it helps them make better informed purchasing decisions (Alonso et al., 2020). However, animal welfare cues take many forms, e.g., some labels are specifically focused on animal welfare, such as the RSPCA Assured label, while others incorporate animal welfare requirements into wider environmental standards (e.g., Soil Association). Some national agricultural marketing and food safety schemes also incorporate animal welfare requirements, but the latter may only be equivalent to legally required minimum standards. Thus, animal welfare requirements vary across labels with some more stringent than others (RSPCA, 2017). As the vast majority of people assign an intrinsic value to animals and their welfare (Frey and Pirscher, 2018), believe in protecting the welfare of farmed animals (European Commission, 2021), welcome animal welfare labelling (Sonoda et al., 2018) and more stringent requirements for farm animal welfare (European Commission, 2021), and state that they are willing to pay for improved animal welfare (Denver et al., 2022; European Commission, 2021; Latacz-Lohmann and Schreiner, 2019), we expect that:

H1b: Labels associated with more stringent animal welfare requirements elicit greater consumer WTP for chicken meat than those associated with minimum animal welfare requirements.

2.2. Cause-related marketing cues

CRM is a strategic marketing tool which links the purchase of specific

goods or services to social benefits (Folse et al., 2010). Two main types of cause-related marketing are evident, i. purchases which provide benefits to producers, such as the case of Fairtrade, designed to improve workers' pay and conditions, and ii. campaigns linked to beneficiaries outside of the exchange relationship. Many local food schemes fall within the former category, with appeals to support local farmers and producers (Young, 2022). For beneficiaries outside of the exchange relationship, common types include charitable donations linked to purchases and cause awareness raising campaigns such as those for breast cancer (Donnelly et al., 2021; Singh and Dhir, 2019).

Extant research identifies that CRM can positively affect consumer attitude, satisfaction, and purchase intentions for cause linked products (Natarajan et al., 2018; Patel et al., 2017), especially where consumers have a strong degree of affinity or involvement with the cause (Galan-Ladero et al., 2013). A majority of consumers indicate that they would switch brands to one that supports a good cause, given a similar price and quality (Cone Communications, 2013). However, a meta-analysis of the CRM literature indicates that most studies consider changes in consumer attitude, brand image and purchase intentions as outcome measures, with few considering WTP or food products specifically (Fan et al., 2022). Nonetheless, we expect that:

H2a: CRM has a positive effect on consumers' WTP for chicken meat.

The outcomes and benefits of CRM can be opaque. For instance, 'local food' campaigns may not guarantee desired socio-economic or environmental outcomes (Young, 2022) and cause-related campaigns, in contrast to quality assurance schemes, often lack third-party verification. While in many countries products sold bearing a charity's logo (such as Pampers diapers carrying the UNICEF logo) should legally state donation amounts, not all CRM campaigns comply and there are no legal minimums for donation amounts (Hudson, 2012). Where cause-related campaigns lack externally verifiable reference points and transparency regarding benefits, their reliability as cues are weak (Marozzo et al., 2020; Schifferstein et al., 2021), so that consumers may come to regard them as lacking communicative competence (Underwood and Ozanne, 1998). Campaigns deemed unclear or misleading risk generating mistrust and a consumer backlash (Carter, 2015; Hudson, 2012). Generally, consumers prefer cues from which reliable inferences can be drawn (Steenis et al., 2017), which in turn influence their WTP (Kadirov, 2015). Previous research specifically relating to animal welfare establishes that WTP depends on the degree to which consumers trust cues (Nocella et al., 2010). Consequently, it is expected that:

H2b: On-packaging CRM with unverified claims elicit lower consumers' WTP than a farm animal welfare label.

2.3. Heterogeneity in consumer preferences for farm animal welfare

Much work on consumers' WTP for farm animal welfare standards assumes homogeneity in preferences across a sampled population (Latacz-Lohmann and Schreiner, 2019). However, consumers differ in terms of what they regard as appropriate farm animal welfare standards and there is a lack of consensus regarding acceptable norms (Gracia, 2013; McInerney, 2004). Advances in choice experiment design and modelling (Balcombe et al., 2016; Boxall and Adamowicz, 2002) as well as Latent Class Analysis (Greene and Hensher, 2003) can help better understand heterogeneity in consumer preferences.

Several non-WTP studies, using cluster analysis, identify multiple segments of meat consumers. For Germany and Poland, Grunert et al. (2018) identify, in total, four segments of meat consumers with one marked as 'production-interested', displaying the greatest level of farm animal welfare concerns. The production-interested segment accounted for 31% and 26% of the samples from Germany and Poland respectively. The production-interested segment identified by Grunert et al. (2018) shares some common characteristics with a segment of 'concerned meat

consumers' detected by Verbeke and Vackier (2004), which accounted for 32% of a sample of 625 consumers from Belgium. While concerned meat consumers expressed interest in learning more about production processes, other segments did not and their choices depended on hedonic motivations (Verbeke and Vackier, 2004). Recent survey evidence indicates that WTP for higher animal welfare standards varies substantially, with a relatively small segment of consumers open to paying a premium of 20% or larger (European Commission, 2016). We therefore test the hypothesis that:

H3a: Heterogeneity characterizes consumer preferences and WTP for farm animal welfare, so that more than one distinct consumer segment for chicken meat can be discerned.

Socio-economic characteristics affect WTP for farm animal welfare. Alonso et al. (2020) found a positive relationship between WTP and respondent income as well as a negative relationship with age. The latter finding echoes the conclusion of meta-analyses by Lagerkvist and Hess (2010) and Clark et al. (2017). Women are more likely to purchase and pay a premium for meat produced according to high(er) animal welfare standards (Alonso et al., 2020; Latacz-Lohmann and Schreiner, 2019). Consumers educated to degree level are also more likely to pay a premium for meat produced according to higher animal welfare standards (Akaichi et al., 2019). In that female, younger, more affluent, and better educated consumers are more likely to purchase, the socio-economic profile of those purchasing higher animal welfare products are similar to other 'ethical foods' like organic, local and fair trade (Gerini et al., 2016; Van Loo et al., 2011; Weatherell et al., 2003). Overall, previous research suggests that a niche market for higher farm animal welfare standards exists (Clark et al., 2017; Gracia, 2013; Miranda-de la Lama et al., 2019; Sonoda et al., 2018), with a distinct socio-economic profile. However, other consumers, skewed to those with lower incomes, low levels of education (without a degree) and men, are more likely to purchase meat based on price, expected taste and convenience, with farm animal welfare of negligible importance (Alonso et al., 2020; Grunert et al., 2018). Consequently, we test:

H3b: Consumer segments for chicken meat differ significantly with respect to socio-economic characteristics.

3. Method, materials, and data

3.1. Qualitative research prior to the DCE

To support the development of the DCE we drew on 12 semi-structured, face-to-face in-depth interviews with six British family households (H1-H6). Interviews occurred between June 2017 and July 2018, and were conducted as part of extensive ethnographic fieldwork undertaken with 41 households across seven European countries (Amilien et al., 2022). While the purpose of this research was to understand consumers' perceptions and everyday food consumption practices in the context of food quality labels and sustainability, it nonetheless revealed specific insights regarding the RSPCA Assured and Red Tractor quality assurance schemes as well as preferences for chicken meat. Amilien et al. (2022) provides further detail on the methodology and sampling procedures, but for the UK sample analysed here, the recorded interviews lasted between 80 and 130 mins each, and were transcribed *verbatim*, coded, and analysed. The data highlighted how consumers possess multiple concerns when buying chicken meat (e.g., price, quality, convenience, sustainability, animal welfare and origin) with evident trade-offs perceived between price, origin, sustainability, and more stringent animal welfare requirements. How households resolved these trade-offs varied with some stating "if you're going to eat meat, I'd rather it was done in the best way possible [animal welfare]" (H4, male, age band 40–50) while others reported "We just use the price and date" (H3, male, age band 50–60). Interviewees expressed a range of opinions regarding whether the Red Tractor or RSPCA Assured labels would affect their choices: for

instance one interviewee reported “*[if] they’ve got that Red Tractor on, ..., then I can, totally, hand on heart say, yes, I would pick that up rather than the one that didn’t have it on*” (H3, female, age band 50–60) but others were sceptical “*...my personal opinion would be a little cynical... because anybody can put a label on*” (H2, male, age band 40–50). In addition to quality assurance labels, interviewees highlighted how textual and visual images on packaging could also affect their choices, for instance if chicken meat was labelled as “*basic*” or “*taste the difference*” (H3, female, age band 50–60) While the interviews provided insights into the complexity of shoppers’ moral dilemmas and trade-offs in food consumption decisions, they did not provide quantitative information on WTP, particularly regarding the effects of animal welfare logos and images. This informed the selection of a DCE as a methodological approach and the attributes considered.

3.2. DCE dataset

We conducted an online, representative survey to investigate the effects of label and CRM cues on consumers’ WTP for chicken breasts in the UK. A commercial market research company, LightSpeed, was commissioned for data collection, with respondents who completed the questionnaire receiving a small payment. The average response time was around 10 min. The useable sample consisted of 401 individuals, where participants were selected if they (i.) were either solely or partially responsible for food shopping in their household and (ii.) consumed chicken breasts at least once in the three months prior to the study.

Table 1 profiles the sample’s characteristics. The sample is broadly representative of the UK adult population. Specifically, in terms of mean age (sample = 43.2 years, official statistics = 40.4 years) and gender (sample = 50.1% men, official statistics = 49.4%) (ONS, 2021). However, 26.7% of the sample reported living in a rural area, compared against 17.1% of the UK population according to the official classification of urban and rural localities (Defra, 2021). Figures for urban areas including medium-sized towns but excluding major conurbations are similar: sample = 43.1%, official population = 43.4% (Defra, 2021). While official statistics indicate that 27.2% of the UK population is educated to degree level or higher (ONS, 2020), our sample is skewed to those who completed higher education with 28.4% of the sample possessing a bachelor’s degree and 10.2% a postgraduate qualification. This

Table 1
Sample characteristics.

	UK
Valid N	401
Food purchase responsibility	
Mainly responsible (%)	74.81
Partly responsible (%)	25.19
Gender	
Female (%)	49.88
Male (%)	50.12
Average age	43.18
Home location	
Rural area (%)	26.70
Urban, including medium towns (%)	43.10
City conurbations (%)	30.20
Education	
Lower secondary/primary education or below (%)	23.69
Upper secondary education (%)	25.19
University or college entrance qualification (%)	12.47
Bachelor’s degree or equivalent level (%)	28.43
Master, Postgraduate or doctoral degree (%)	10.22
Household size (No of people)	2.72
Number of children (<18 year) per household	0.67

reflects a common problem that responses to internet based surveys are often biased to those with higher educational attainment (Evans and Mathur, 2018). The average size of sampled households (2.72 person per household) is close to that recorded for the UK population (2.3).

3.3. DCE design

The survey included a DCE which is appropriate when attempting to elicit consumer preferences and trade-offs for different characteristics of a product (Lancaster, 1966). The DCE approach is consistent with the theory of consumer behaviour proposed by Lancaster (1966) as well as random utility theory (McFadden, 1974). Specifically, Lancaster (1966) argues that consumers derive utility from product attributes rather than products per se, and McFadden (1974) states that individuals choose the alternative with the maximum value of perceived utility from a choice situation and seek to maximize their utility.

In the DCE, the product offered to participants was a 320-g pack of chicken breasts, with alternative options that differed in terms of label and CRM cues as well as price. Chicken is the most popular meat in the UK, with chicken breasts accounting for the best-selling cut, with over 1.1 billion chickens slaughtered annually (Defra, 2019; Statista, 2021). The scale of chicken production in the UK raises considerable concern regarding intensive production and animal welfare (Buller and Roe, 2014), making it an exemplary case study for studying consumers’ WTP in response to animal welfare and cause-related cues.

Table 2 presents an overview of the attributes included in the DCE and their corresponding levels. Label cues were split into three levels (RSPCA Assured label, Red Tractor label, no label). The RSPCA Assured label, previously known as Freedom Food, is a farm assurance and food labelling scheme dedicated to animal welfare (RSPCA, 2022). Launched in 1994 by the UK charity the Royal Society for the Prevention of Cruelty

Table 2
Attributes and levels used in the DCE.

Attributes	Levels
Quality assurance cues	1. No-label
	2. Red Tractor
	3. RSPCA
Cause-related cues	1. No cause
	2. Planting meadows
	3. Farmer
Price	1. £ 1.69
	2. £ 2.79
	3. £ 3.99
	4. £ 5.19



to Animals (RSPCA), the scheme seeks to promote higher standards of animal welfare. It is applied to each stage of an animal's life, including on farm (covering indoor and outdoor rearing systems), transportation and slaughter (RSPCA, 2022). To date, there are more than 2000 RSPCA Assured labelled products marketed by UK food retailers, including lines at major supermarkets.

The Red Tractor label is the largest food and farming standards scheme in the UK, when measured both by farm participation and sales volume (Red Tractor, 2022). Established in 2000, the Red Tractor label is run by Assured Food Standards, an independent, not-for-profit organisation. The scheme, which sets standard industry practices, certifies that the food has been produced in the UK (hence the Union Jack logo motif) and ensures minimum legislative requirements for its safety, hygiene, and the environment, with rules regarding the traceability of food, animal welfare and environmental protection. The Red Tractor label is found on produce available in all major UK grocery retailers and many branded manufacturers, with a combined sales value of approximately £12 billion per annum (Red Tractor, 2022).

Generally, the animal welfare standards required for Red Tractor labelling equate to legal requirements. Standards for the RSPCA Assured label, in some important but not all regards, exceed legal requirements (RSPCA, 2017). Notably, regarding chickens for meat, the RSPCA label requires a lower stocking density than the legal requirement and that permitted under the Red Tractor standard (Red Tractor, 2020; RSPCA, 2017). The RSPCA Assured label also has additional requirements regarding, for instance, bales / boxes per 1000 birds, depth of bedding, and the number of water bells per 100 chickens.

Regarding CRM, the DCE incorporated three levels (farmer, planting meadows, no cause). The options chosen thus capture the two main types of CRM: aiding the producer and a benefit external to the buyer or seller. The selection of specific causes followed a two-step process. Firstly, a focus group with postgraduate students ($n = 10$) discussed views of CRM and idealised perceptions of animal welfare and agriculture, using photographs as prompts. Participants deemed two photographs fitting with their idealised images of agriculture. In Picture A, a chicken, in a sunny meadow, pecks at lush grass, with the associated cause text reading "we are planting meadows on our farms". In picture B, a female farmer in overalls is outdoors, surrounded by chickens, with the text "Alison, one of our farmers". Neither case specifies donation amounts or socio-economic and environmental outcomes, thus providing consumers with unverified claims (Hudson, 2012). In a second step, a survey of 35 UK-based participants (mean age of 37, 62% women), recruited through the Prolific market research platform, assessed the appeal of the specific images. The online survey asked respondents to indicate, on a seven-point Likert scale (1 = strongly disagree and 7 = strongly agree), their agreement with a series of statements. Responses for Photograph A of a chicken in a sunny meadow, yielded mean scores of 6.23 and 6.08 for the statements "this picture shows good animal welfare" and "this picture presents a positive image of British agriculture" respectively, whereas photograph B of the farmer surrounded by chickens, yielded mean scores of 6.08 and 5.62 respectively. Survey responses were thus consistent with the focus group findings and confirmed the positive valence of the images used in the DCE. Finally, the price attribute in the DCE included four pricing levels expressed in British Pounds, of £1.69, £2.79, £3.99, and £5.19. A UK retail shop check helped set the different price levels.

Before the main wave of data collection, the questionnaire was pilot tested to check its readability and clarity. To mitigate a possible hypothetical bias, the survey included a cheap talk script (Carlsson et al., 2005) before the DCE questions. The cheap talk script asked participants to imagine that they were in a shopping situation and to make choices according to their own budget constraints. The participants chose between chicken breast options that differed in price as well as in terms of label and CRM cues. Each participant faced six choice situations. Each choice situation consisted of three randomized chicken breast alternatives and an opt-out option defined as "none of those" (Fig. 1). As a full

factorial choice experimental design would encompass 46,656 alternative chicken breast options, which would be impossible to evaluate due to respondent fatigue, we therefore employed a fractional factorial design employing D-efficiency criterion using Ngene software (Choice-Metrics, 2018), which provided an efficient 20 blocks with 6 choice tasks each. Subsequently, participants were randomly assigned to answer one of the 20 blocks of choice questions.

After completing the DCE, respondents reported the extent to which they found the purchase decision realistic (mean = 5.85, S.D. = 1.27), the prices corresponded to realistic market prices (mean = 5.12, S.D. = 1.31), and that the choice was similar to a purchase situation in a supermarket (mean = 5.17, S.D. = 1.35) on 7-point Likert scales (1 = strongly disagree, 7 = strongly agree). The mean scores for the validation questions were thus all above 5, giving credence to the notion that the DCE was realistic in terms of mimicking the choices and prices available to respondents in store.

3.4. Econometric analysis

The econometric analysis sought to estimate consumers' valuation of attributes included in the DCE and to identify distinct segments of consumers. In the data analysis, the product chosen, which resulted from the DCE, served as a dependent variable. The choice data were first analysed based on a mixed logit model using hierarchical Bayesian estimation. This approach is advantageous as it calculates part-worth utilities for each individual (Train, 2009). Each participant n was assumed to select the chicken breast alternative j providing them with the highest utility in each choice scenario t . A linear specification of the systematic part of the utility obtained from the chicken breast product was assumed. The utility U_{njt} is specified as follows:

$$U_{njt} = \beta_{0n} + \beta_{1n} \text{quality assurance cue}_{njt} + \beta_{2n} \text{cause related cue}_{njt} + \beta_{3n} \text{Price}_{njt} + \varepsilon_{njt}$$

where β_0 is a constant that captures systematic preferences for the opt-out option (not choosing any of the hypothetical alternatives). The coefficients (β_{1n} , β_{2n} and β_{3n}) are the part-worth parameters, capturing the marginal utility of the DCE attributes. The error term ε_{njt} represents unobserved and unsystematic components of individual n 's choice (Train, 2009).

When investigating consumers' preference heterogeneity, choice data are often analysed using a mixed logit model (Scarpa et al., 2007). The core property of the mixed logit model is that instead of assuming fixed partworth parameters, as is the norm with a multinomial logit model, it allows a greater variability of preferences for choice specific attributes based on the distribution function for individuals in the sample (Train, 2009). Thus, the mixed logit model allows for the heterogeneity in consumer preferences and for variation in the attribute values across the sampled consumers (Train, 2009).

The two main approaches used to fit mixed logit models to choice data are Maximum Simulated Likelihood (MSL) and Bayesian estimation (Akinc and Vandebroek, 2018). Unlike MSL estimation, the Bayesian technique was developed by Allenby and Rossi (1998) and generalized by Train (2009) to obtain the posterior distribution, which can be done by specifying prior distributions and combining these with the likelihood function of the data. In theory, both approaches should converge to the true parameters if the sample size increases, and the model is correctly specified, but in practice their precision depends greatly on the number of draws in MSL and on the prior distributions in Bayesian estimation. In this study we follow the Bayesian estimation approach. Regarding the prior distribution, we applied the Inverse Wishart distribution because it is the most commonly used prior for the covariance matrix in the Bayesian approach (Akinc and Vandebroek, 2018). As the latter authors note: "In almost all cases, the Bayesian approach, even with misspecified priors, leads to more precise estimates than the MSL approach" (Akinc and Vandebroek, 2018, p.144).

Please decide which of the chicken breasts you would like to buy (Options 1 to 3) or whether you do not want to buy any chicken breasts (Option 4).
(1 of 6)

Option 1	Option 2	Option 3	Option 4
<p>Chicken breast fillets (320 g) RSPCA ASSURED Alison, one of our farmers £ 1.69</p>	<p>Chicken breast fillets (320 g) We are planting meadows on our farms £ 3.99</p>	<p>Chicken breast fillets (320 g) ASSURED £ 3.99</p>	<p>I wouldn't choose any of these.</p>
Select	Select	Select	Select

Fig. 1. An example of a chicken breast DCE question.

A second stage of analysis involved the application of Latent Class Analysis (LCA) using the maximum likelihood approach (Boxall and Adamowicz, 2002). LCA helps identify distinct segments of individuals within a sample. Besides estimating preferences for different consumer segments, LCA models also provide the probability of each class membership for each individual. The underlying theory of the LCA posits that individual behaviour depends on observable attributes and on latent heterogeneity that varies with factors that are unobserved by the researchers (Greene and Hensher, 2003). In the last step of the data analysis, as we identified two classes, we conducted Mann and Whitney (1947) *U* tests to investigate whether the consumer segments vary significantly with respect to socioeconomic and behavioural characteristics. Regarding the latter, the survey captured purchase behaviour, including in relation to chicken breasts with higher animal welfare standards. A condensed version of the Food Choice Questionnaire (Stephens et al., 1995) measured consumers' motives for food choice.

3.5. Post-DCE qualitative research

To aid the interpretation of the DCE results, we also conducted, after completion and analysis of the survey data, a further 10 in-depth interviews. These interviews sought to provide further insights into consumers' understandings and associations of the RSPCA Assured and Red Tractor logos. Interviewees were shown both logos in turn and asked questions regarding their associations, perceived meaning and knowledge, degree of clarity, liking and use of the labels in food shopping. Recruitment of interviewees occurred through a snowball approach (Parker et al., 2019) with the researchers using their social networks to identify the initial interviewees who then recommended others, who we selected from, ensuring a diversity in terms of age, occupation (public

and private sector), and gender. To be included in the study, interviewees had to be UK citizens and responsible for their own / their family's food shopping.¹

4. Results

4.1. Mixed logit model





The first step in the DCE analysis involved the estimation of a mixed logit model using the hierarchical Bayesian estimation method, assuming that there is heterogeneity in consumer preferences. Table 3 presents the results on the importance of each attribute. The results reveal that, for the full sample, price is the most important attribute, followed by quality assurance cues, while CRM cues are the least important. For each attribute, the estimated average utility mean value and standard deviation are reported using zero-centred measures. They represent the relative attractiveness of the options for each attribute – in other words, the higher the number, the more preferable it is to participants.

The results indicate that consumers prefer chicken breasts with quality assurance labels compared against those with no such labels. The results are thus consistent with Hypothesis 1a. The average utility of the RSPCA Assured label compared against the no quality assurance label option is greater than the average utility of the Red Tractor label compared against the no quality label option. Similarly, WTP for the RSPCA Assured label is higher than that for the Red Tractor label (£0.99 versus £0.77). This gives credence to the view, expressed in Hypothesis 1b, that quality assurance labels associated with more stringent animal welfare requirements can elicit greater consumer WTP.

In keeping with H2a, the results indicate that CRM cues have a

¹ Interviewees included 8 women and 2 men, ranging in age bands from 20 to 30 up to 60 to 70 years of age. 7 interviewees worked at the time of the interview, while 2 were retired and 1 was economically inactive. Two interviewees had children under the age of 18 at the time of interview. All interviews were audio-recorded and transcribed in full, prior to thematic analysis. Copies of the interview guide, participant information sheet, and informed consent form are available from the authors on request.

Table 3
Mixed logit model for the DCE data.

		Mixed logit model	
N		401	
Initial log-likelihood		-3335.42	
final log-likelihood		-1350.86	
Number of parameters		8	
McFadden R^2		0.59	
		Relative importance (S.D.)	WTP ^b
		Average Utilities ^a (S.D.)	
<i>Quality assurance cues</i>		26.88 (14.50)	
None		-39.86 (38.42)	-1.77
Red Tractor		17.48 (28.82)	0.77
			
RSPCA Assured		22.38 (24.31)	0.99
			
<i>Cause-related cues</i>		19.86 (15.54)	
No cause		-28.97 (30.03)	-1.28
Planting meadows		24.42 (21.25)	1.08
			
Farmer		4.55 (18.66)	0.20
			
Price		53.25 (23.57)	-45.00 (36.99)
Opt-out option			-132.01 (142.53)

^aAverage utility score is zero-centred.

^bDue to the effect coding process in the DCE, WTP was calculated according to the specification reported in [Bech and Gyrd-Hansen \(2005\)](#).

positive effect on consumer WTP. Specifically, the utility of both causes is greater than when no such cause is included on the packaging. The average utility of the “we are planting meadows on our farms” cause is substantial and WTP (£1.08) exceeds that of the RSPCA Assured and Red Tractor labels. This result thus opposes the prediction of Hypothesis 2b.

Many retailers use pictures of farmers who supply their stores on promotional materials and food packaging. We consider the effects of this through the “Alison, one of our farmers” text and accompanying picture. The analysis indicates that such a strategy has a positive effect on WTP (£0.20). While the effect appears modest, the costs incurred in such a campaign are likely to be minimal. Such materials do not promise specific benefits to the farmer but nonetheless affect consumer demand. Regarding cost factors, as one would expect, consumers prefer lower prices (preference utility decreases with an increase in price).





As detailed in the bottom row of [Table 3](#), the coefficient for the opt-out option is large and negative, implying that the ‘purchase none of the chicken breasts’ option has a low overall utility and was selected rarely. This gives further credence to the notion that the DCE consisted of

realistic purchase options. Finally, regarding [Table 3](#), the estimated standard deviations of the coefficients are relatively high, suggesting that there is substantial heterogeneity in consumer preferences regarding the attributes included in the DCE.

4.2. Latent class analysis (LCA)

We further analysed the data by applying LCA to discern specific consumer segments with differing preferences, and to compute parameter estimates quantifying each segment’s preference for the levels of each attribute. While there are no established absolute statistical solutions to select the optimal number of latent classes ([Boxall and Adamowicz, 2002](#)), the usefulness of LCA depends on the identification of distinct and interpretable profiles ([Bauer, 2022; Wang and Wang, 2012](#)). We estimated 2-class, 3-class and 4-class models and found that the 2-class model yielded the clearest, interpretable solution, and this is

Table 4
Latent class analysis (2 group solution).

N		401		
Null log-likelihood			-3335.42	
Restricted log-likelihood			-2268.46	
AIC			4562.92	
BIC			4638.14	
Chi-Square			2133.93	
	Group 1 Price Sensitive		Group 2 Concerned Consumers	
Sample size	50.3%		49.5%	
	Relative Imprt. (%)	Part-worth utilites (t-stat.)	Relative Imprt. (%)	Part-worth utilites (t-stat.)
Quality assurance cues				
None	16.67	-30.55*** (-10.19)	46.70	-88.29*** (-9.93)
Red Tractor		11.10*** (3.74)		51.80*** (6.27)
				
RSPCA		19.45 (0.70)		36.48*** (4.68)
				
Cause-related cues	8.60		37.97	
No cause		-13.86*** (-4.80)		-63.53*** (-7.50)
Planting meadows		11.95*** (3.97)		50.37*** (6.25)
				
Farmer		1.90 (0.70)		13.16 (1.68)
				
Price	74.73	-74.73*** (-21.94)	15.34	-15.34*** (-3.21)
Opt-out option		-32.14*** (-5.06)		-194.21*** (-11.35)

*, **, ***; $p < .05, 0.01, 0.001$.

Table 5
Consumers' WTP by segment.

	Price Sensitive	Concerned Consumers
	WTP (C.I.)	WTP (C.I.)
<i>Quality assurance cues</i>		
None	-0.82 (-0.99 to -0.65)	-11.51 (-11.61 to -11.40)
Red Tractor	0.30 (0.13 to 0.46)	6.75 (6.65 to 6.85)
RSPCA	0.52 (0.36 to 0.68)	4.76 (4.66 to 4.84)
<i>Cause-related cues</i>		
No cause	-0.37 (-0.53 to -0.21)	-8.28 (-8.38 to -8.18)
Planting meadows	0.32 (0.15 to 0.49)	6.57 (6.47 to 6.66)
Farmer	0.05 (-0.10 to 0.20)	1.72 (1.63 to 1.81)

Table 6
Latent class profiles and the results of the Mann-Whitney U tests.

	UK		M-W tests
	Group 1 Price sensitive	Group 2 Concerned consumers	
N	401		
	50.3%	49.5%	
Gender			
Female (%)	46.5	53.3	
Male (%)	53.5	46.7	
Age			
Age	45.0	41.3	**
Education			
Up to secondary school education (%)	64.9	57.8	
Bachelor's degree or higher (%)	35.1	42.2	*
Location			
Rural area (%)	27.2	26.1	
Urban, including medium sized towns (%)	43.1	43.2	
Large cities / conurbations (%)	29.7	30.7	
How often do you buy chicken breasts with higher animal welfare standards? (1 = never, 7 = every time)	4.0	4.9	***
How often do you buy chicken breasts which provides some information about the farm? (1 = never, 7 = every time)	3.9	4.7	***
How often do you buy chicken breasts at a farmers' market or butcher? (1 = never, 7 = every time)	2.8	4.7	***
How often do you buy chicken breasts?			**
About or less than three times a month (%)	72.3	65.3	
About or more than once a week (%)	27.7	34.7	
How often do you cook chicken breasts?			*
Once a week or less (%)	75.2	72.4	
More than once a week (%)	24.8	27.6	
It is important to me that the food I eat on a typical day... (1 indicates strongly disagree and 7 strongly agree)			
...is healthy.	5.5	5.7	
...is a way of managing my mood (e.g., a good feeling or coping with stress).	4.4	4.8	*
...is convenient (in buying and cooking).	5.4	5.3	
...provides me with pleasure (e.g., appearance, texture, smell, taste).	5.8	5.7	
...is natural (no additives, only natural ingredients).	5.0	5.6	***
...is affordable.	6.0	5.6	***
...helps me control my weight.	4.6	5.0	*
...is familiar.	5.0	5.3	
...is environmentally friendly.	4.8	5.4	***
...is produced and traded in a fair manner.	5.0	5.6	***

***, **, * significant at 0.1%, 1%, 5%, level with asymptotic method of non-parametric Kruskal-Wallis test

adopted in the analysis below.²

Table 4 presents the results of the two latent class solution based on the three attributes of quality assurance cues, CRM, and price, while Table 5 presents the WTP estimates for the two classes, including confidence intervals. The class specific WTP estimates for each attribute level for the identified consumer classes were computed by dividing the respective attribute level coefficient by the price coefficient. Due to the involvement of effects coding procedures in the discrete choice data, the mean WTP was calculated based on the specification of Bech and Gyrd-Hansen (2005):

$$WTP = \left(\frac{-2 \beta_{\text{attribute level}}}{\beta_{\text{price}}} \right)$$

Table 4 reveals stark differences between the classes; consistent with Hypothesis 3a that heterogeneity characterizes consumer preferences, so that more than one distinct consumer segment can be discerned. For both groups, the coefficients for the price attribute are negative and statistically significant, suggesting that higher prices for chicken breasts generate disutility. However, for Group 1, labelled *price sensitive*, price has much greater relative importance in their decision making and the disutility of higher prices is much stronger than for Group 2, labelled *concerned consumers*. For both groups, quality assurance labels are relatively more important than CRM in decision making. However, for *concerned consumers* the relative importance of both quality assurance and cause-related cues in their decision making is greater than for *price sensitive* consumers. In terms of share of the sample, there are almost identical numbers of *price sensitive* and *concerned consumers*, suggesting that both segments are substantial. The coefficients for the opt-out option are negative and strongly significant, especially for *concerned consumers*, suggesting again the acceptability of the chicken breast options presented in the DCE.

Amongst *concerned consumers*, the lack of certification labels as well as cause-related cues on food packaging has a much stronger disutility than for *price sensitive* consumers. This is consistent with the notion that *concerned consumers* are more sensitive to the presence of quality cues. Interestingly, amongst *concerned consumers*, the part-worth utility of, and WTP for, the Red Tractor label is greater than that associated with the RSPCA Assured label. This implies that such consumers may not always place greater value on labels associated with higher animal welfare standards. Regarding CRM, the nature of the specific appeal matters. The 'planting meadows on our farms' cause elicits a substantial premium amongst *concerned consumers*, which is close to that of the Red Tractor scheme, and substantially more than for the RSPCA Assured label. The named farmer cause generates a very modest WTP (£0.05) for *price sensitive* consumers, but amongst *concerned consumers* WTP for this cause is substantially higher (£1.72).

Table 6 presents the results of the Mann-Whitney U tests for differences across the two latent classes regarding their demographic, socio-economic and behavioural characteristics. The results indicate that *concerned consumers* are younger and more likely to have completed higher education than *price sensitive* consumers. However, there are no significant differences between the two groups regarding gender or

² Examination of the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) suggested that a 3-class or 4-class model may be preferable. However, comparing the 2-class and 3-class models revealed that the third class consisted of a small number of observations (3.8%) for which the likelihood of choosing none of the options was very high. Particularly, for this class, price and label were insignificant. Given its size and characteristics, this group does not appear meaningful/targetable and the 4-class model presented a similar issue. After careful consideration and following the recommendation of Wang and Wang (2012, p.295) that "to have a meaningful class classification, the relative size of each of each latent class should not be too small" and "each of the latent classes must be theoretically meaningful and interpretable", we adopted the two latent class solution.

location (urban / rural). Regarding food choice motivations, *concerned consumers* place greater emphasis on the food they eat being natural, environmentally friendly, and produced and traded in a fair manner. In contrast, *price sensitive* consumers, unsurprisingly, place greater emphasis on the food that they eat being affordable. *Concerned consumers* are significantly more likely to buy chicken breasts produced according to higher farm animal welfare standards, buy chicken breasts where the packaging includes information about the farm, and buy chicken breasts from a farmers' market or butcher. Overall, consistent with Hypothesis 3b, the analysis thus indicates that consumer segments differ significantly with respect to socio-economic and behavioural characteristics.

The analysis of the post-DCE, in-depth interviews identified three main themes (lack of consumer reflexivity, confusion regarding the standards underpinning logos, and uncritical trust). We discuss each theme briefly in turn. Firstly, regarding consumer reflexivity, while consumers associate the Red Tractor logo with UK production, and typically link the RSPCA Assured logo with animal welfare, critical reflection is limited. As one interviewee remarked "*hand on heart, never paid attention to it [RSPCA Assured label]*" (Interviewee 5) and in some cases associations were erroneous, for example, that the Red Tractor scheme only applies to small farms (Interviewee 3). Concerning the second theme, interviewees found it difficult to compare standards across different labelling schemes, separating out, for example those with more and less stringent animal welfare requirements: "*I don't know the exact, but it [RSPCA Assured] is definitely that they have to have set animal welfare standards ..., I think that's higher than the Red Tractor but I don't know*" (Interviewee 6). Consequently, interviewees perceived a need for "standardization of logos" (Interviewee 2) to aid cross-comparison as "*they've just gradually evolved, there's too many different ones, and then people get very confused and that is particularly the case for animal welfare*" (Interviewee 6). Regarding the third theme (uncritical trust), although shoppers felt uncertain as to the standards underpinning the logos, they nonetheless trusted them: "*It just kind of gives me that feeling that I can trust*" (Interviewee 5). Moreover, interviewees recognised that the logos could influence their behaviour without any extensive deliberation: "*But really a sort of subconscious decision... like you know, comparing the two I would always pick up the one with more logos and over the one with no logos...*" (Interviewee 1).

5. Discussion

Farm animal welfare is a credence attribute which consumers generally regard as important but typically know little about (Alonso et al., 2020). Consequently, consumers rely on cues to make judgements regarding the expected qualities of meat (Grunert et al., 1996). Where these cues are accurate and consistent with consumer preferences, they turn credence attributes into quasi-search attributes (Gorton et al., 2021). However, where cues are misleading or inaccurate, market failure may occur (Harvey and Hubbard, 2013). In store, consumers can select products with a dedicated animal welfare label, such the RSPCA Assured, but in making choices they face a multitude of other labels and causes (Moon et al., 2017). To date, there is limited evidence regarding how consumers value dedicated animal welfare labels in the presence of multiple and contrasting labelling and cause cues (Grunert et al., 2018). In response to the gap in the literature, this paper presents a DCE experiment relating to chicken breasts, the most popular meat in the UK, to better understand the effects of quality assurance and cause-related cues on consumers' choices. It contributes to the literature in three main ways.

Higher animal welfare standards impose greater costs on producers, so that voluntary, as opposed to legislative, movements to higher welfare standards require support through consumers paying a premium (Clark et al., 2017; Harvey and Hubbard, 2013; Nocella et al., 2010). Such a premium will only exist however if (a) consumers are willing to pay extra for higher animal welfare standards and (b) are able to discern

meat produced according to higher, from lower, animal welfare standards. Certification schemes provide a mechanism for the latter and the first contribution of the paper relates to evidence indicating that consumers are willing to pay extra for meat produced according to more stringent animal welfare standards. For the full sample, the utility and WTP associated with the higher animal welfare standards scheme (RSPCA Assured) is greater than that of the leading farm assurance label in the UK (Red Tractor). In a crowded marketplace of many food labels, a quality scheme focused specifically on animal welfare can command a premium.

The LCA, however, suggests that the business case for producers considering 'upgrading' from a national farming to a dedicated animal welfare label (From Red Tractor to RSPCA Assured in the UK case) is questionable. Amongst *price sensitive* consumers the additional retail premium may be insufficient to cover the greater farm level costs incurred in producing according to higher welfare standards, even when the costs involved are modest (Seibert and Norwood, 2011). Amongst *concerned consumers*, the dedicated animal welfare label elicits a smaller premium than the national farming scheme, suggesting for those most willing to pay extra for meat products, supporting local farmers and ethnocentric concerns, may trump animal welfare.

The second contribution relates to the effects of CRM on consumer choices. While previous research identifies the importance of packaging on consumers' evaluations of food products (Marozzo et al., 2020; Steenis et al., 2017), there is a lack of evidence on the relative importance of cause-related compared against quality assurance ones. The study demonstrates that CRM affects substantially consumers' evaluation of food products and influences their WTP. Often cause-related campaigns lack specific information on donation amounts and socio-economic and environmental outcomes (Young, 2022). We incorporated these features into the two causes investigated in this study. Despite the lack of such specific information, the "we are planting meadows on our farms" cause elicited a WTP amongst *concerned consumers* substantially greater than for a dedicated animal welfare label. This suggests that quality assurance schemes for animal welfare could be undermined by initiatives that guarantee far less, but which nonetheless appear favourable to consumers.

The qualitative and DCE evidence identify the potential for market failure relating to animal welfare labelling. Specifically, less stringent animal welfare labels and CRM could crowd out more stringent (higher quality) options in the presence of asymmetric information, akin to a market for lemons (Akerlof, 1970). The requirements for such market failure (Philips, 1983) occur because, as evidenced by the WTP results, there is an incentive for sellers to pass-off less stringent animal welfare standards as more stringent ones, and as evidenced in the post-DCE interviews, there are multiple schemes with varying standards, most buyers cannot discern the relative standards underpinning specific logos, and currently there is no standardization so that sellers lack credible disclosure technology - sellers with more stringent animal welfare standards find it difficult to distinguish their offering from less stringent ones. Consequently, consumers' preferences regarding animal welfare may not translate into consistent choices.

An acknowledged limitation of the extant literature on consumers' WTP for higher animal welfare standards is a failure to adequately capture heterogeneity in consumer preferences (Clark et al., 2017; Latacz-Lohmann and Schreiner, 2019). The third contribution of the paper relates to this, employing LCA to profile distinct consumer groups and their WTP. The analysis indicates a class of *concerned consumers* that is willing to pay a substantial premium for higher animal welfare labelled meat (RSPCA Assured). However, this group experiences relatively greater utility from Red Tractor labelled meat indicating that, for them, animal welfare labelling may not be the most salient of qualities.

Just over half of consumers fall into in the *price sensitive* class, for whom quality assurance and cause-related cues are relatively unimportant. The results thus echo notions that for a large proportion of the population, food quality labels are relatively unimportant (Dubois et al.,

2021). Regarding animal welfare, a common policy recommendation is to provide more information to consumers to alter behaviour (European Commission, 2021; Miranda-de la Lama et al., 2019). However, for a substantial segment of consumers additional information, in the form of labelling, may not change their WTP and behaviour.

Comparing the LCA results against previous segmentations of meat consumers, highlights similarities and differences. *Concerned consumers* are younger and more likely to have completed higher education than *price sensitive consumers*, which is consistent with previous results (Alonso et al., 2020; Lagerkvist and Hess, 2010; Verbeke and Vackier, 2004). However, in contrast to Akaichi et al. (2019), we find no significant differences across segments according to gender, or whether respondents live in urban or rural locations which Weatherell et al. (2003) found to be important. Generally, there is a stronger correlation between food attitudes and consumer behaviour, than socio-demographic characteristics and consumer behaviour.

5.1. Limitations and further research

While generating insights into the effects of quality assurance schemes and cause-related cues on consumers' WTP, the study is not without limitations, which can guide future research. Firstly, the study occurred in one country (UK) with a long history of farm animal welfare regulation and consumer interest. Future research could test the generalisability of the findings to other European countries as well as emerging economies. Secondly, eye-tracking software (Peng et al., 2021) and fMRI scanner analysis (Simmank et al., 2020) could provide further insights into the attention given to, and processing of, quality assurance and cause-related cues in consumers' choices. Finally, the paper's evidence relating to cause-related cues generates important ethical and regulatory policy questions that warrant further attention. For instance, within the EU, health claims on food packaging are tightly regulated, with only those authorised by the European Food Safety Authority (EFSA) permitted. CRM claims are currently subject to weaker regulation (Hudson, 2012). However, given the potential for market failure highlighted in this paper, further investigation of how to minimise consumer misunderstanding of CRM claims is appropriate.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

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Data availability

Data will be made available on request.

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