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Looking behind the choice of organic: A cross-country analysis applying Integrated Choice and Latent Variable Models

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ABSTRACT

This cross-country study investigates the relative role of organic labelling in consumers' purchase decisions for apples and the extent to which behavioral constructs, derived from an extension of the Theory of Planned Behavior, influence consumers' choices. We apply an Integrated Choice and Latent Variable Model, combining a discrete choice experiment with structural equation modelling. Empirical validation draws on data from an online survey conducted in three European countries ($N_{Germany}$ = 404; N_{Norway} = 407; N_{UK} = 401). In all countries, price is by far the most important attribute in consumers' purchase decision of apples, followed by country-of-origin and production method. The results show considerable consistency across the investigated countries regarding the importance of behavioral constructs - attitudes, subjective norms, perceived behavioral control, trust, and personal moral norms - in explaining consumers' intentions to buy, and purchase choices for, organic apples, confirming the derived theoretical framework.

1. Introduction

A large number of product and process attributes, such as price, brand, taste, nutritional value, country of origin, and production methods influence consumer food choices (Hoffmann et al., 2020; Honkanen & Frewer, 2009). Some characteristics can be evaluated easily at the point of sale (e.g. price) while others are difficult to assess prior to consumption (e.g. taste) or even afterwards (e.g. production methods). The latter, so called 'credence attributes' (Darby & Karni, 1973), can only be valued, and thus influence choices, if consumers are informed, e.g. via labels about those attributes, and if they believe that the certified products are in compliance with regulated standards and embody the stated characteristics (Passantino, Conte, & Russo, 2008). Ensuring that food labels are recognized, understood and perceived as credible is integral to the EU's Farm to Fork policy framework (European Commission, 2020) and an important aspect of food producers and processors' marketing communications (Caswell & Mojduszka, 1996).

Organic production is a farm management practice that strives for a high level of animal welfare and biodiversity as well as the preservation of natural resources (European Commission, 2014). It is an example of a credence attribute. The organic food sector in Europe has grown substantially in recent years (Willer, Schaack, & Lernoud, 2019), with organic farmland increasing by 7.9% p.a. over the last decade, and organic food sales registering a double-digit annual growth rate (10.5%) globally. In Germany, retail sales for organic food almost doubled from €6.0 Billion in 2010 to €10.9 Billion in 2018 (Willer et al., 2019). Positive market growth also occurred in Norway and the UK, albeit after a dip in sales during the financial crisis from 2008 to 2011 in the latter case (Soil Association, 2019). Nevertheless, in all three countries organic food remains a niche market, holding, in 2018, a market share of 5.1%, 1.7% and 1.5% in Germany, Norway and the UK respectively (FiBL Statistics, 2020).

A large body of literature (e.g. Akaichi, de Grauw, Darmon, & Revoredo-Giha, 2016; de-Magistris & Gracia, 2014) investigates consumers' Willingness-To-Pay (WTP) for organic products using Discrete Choice Experiments (DCE). In parallel, considerable research focuses on understanding what determines consumers' attitude toward organic food purchase/consumption, employing latent construct models (LCM)

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(e.g. Liang, 2016; Pino, Peluso, & Guido, 2012). However, to date few studies examine the role of attitudinal and perceptual determinants in consumers' food choice (Alemu & Olsen, 2019; Ghvanidze, Velikova, Dodd, & Oldewage-Theron, 2017). Incorporating these factors into choice models promises a more behaviorally realistic depiction of the choice process, thereby improving the explanatory power of models (Vij & Walker, 2016). While Integrated Choice and Latent Variable (ICLV) Models and thus, the combination of DCE and LCM, have been employed recently in the transport literature (Bahamonde-Birke, Kunert, Link, & de Dios Ortúzar, 2017; Vij & Walker, 2016), they are only now starting to gain traction in food behavioral studies (e.g. Alemu & Olsen, 2019). To the best of our knowledge, no previous study has modelled consumers' choice of organic food using an ICLV framework, thus combining a DCE and LCM.

Besides the methodological innovation in the food choice literature, this study responds also to specific calls for further research identified in recent systematic reviews of the food marketing (Hoffmann et al., 2020) and environmentally sustainable food consumption (Vermeir et al., 2020) literatures. While acknowledging the considerable body of work investigating the effect of individual extrinsic cues (e.g. brand, price) on food choice, Hoffmann et al. (2020, p.4) call for greater attention to the "nature of interactions between determinants", including understanding mediation effects. Vermeir et al. (2020, p.12) note a "dearth of comparative studies" of eco-labels, which includes organic labels, to understand variations in their effectiveness and a need to address "how different types of (eco-related) labels interact" (p.13). The study also has policy relevance. The 'Farm to Fork' strategy of the European Commission (2020, p.8) envisages actions to 'stimulate both supply and demand for organic products'. It recognizes that consumer trust will be important to this, which begs the questions as "to what extent do European consumers value organic labels, including the EU's 'green leaf' organic label, and what factors motivate demand for organic products"?

In addressing these concerns, we investigate the importance of behavioral factors, such as attitudes, subjective norms and trust, on product choice with respect to consumers' purchase decisions for domestically grown organic apples. The information regarding the utility derived from purchasing organic apples is obtained from the DCE which includes, besides production method and price, also country of origin as product attribute. We decided to focus on apples, as they are the most commonly consumed fruits in the investigated countries (Statista, 2020). The replication of the analysis for three countries aids the assessment of model robustness and the consistency of support for hypotheses across multiple contexts.

1.1. Theoretical framework and research hypotheses

The analysis draws on an ICLV model combining a DCE and LCM. DCEs are based on Random Utility Theory (McFadden, 1974) and Lancaster's theory of consumer demand (Lancaster, 1966), which assume that consumers' utility depends not on products *per se* but on the characteristics embodied in the products being consumed. In compliance with utility maximizing behavior, consumers choose a product from a given set of alternatives that holds the combination of attributes that maximize their utility.

The applied LCM derives from an extension of the Theory of Planned Behavior (TPB), introduced by Ajzen (1991). The TPB is one of the most extensively applied models for explaining individual health- and food-related behavior (Armitage & Conner, 2001; Yazdanpanah, Forouzani, & Hojjati, 2015). According to the TPB, the best predictor of behavior is an intention to perform that particular behavior. Three constructs influence behavioral intentions, namely: attitude towards the behavior, subjective norms regarding the behavior, and perceived behavioral control over the behavior (Ajzen, 1991). Attitude summarizes an individual's evaluation of the positive and negative consequences associated with a behavior and comprises, according to Crites, Fabrigar, and Petty (1994), a cognitive and an affective dimension. Subjective norms refer to the pressure an individual perceives from important others to carry out the behavior, or to abstain from doing so. Finally, perceived behavioral control captures the level of control an individual has over pursuing a specific behavior. The inclusion of this construct is particularly important for situations where factors outside the power of the individual, which prevent the person from pursuing a behavior, are salient (Madden, Ellen, & Ajzen, 1992). Based on the TPB, it is hypothesized that the more positive the attitudes toward a behavior and the more positive the subjective norms will lead to the behavior likely happened. The higher the PBC over a behavior, the stronger is the intention to perform that behavior, which in turn makes it more likely that the behavior occurs. Based on the TPB, we developed the following four hypotheses:

H1: The decision to purchase (domestically produced) organic apples is positively influenced by a behavioral intention to buy organic apples.

H2: A favorable attitude towards buying organic apples positively affects the behavioral intention to buy organic apples.

H3: Subjective norms that are in favor of buying organic apples positively affect the behavioral intention to buy organic apples.

H4: A high perceived behavioral control with respect to buying organic apples positively affects the behavioral intention to buy organic apples.

The food choice literature suggests several extensions to the TPB (Conner & Armitage, 2002; Scalco, Noventa, Sartori, & Ceschi, 2017). With respect to the application of the TPB for investigating consumers' behavior that is linked to credence attributes, such as in the case of organic labelled foods, Vermeir and Verbeke (2008) suggest including a measure of consumers' confidence or trust in the product's reliability to fulfil its promises. Specifically, the lack or low levels of trust over the reliability of a claim will negatively influence the intention to purchase a product (Bryła, 2016; Yamoah, Duffy, Petrovici, & Fearne, 2016). Furthermore, personal moral norms also influence behavioral intentions (Conner & Armitage, 2002; Dean, Raats, & Shepherd, 2008; Manstead, 2000, pp. 11–30; Rivis, Sheeran, & Armitage, 2009). Personal moral norms, also termed moral norms or personal normative beliefs, refer to an "individuals' perception of the moral correctness or incorrectness of performing a particular behavior" (Rivis et al., 2009, p. 2986). The concept relates to a person's feeling of "moral obligation or responsibility to perform […] a certain behavior" (Ajzen, 1991, p. 199). Previous empirical studies support the role of moral norms as a predictor of intention for a number of different behaviors including environmentally related ones (Barbarossa & De Pelsmacker, 2016; Thøgersen, 2002). More specifically, focusing on organic products, Thøgersen (2002) and Arvola et al. (2008) show that consumers with stronger moral norms are more likely to purchase organic products. Despite the support in favor of including personal moral norms as an additional construct in the TPB, a question remains regarding whether the effect of moral norms on behavioral intention is of a direct nature or whether it is mediated through other TPB constructs, e.g. attitude (Botetzagias, Dima, & Malesios, 2015). Botetzagias et al. (2015) point to the primacy of a direct effect of personal moral norms on behavioral intention. However, based on a meta-analysis, Klöckner (2013) concludes that attitude partially mediates the impact of personal moral norms on behavioral intentions. Accordingly, we consider in our study both the direct and indirect impact of personal moral norms on consumers' purchase of organic apples.

Three additional hypotheses can be derived based on the suggested extensions:

H5: Trust in the organic certification positively affects attitude to buying organic apples.

H6: Personal moral norms in favor of buying organic apples positively affect attitude to buying organic apples.

H7: Personal moral norms in favor of buying organic apples positively affect behavioral intention to buy organic apples.

Finally, the decision to select or reject a specific product also depends on consumers' attitude with respect to the other attribute levels that

characterize the product under consideration (Van Loo, Caputo, Nayga, & Verbeke, 2014). In other words, consumers' choice of an organic apple of domestic origin will also depend on their attitude towards domestically produced products, which should be included as a control variable in the model. This leads to our final hypothesis:

H8: The decision to purchase domestically produced organic apples is positively influenced by a favorable attitude towards buying apples produced domestically.

Fig. 1 presents the structural model and the eight related hypotheses regarding the purchase of organic apples of domestic origin.

2. Data and method

2.1. Survey instrument

Online survey data collection occurred in summer 2018 across three European countries, Germany, Norway and the UK, via the market research company, LiGHTSPEED. Respondents received a small payment for completing the questionnaire. To qualify as a participant for the survey, respondents had to: (i) be living in the respective country; (ii) be either responsible or co-responsible for food shopping in their household; (iii) have bought apples in the previous three months.

These initial screening filters were followed by some socio-demographic questions. In the second part of the survey, respondents completed a DCE with respect to apples. The same DCE design was used for the three countries with respect to three product attributes: (1) production method, (2) country-of-origin and (3) price. Prices used in the experimental design were based on market research conducted by the researchers within the respective countries' retail stores and thus reflect market prices at the time of the study. Table 1 displays the three attributes and the associated levels used in the choice experiment.

The NGENE software tool (version 1.2.1; ChoiceMetrics, 2018) was used to generate a D-efficient design with zero prior parameter values (i.e. D-optimal orthogonal design). With a D-efficiency measure of 87% the design reached a relatively good level of D-optimality (Kessels, Goos, & Vandebroek, 2006). This experimental design produced a total of 120 choice scenarios. To reduce possible survey response fatigue, scenarios were randomly blocked into 20 choice sets of six choice scenarios each. Respondents were randomly assigned to one of the 20 blocks and asked, for each choice task, to choose from three products (e.g. three kinds of apples), which differed in the respective levels of the three attributes. From each participant we obtained a total of 24 responses based on the six choice scenarios, given that each scenario consists of four alternatives - three products and an opt-out choice. For the analysis, the dependent variable was coded as 1 when the respective option (product/opt-out) was selected, and coded as 0 otherwise. The "opt-out" option was included to avoid respondents having to choose a product they would not normally purchase during their grocery shopping. To make the choice experiment as realistic as possible, the products and their respective attribute levels were visualized using appropriate high-definition quality pictures and text (see Fig. 2).

Table 1
Attributes and respective levels used in the choice experiment.

Country	DCE structure (attributes and respective levels)
Germany	**1. Label for production method**: None/EU organic/German Bio and EU organic label **2. Country-of-origin label**: New Zealand/Italy/Germany **3. Price (€/kg)**: 1.99€/2.79€/3.59€/4.39€
Norway	**1. Label for production method:** None/EU organic/Debio label (Norwegian organic label) **2. Country-of-origin label**: Chile/Italy/Norway **3. Price (NOK/pack of 6 apples)**: 19.9NOK/28.9NOK/37.9NOK/46.9NOK (€2.08, €3.02, €3.97 and €4.91, respectively)[1]
UK	**1. Label for production method**: None/EU organic/Soil Association (British organic label) **2. Country-of-origin label**: New Zealand/France/UK **3. Price (£/pack of 6 apples)**: £1.29/£2.09/£2.89/£3.79 (€1.45, €2.34, €3.24 and €4.25, respectively)[2]

Notes: 1) Exchange rate July/August 2018 €/NOK = 9.5581; 2) Exchange rate July/August 2018 €/£ = 0.89217.3) effect coding was applied in the present study.

The third section of the questionnaire related to the LCM framework. To analyze the purchase of organic apples based on the extended TPB framework, empirical measures for the multidimensional constructs (attitude, subjective norms, perceived behavioral control, intention to buy, trust, and moral norms) were defined. In line with previous consumer studies, we captured these constructs using scales derived from the literature (see Table 2). The items used for the attitude construct were based on a 7-point sematic differential scale, while the items for all other constructs were measured on 7-point Likert scales.

The final section of the questionnaire solicited information regarding additional socio-economic characteristics of the household, such as income. The initial design of the questionnaire was developed in English, with translations into German and Norwegian by native-language

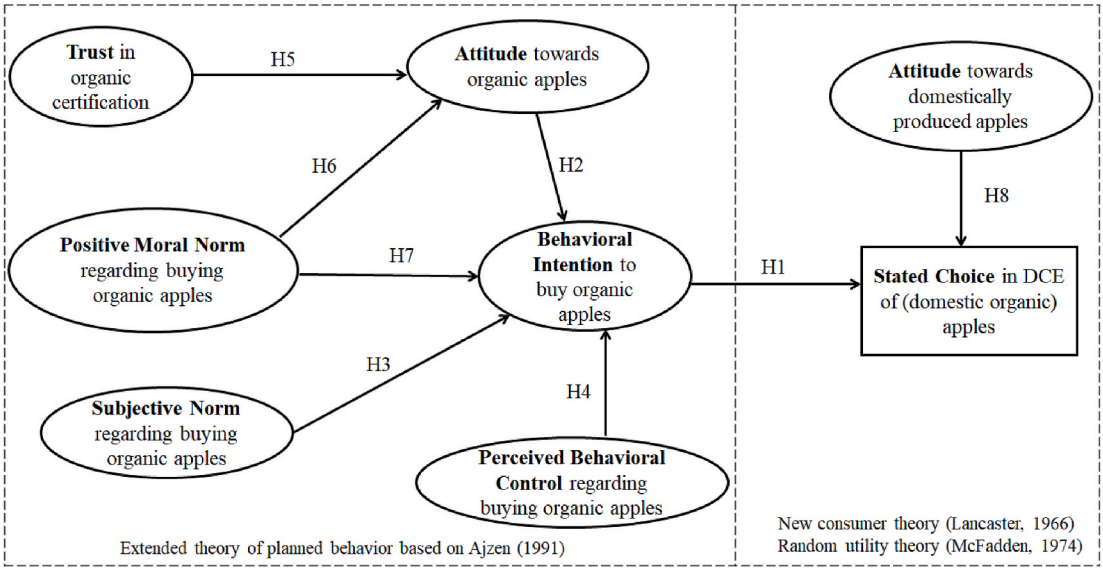

Fig. 1. Structural model for consumers' purchase decision for organic labelled apples of domestic origin.

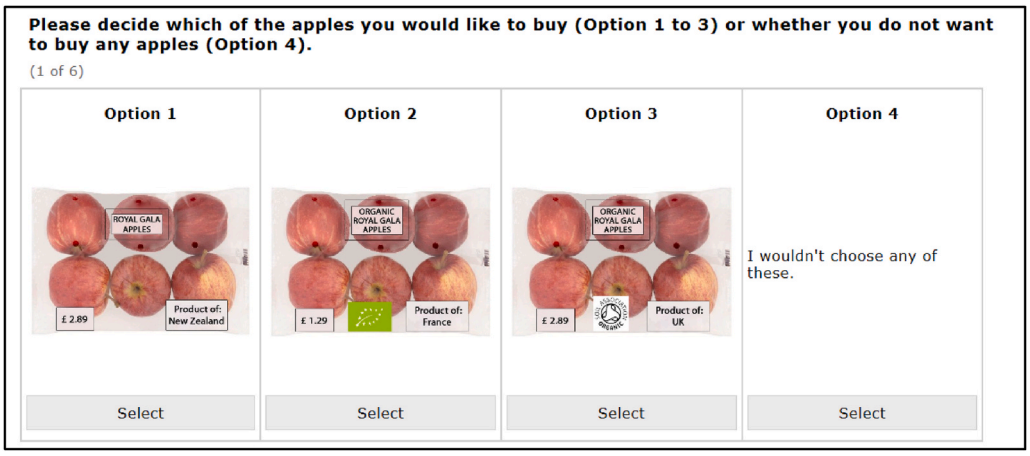

Fig. 2. Example of a DCE task for apples in the UK survey.

researchers. In order to ensure that all surveys were identical, independent of the language used, we outsourced back-translation to a professional translation institute. Subsequently, researchers checked consistency with the original English language survey and any discrepancies were corrected. Pilot testing of the surveys occurred in all three countries.

2.2. Econometric analysis of DCE data

DCEs rely on the assumption that an individual chooses from a set of products the alternative that yields them the highest utility (McFadden, 1971). In line with Lancaster's New Demand Theory, the utility a consumer derives from a product depends on the utilities associated with its composing attributes and attribute levels (Lancaster, 1966).

Discrete choice data were analysed using hierarchical Bayesian estimation of the mixed logit model. This approach accounts for heterogeneity in consumer preferences and for variation in the attribute values across the sample of consumers (Train, 2009).

2.3. Analysis of latent variable structural equation model

We followed the standard two-step approach of Anderson and Gerbing (1988) for estimating the LCM using the software Mplus version 8 (Muthén & Muthén, 2017). In the first step, a confirmatory factor analysis model was estimated to test the validity of the defined measurement systems. More specifically, we investigated the relation of the observed variables to the underlying latent constructs, namely: attitude, subjective norms, perceived behavioral control, behavioral intention, trust, and perceived moral norms (Anderson & Gerbing, 1988).

To gauge construct validity, we assessed the convergent validity of each latent construct and discriminant validity between latent constructs. The former was evaluated based on the following criteria: significant estimates of factor loadings and standardized factor loading greater than 0.7 for each indicator, Cronbach's Alpha and composite reliability for each latent construct greater than 0.7, and an Average Variance Extracted of at least 0.5 (Bagozzi & Yi, 2012; Hair, Black, Babin, Anderson, & Tatham, 2010). Moreover, we assessed discriminant validity following the procedure suggested by Fornell and Larcker (1981) and thus, compared the amount of the variance captured by the latent construct and the shared variance with other latent constructs.

To assess the overall model fit of the measurement model the following commonly used goodness-of-fit measures were applied: Standardized Root Mean Square Residual (SRMR) acceptable fit: < 0.08; good fit: < 0.06; Root Mean Square Error of Approximation (RMSEA) acceptable fit < 0.08; good fit: < 0.06), Tucker-Lewis index (TLI) acceptable fit: > 0.90; good fit: > 0.95; and Comparative Fit Index (CFI) acceptable fit: > 0.9; good fit: > 0.95 (Brown, 2006; Hu & Bentler, 1999; Ullman & Bentler, 2012).

Given a good fit and acceptable validity, the structural model was estimated in the second stage. A standard estimation method for the measurement and the corresponding structural model is covariance based Maximum Likelihood estimation. The Shapiro–Wilk test is used to examine the normality of the dataset. Significant p-values for all Structural Equation Model items ($p < 0.001$) suggest a non-normal distribution of the data for the latent constructs. As the assumption of a multivariate normal distribution of the empirically measured indicators was violated, we used the robust maximum likelihood (MLR) estimator for the analysis (Muthén & Muthén, 2017). MLR is suitable for handling non-normally distributed data (Beauducel & Herzberg, 2006).

3. Results and discussion

In total, 2114 adults took part in the survey with 1212 (57%) valid responses for empirical analysis ($n = 404$ Germany, $n = 407$ Norway, and $n = 401$ UK). The considerable difference between the number of study participants and the number of valid responses is due to the three screening questions set at the beginning of the survey. Thus, respondents not living in the respective country, not (co-)responsible for food shopping in their household, and not having bought apples in the previous three months were excluded from the sample. The samples are broadly representative in terms of age and gender for the overall population in the three countries (ONS, 2015; Statistics Norway, 2019; Statistisches Bundesamt, 2017a). The overall samples appear, however, biased in favor of respondents living in rural areas, and with higher levels of educational attainment, in the German case, exhibit higher income levels and have more children, whereas in the Norwegian case report less children (ONS, 2013, 2015; Statistics Norway, 2019; Statistisches Bundesamt, 2016, 2017b). Table 3 presents the respective socio-demographic characteristics for the three countries' samples.

DCE choice data were analysed applying hierarchical Bayesian mixed logit models. Table 4 provides information on the average importance scores for the three attributes investigated in the DCE separately for Germany, Norway and the UK. To allow for comparability between countries, attribute importance scores are standardized to sum up to 100% across all attributes for each country.

The results reveal that in all three countries price is, by far, the most important attribute. Between 54% (Germany) and 65% (UK) of the utility derived from the purchase of apples is related to this attribute. This is followed by country-of-origin (33% in Germany and Norway, 24% in UK), while production method is the least important attribute (13% in Germany, 7% in Norway, 12% in UK). The finding that country-of-origin trumps production method (organic) is in line with other

Table 2
Scales and items for behavioral variables.

Construct	Items	Sources
Attitude (ATT) **	Buying organic apples instead of conventionally produced apples would make me feel … 1. … unsatisfied/satisfied; 2. … unhappy/happy; 3. … bad/good I think that buying organic apples instead of conventionally produced apples is … 1. … meaningless/ meaningful; 2. … harmful/beneficial; 3. … unimportant/important	Adapted from Povey et al. (2001); Fishbein and Ajzen (2011)
Subjective Norms (SN) *	1. Most people who are important to me would like me to buy organic apples instead of conventionally produced apples. 2. My close friends and family expect me to buy organic apples instead of conventionally produced apples. 3. Most of my close friends and family generally buy organic apples instead of conventionally produced apples.	Ajzen (2020); Fishbein and Ajzen (2011)
Perceived Behavioral Control (PBC) *	1. Whether or not I buy organic apples instead of conventionally produced apples on a regular basis is completely up to me. 2. I am confident that I can buy organic apples instead of conventionally produced apples on a regular basis. 3. For me buying organic apples instead of conventionally produced apples on a regular basis is easy.	Ajzen (2020)
Behavioral Intention (BI) *	1. I intend to buy organic apples instead of conventionally produced apples on a regular basis. [extremely unlikely – extremely likely] 2. I will make an effort to buy organic apples instead of conventionally produced apples on a regular basis. [strongly disagree – strongly agree] 3. In the future when you buy apples how often will you buy organic apples? [never – every time]	Adapted from Fishbein and Ajzen (2011)
Trust *	1. Products with the organic label fulfil strict rules. 2. The label for organic products guarantees that the products are really organic. 3. I have great trust in the control system behind the organic label.	Adapted from Teng and Wang (2015)
Perceived Moral Norms (PMN) *	*Buying organic apples instead of conventionally produced apples …* 1 ….would feel like I am making a personal contribution to something better. 2 ….would feel like the morally right thing to do. 3 ….makes me feel like a better person.	Dean et al. (2008); Arvola et al. (2008)
Domestic Country-of-Origin Attitude (COATT) **	*Buying apples produced domestically instead of apples produced in the foreign country would make me feel …* 1. … unsatisfied/satisfied; 2. … unhappy/happy; 3. … bad/good *I think that buying apples produced domestically instead of apples produced in the foreign country is …* 1. … meaningless/meaningful; 2. … harmful/beneficial; 3. … unimportant/important	Adapted from Puska, Kurki, Lähdesmäki, Siltaoja, and Luomala (2018), Fishbein and Ajzen (2011)

* Measurement on a 7-point Likert Scale; **measurement on a 7-point semantic differential scale.

Table 3
Sample structure across the three countries: Germany, Norway and the UK.

	Germany	Norway	UK
Total N	756	744	614
Valid N	404	407	401
Qualified N % (valid N/total N)	0.53	0.55	0.65
Gender			
Female (%)	50.50	52.83	50.87
Male (%)	49.50	47.17	49.13
Average age (years)	43.23	43.98	43.28
Living area			
Rural area (%)	38.12	19.90	26.93
Urban medium town (%)	28.22	38.57	46.13
City (%)	33.66	41.52	26.93
Education			
Lower secondary/primary education or below (%)	18.32	4.67	20.20
Upper secondary education (%)	15.35	24.08	27.93
University or college entrance qualification (%)	37.13	14.00	15.46
Bachelor's degree or equivalent level (%)	14.60	34.64	25.19
Master, Postgraduate or doctoral degree (%)	14.60	22.60	11.22
Household size (N)	2.41	2.51	2.54
Number of children (<18 years) in the household (N)	0.45	0.59	0.53

Table 4
Attributes' importance scores for Germany, Norway and the UK.

Country	Germany (N = 404)	Norway (N = 407)	UK (N = 401)
	Avg. Importance (Std.Dev.)	**Avg. Importance (Std.Dev.)**	**Avg. Importance (Std.Dev.)**
Production Method	12.68 (9.23)	7.47 (8.14)	11.84 (9.55)
Country-of-Origin	33.42 (12.48)	32.56 (13.49)	23.51 (11.18)
Price	53.89 (15.09)	59.97 (15.34)	64.65 (14.70)

studies (Costanigro, Kroll, Thilmany, & Nurse, 2010; de-Magistris & Gracia, 2014; James, Rickard, & Rossman, 2009). Previous research indicates that European consumers strongly prefer domestically produced offerings, mainly due to environmental concerns related to transportation, greater trust in their own country's certification bodies, and a desire to support local farmers (Pedersen, Aschemann-Witzel, & Thøgersen, 2018). Furthermore, the finding of price being one of the primary determinants of food choice is also consistent with previous literature (Bryła, 2016; French, 2003; Steenhuis, Waterlander, & de Mul,

2011) and is a central attribute in terms of explaining the rejection of organic food (Marian, Chrysochou, Krystallis, & Thøgersen, 2014). Though the ranking of the attributes is the same in the three countries, the results reveal the existence of differences in the magnitude of the importance scores of the different attributes across countries. Noticeably, price is substantially more important in the UK, which is consistent with previous evidence regarding the greater price sensitivity of British consumers, especially in relation to organic food (Fourmouzi, Genius, & Midmore, 2012).

From the hierarchical Bayesian mixed logit models, we obtained the average raw part-worth utilities applying the mixed logit models using hierarchical Bayesian estimation on the effects coded (Bech and Gyrd-Hansen, 2005) choice data. To provide greater comparability across countries and attributes, Table 5 does not report raw values but the normalized zero-centered differences of the average part-worth utilities within attributes. Rescaled utilities constrain the levels of part-worth utilities within an attribute such that the mean over all attribute levels of each attribute is zero for each respondent. Thus, each respondent receives equal weighting when averaging the scores over all survey respondents for a country. The zero-centered scores also aid cross-comparison between countries as they remove scale factor differences between respondents which is of interest as all three countries share almost the same design as the number of attributes, attribute levels as well as the attributes are identical and the attribute levels are very similarly defined. The latter reflect differences in domestic market conditions in the three countries analysed (e.g. price range and the importance of importers) and thus are similar but not identical. This should be kept in mind in the comparison of the scores across the three countries. Positive values indicate that the attribute level contributes to a greater utility of the product while negative values reduce the utility a consumer derives from a specific product. The average utility of the opt-out option is calculated as the mean value of the individual specific constant.

The results clearly indicate that respondents prefer organic apples compared to conventional ones, though the nature of the organic label is highly salient, especially in Germany and Norway. More specifically, we find a stronger preference for, and thus a higher evaluation of products displaying, national organic labels compared to products that exclusively carry the EU organic label. This outcome echoes the findings of Thøgersen, Pedersen, and Aschemann-Witzel (2019) who found that European consumers generally favor organic products carrying their national organic label rather than the EU's green-leaf organic label.

Table 5 also reveals that domestic apples provide a considerably higher utility to respondents compared with foreign ones. These findings are in line with previous studies (Ceschi, Canavari, & Castellini, 2018; Pouta, Heikkilä, Forsman-Hugg, Isoniemi, & Mäkelä, 2010), confirming that European consumers have in general a preference for domestic relative to imported products. To a large extent, European consumers place greater trust in domestic foods and assume them to be fresher and healthier (Mauracher, Tempesta, & Vecchiato, 2013). However, this may not be true globally - domestic origin negatively affects WTP for organic food in China (Wu, Yin, Xu, & Zhu, 2014), due to high profile, domestic food safety scandals. The preference for domestic products is especially pronounced in Germany and Norway, compared to the UK. This may reflect differences in ethnocentrism, which influences consumers' evaluations and purchase intentions of domestic versus foreign goods (Vabø, Hansen, Hansen, & Kraggerud, 2016), or perhaps capture the UK's traditionally diverse cuisine that incorporates many international influences (James, 1997). In this study, we did not measure consumers' ethnocentrism, but prior research identifies a positive relationship between consumers' preferences for domestic products and ethnocentrism for Germany (e.g., Netemeyer, Durvasula, & Lichtenstei, 1991), Norway (e.g., Vabø et al., 2016) and the UK (e.g. Siamagka & Balabanis, 2015).

Consumers also differentiate between the origins of imported apples. In the case of Germany and Norway, utility is considerably higher for apples imported from an EU country (e.g. Italy) compared to a non-European country (e.g. New Zealand, Chile). This may reflect concerns regarding food miles as well as Italy's culinary status. This is not the case for the UK, where the average utility values, though negative, are the same (−18.6) for both import origins (New Zealand and France). The UK has a tradition of importing food and wine from New Zealand dating back to its Empire (Woods, 2012), whose products are favorably regarded (Hamlin & Leith, 2006), and which likely offsets the greater geographical distance. At the same time, some UK consumers continue to express animosity towards France and French companies, which may reflect some conscious or unconscious bias (Lee & Mazodier, 2015).

The results also reveal that respondents' utility proportionally declines with increases in price. Thus, as expected, consumers show a negative price elasticity of demand. Previous studies consistently show price as the primary barrier to increasing organic food consumption (Aschemann-Witzel & Zielke, 2017), with organic fruits and vegetables being more price elastic than their non-organic counterparts (Fourmouzi et al., 2012). Finally, the opt-out is associated with negative values with differing magnitudes in the three countries, suggesting that the option of not purchasing any apples is associated with a higher utility loss in the UK (−72.8) relative to Norway (−54.3) and Germany (−33.9).

To gain insights into the determinants of consumers' purchase

Table 5
Bayesian estimation of the mixed logit model for Germany, Norway and UK.

Country	Germany		Norway		UK
N	404		407		401
	Avg. Utilities[a] (S.D.)		**Avg. Utilities[a] (S.D.)**		**Avg. Utilities[a] (S.D.)**
Production Method					
No label	−14.59 (16.74)	No label	−7.12 (12.25)	No label	−5.75 (23.78)
EU organic	0.41 (11.64)	EU organic	−1.72 (8.84)	EU organic	2.32 (15.90)
German BIO	14.18 (18.87)	Norwegian organic	8.85 (15.60)	UK organic	3.44 (17.48)
Country-of-Origin					
New Zealand	−35.19 (20.45)	Chile	−36.83 (20.40)	New Zealand	−18.61 (17.27)
Italy	−19.23 (22.06)	Italy	−16.50 (17.94)	France	−18.60 (20.41)
Germany	54.42 (35.24)	Norway	53.32 (32.66)	UK	37.21 (29.20)
Price[b]					
€ 1.99	69.28 (52.60)	19.9 NOK	90.05 (46.85)	£ 1.29	97.12 (58.09)
€ 2.79	34.12 (19.44)	28.9 NOK	31.05 (11.81)	£ 2.09	20.09 (18.29)
€ 3.59	−28.90 (36.23)	37.9 NOK	−37.85 (29.41)	£ 2.89	−39.70 (37.45)
€ 4.39	−74.50 (29.29)	46.9 NOK	−83.25 (17.90)	£ 3.79	−77.50 (33.78)
Opt-out	−33.94 (113.52)		−54.33 (164.24)		−72.78 (173.26)

Notes: a) The average utilities reported are zero-centered. b) Equivalent prices in Euro for Norway taking the Exchange rate July/August 2018 €/NOK = 9.5581 are equal to €2.08, €3.02, €3.97 and €4.91, respectively; Equivalent prices in Euro for the UK taking the exchange rate July/August 2018 €/£ = 0.89217 are equal to €1.45, €2.34, €3.24 and €4.25, respectively.

decisions we investigated the extent to which the planned behavioral constructs influence the choice of organic apples. The properties of the items capturing the six behavioral constructs of the Structural Equation Model were analysed with respect to their distributional characteristics. The descriptive statistics (means, standard deviations, skewness, and kurtosis) for each item are reported in Appendix 2.

For Germany, the mean values of all items for attitude are considerably above 5. Thus, respondents have on average a slight to moderate positive attitude towards buying organic apples. For the UK, the respective values are slightly lower and for Norway, none of the attitude items reaches a mean value above 5. The latter may reflect lower interest in organic food by Norwegian consumers; where consumers appear indifferent between conventionally produced and certified organic domestic food (Amilien, Torjusen, & Vittersø, 2005; Terragni, Torjusen, & Vittersø, 2009), with a general negative trend in the perception of organic products compared to the previous decade (Vittersø & Tangeland, 2015). Respondents from all the three countries generally perceive little social pressure to buy organic apples (values ranging from 2.7 for SN2 in Norway to 3.61 for SN3 in Germany and SN1 in the UK). The means of the items capturing the construct Perceived Behavioural Control differ considerably. While in all three countries the item PBC1 is above 5.7, the item PBC3 has a mean value of 4.8 and 4.3 in Germany and UK respectively. Thus, although respondents feel that buying organic apples instead of conventional ones is, to a large degree, "up to them" (PBC1), they do not find it that easy to make this purchase decision (PBC3). Accordingly, it is unsurprising that all mean values for the construct Behavioural Intention are only around 4.5 in Germany, considerably lower in the UK, and even less in Norway. Thus, Norwegian respondents exhibit an especially low intention to buy organic apples. As previously noted, this may reflect recent declining perceptions of organic food in Norway, with a lack of trust in the labelling system (Vittersø & Tangeland, 2015). The values for the trust items are around 4.6 in Germany and the UK, and slightly lower in Norway. The survey thus reveals that respondents in all three countries only slightly trust organic labels. Finally, the findings regarding personal moral norms differ considerably between countries and items. The values for personal moral norms are especially high in Germany (well above 4.0), followed by the UK, with Norway exhibiting the lowest personal moral norms to buy organic products (values below 4.0). The latter values reveal that buying organic apples instead of conventionally produced apples is slightly perceived as making a personal contribution to something better (PMN1), while it does rather not make people feel "like a better person" (PMN3).

The next step involved testing the validity of the latent constructs and the overall fit of the measurement model. The analysis revealed that the factor loadings of the first PBC item (PBC1) deviates considerably from the threshold value of 0.7 in all three countries (0.36 for Germany, 0.31 for Norway and 0.06 for UK). In Norway, in addition, the factor loading for PBC2 is 0.55, below, though much closer to, the 0.7 threshold. In order to overcome the former shortcoming, a two-indicator measure was defined for PBC in all three countries, excluding the item PBC1 "Whether or not I buy organic apples instead of conventionally produced apples on a regular basis is completely up to me." To retain the same model over all countries we decided to accept the limitation for PBC2 in Norway. Table 6 and Appendix 3 display the results of the adjusted confirmatory factor analysis (CFA). Appendix 3 reveals that the factor loadings of the items of all other behavioral constructs are well above, or in the case of attitude close (for two of six items in Germany and one item in Norway), to the recommended threshold value of 0.7. The values for Cronbach's alpha, Composite Reliability and AVE statistics indicate a good to very good validity. Thus, overall, our measurement models exceed the acceptable benchmarks and exhibit appropriate convergent validity. Regarding discriminant validity, a comparison of the correlation between latent constructs and the square root of the average variance extracted revealed sufficient differentiation between the constructs (Fornell & Larcker, 1981) for all behavioral constructs, except attitude with personal moral norms in the case of Germany (see Table 6). Values of the indices measuring overall model fit suggest that the model structure provides a good model fit in all three countries (see Table 7). Given the overall good model fit, the fact that the deviation from discriminant validity is only in one case and rather minor, and since a comparison across countries makes it necessary to use a common model structure over all three countries, the proposed measurement model specification was accepted and the structural model was estimated.

For estimating the ICLV Model, the findings from the DCE, as well as the construct of attitude towards domestically produced apples were added to the extended framework of the TPB, and thus to the latent variable model. This involved the following steps. For the DCE data we estimated mixed logit models using hierarchical Bayesian estimation,

Table 6
Reliability and discriminant validity statistics for measurement models for Germany, Norway and the UK.

		Cronbach's alpha	Composite reliability	Average Variance Extracted	Sqrt. of Average Variance Extracted	Highest corr. coef. with other construct	Highest correlated relationship
Germany (N = 404)	ATT	0.91	0.90	0.60	0.77	0.81	ATT-PMN
	SN	0.87	0.88	0.70	0.84	0.64	SN--BI
	PBC	0.85	0.85	0.74	0.86	0.72	PBC-BI
	BI	0.94	0.94	0.85	0.92	0.78	BI-PMN
	Trust	0.92	0.95	0.86	0.93	0.47	Trust-PMN
	PMN	0.93	0.93	0.81	0.90	0.81	PMN-ATT
	DOATT	0.93	0.93	0.67	0.82	0.72	COATT-PMN
Norway (N = 407)	ATT	0.91	0.90	0.61	0.78	0.70	ATT-PMN
	SN	0.88	0.88	0.71	0.84	0.69	SN-BI
	PBC	0.71	0.79	0.67	0.82	0.42	PBC-PMN
	BI	0.92	0.92	0.80	0.89	0.76	BI-PMN
	Trust	0.90	0.93	0.82	0.91	0.45	Trust-ATT
	PMN	0.94	0.94	0.84	0.92	0.76	PMN-BI
	DOATT	0.92	0.92	0.67	0.82	0.40	DOATT-Trust
UK (N = 401)	ATT	0.93	0.92	0.67	0.82	0.82	ATT-PMN
	SN	0.92	0.92	0.79	0.89	0.84	SN-BI
	PBC	0.83	0.83	0.72	0.85	0.75	PBC-BI
	BI	0.95	0.95	0.86	0.93	0.84	BI-SN
	Trust	0.93	0.95	0.87	0.93	0.60	Trust-ATT
	PMN	0.96	0.96	0.88	0.94	0.82	PMN-ATT
	DOATT	0.94	0.93	0.71	0.84	0.41	DOATT-PMN

Notes: ATT: Attitude; SN: Subjective Norms; PBC: Perceived Behavioral Control; BI: Behavioral Intention; T: Trust; PMN: Perceived Moral Norms; DOATT: Domestic Origin Attitude; AVE: Average variance extracted.

Table 7
Goodness of fit indicators for measuring ICLV Models' adequacy.

		Recommended Threshold	Germany (N = 404)	Norway (N = 407)	UK (N = 401)
Measurement model	CFI	>0.90	0.950	0.961	0.950
	TLI	>0.90	0.941	0.954	0.941
	RMSEA	<0.08	0.052	0.045	0.069
	SRMR	<0.08	0.080	0.051	0.074
Structural model	CFI	>0.90	0.959	0.964	0.954
	TLI	>0.90	0.952	0.957	0.946
	RMSEA	<0.08	0.047	0.044	0.054
	SRMR	<0.08	0.055	0.049	0.046
	$R^2_{Stated\ Choice}$		0.217	0.080	0.202
	$R^2_{Attitude}$		0.686	0.509	0.704
	$R^2_{Behavior\ Intention}$		0.783	0.792	0.840

Notes: CFI: Comparative fit index; TLI: Tucker-Lewis index; RMSEA: Root Mean Square Error of Approximation; SRMR: standardized root mean square residual.

setting the price attribute levels as a linear term while keeping the levels of the other attributes as part-worth utilities. Based on this analysis, we obtained individuals' utility scores for each attribute level regarding the two attributes production methods and country-of-origin, whereas a single utility score for the price attribute was also obtained. This allowed us to simulate, for each participant, the utility derived from consuming a product with the attribute levels "domestic" and "EU organic label" as well as for a product with the attribute level "domestic" and "national organic label" for the price attribute, respectively. Thus, we obtained for each participant two utility measures (two products: "domestic + EU organic label" and "domestic national organic label"). We took the mean utility over those two utility measures to derive the average utility an individual obtains from buying organic labelled apples of domestic origin. This value was then included in the Structural Equation Model. The final ICLV Model displays a good model fit to the empirical data in all three countries (see Table 7). Table 8 and Fig. 3 display the estimations of the regression weights.

The estimated model is in line with all but one of the assumed structural relationships of the extended TPB framework, in most cases at a significance level of $\alpha < 0.001$. The exception refers to the relationship between personal moral norms and behavioral intention in the UK. Our results indicate that the relationships postulated by the TPB - the influence of behavioral intention on consumers' purchase of organic apples (H1) as well as the impact of attitudes (H2), subjective norms (H3) and perceived behavioral control (H4) on behavioral intention - are supported in all countries (see Fig. 3). Regarding the relevance of the different behavioral constructs on intentions to purchase organic apples, our models indicate differences between countries. In Germany and Norway, respondents' attitude with respect to buying organic apples has the strongest impact on their purchase intention, while in the UK subjective norms are the most important predictor for consumers' buying intentions with attitude taking second place. The stronger effect of attitude, compared against subjective norms, on purchase intention, as witnessed in Germany and Norway, is consistent with the meta-analysis findings of Scalco et al. (2017). Interestingly, Scalco et al. (2017) found that the effect sizes for attitude on behavioral intentions to be far more consistent across countries than for the case of subjective norms and this is also apparent in our data.

Looking at the extension of the TPB, our results show that trust in the label has a significant effect on consumers' attitude (H5) thereby indirectly affecting respondents' behavioral intention to buy organic apples. This supports notions that trust is a critical determinant of attitudes for products characterized by credence attributes, as in the case of organic food (Vermeir & Verbeke, 2008). A concern for those promoting organic foods, is thus the overall modest levels of trust currently evident (Appendix 2).

Personal moral norms influence behavioral intentions directly in the German and Norwegian models and indirectly via attitude in all three countries. Thus, our results confirm the findings of Klöckner (2013), based on a meta-analysis of environmental behavior, and of Arvola et al. (2008), regarding the purchase of organic food, that part of the impact of personal moral norms on behavioral intentions is mediated by attitude. Recently, Koklic, Golob, Podnar, and Zabkar (2019) demonstrate that moral norms are a significant direct predictor of purchase intentions for organic food, and the results for Germany and Norway are consistent. While support for the notions that purchasing organic food contributes to something better and the right thing to do remains rather modest amongst consumers, nonetheless personal moral norms influence whether consumers have a positive attitude towards purchasing organic apples.

Overall, the ICLV Model records a high to very high R^2 for attitude and intention in all three countries (attitude: Germany: 0.69; Norway: 0.51 and UK: 0.70: behavioral intention: Germany: 0.78; Norway: 0.79 and UK: 0.84) and moderate to low R^2 for explaining choice (Germany: 0.22, Norway: 0.08, and UK: 0.20) (see Table 7). The ability of the model to explain behavioral intentions is thus greater than that for the product's choice, here proxied by average utility. This result can be explained through different, but complementary, perspectives. First, while the measurement of intention and attitude referred to organic apples in general, purchase decisions regarding both the national and EU labels were considered in arriving at the average utility that entered the ICLV Model. However, it might be that (some) consumers considered only the EU or only the national label when expressing their attitude and intention towards organic. That might be especially the case in the non-EU country, Norway. Thus, averaging utilities over choices linked to both labels can be one explanation for the low R^2 for choice (utility) compared to intention especially in the case of Norway.

Second, Norwegian consumers have a tendency to consider Norwegian produced food as "almost organic" or at least "greener" than foreign food (Vittersø & Tangeland, 2015). This reflects a common discourse from government and producers and can explain how respondents intended to buy organic produce but finally chose the Norwegian alternative, especially during the apple season. This leads to the third perspective. The findings might reflect an intention-behavior gap (Carrington et al., 2010, 2014) whereby a highly positive intention, in our case with respect to the purchase of organic apples does not necessary

Table 8
Results of hypotheses.

	Path	Germany (N = 404)		Norway (N = 407)		UK (N = 401)	
Hypotheses		β	Results	β	Results	β	Results
H1	**BI → Choice**	0.405***	✓	0.168**	✓	0.391***	✓
H2	**ATT → BI**	0.349***	✓	0.422***	✓	0.323***	✓
H3	**SN → BI**	0.203***	✓	0.399***	✓	0.479***	✓
H4	**PBC → BI**	0.322***	✓	0.116***	✓	0.224***	✓
H5	**Trust → ATT**	0.240***	✓	0.175***	✓	0.174**	✓
H6	**PMN → ATT**	0.637***	✓	0.617***	✓	0.723***	✓
H7	**PMN → BI**	0.197**	✓	0.198***	✓	0.029	X
H8	**DOATT→ Choice**	0.120*	✓	0.179***	✓	0.128***	✓

*,**,***; $p < 0.05, 0.01, 0.001$.

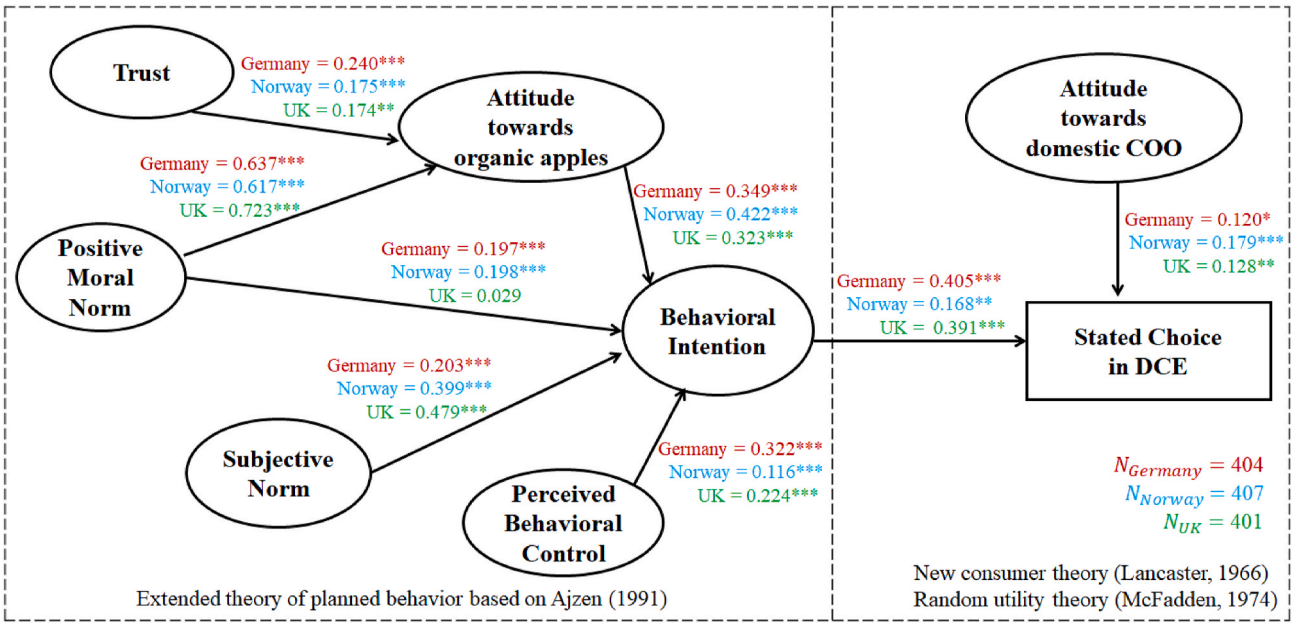

Fig. 3. Results from the cross-country ICLV Model.

lead to the purchase of organic apples. Prior research on organic food choice confirms that while behavioral intentions are a significant determinant of behavior, an intention-behavior gap exists (Scalco et al., 2017; Vittersø & Tangeland, 2015). This intention–behavior gap has been widely studied for other forms of sustainable consumption (Carrington et al., 2010; Chen & Hung, 2016) and findings reveal that a range of factors e.g. a lack of information/knowledge or trustworthiness regarding the label and what it stands for, social desirability bias, ability related factors such as financial resources as well as market related factors such as the attractiveness of available alternatives might lead to this gap (e.g. Meyer-Höfer, Olea-Jaik, Antonio Padilla-Bravo, & Spiller, 2015; Nuttavuthisit & Thøgersen, 2017). While in our experiment some of those factors were controlled for (e.g. label trust) others remain relevant. Specifically, differences between intention and behavior detected in our study can partly be explained by trade-offs with other desirable food attributes (such as low price) which are relevant to the purchase decision but are not so explicit for respondents when stating their intention. Thus, if consumers care (more) about domestic origin and have limited financial resources they might choose a domestically produced conventional apple that is considerably cheaper compared to a domestically produced organic apple (Siamagka & Balabanis, 2015).

4. Conclusions

This paper examines the relative importance of organic labelling in consumers' purchase decisions for apples and the extent to which attitudes, subjective norms, perceived behavioral control, trust, and personal moral norms influence such choice. An ICLV model was applied with survey data across three European countries (Germany, Norway and the UK).

The empirical results indicate that price is by far the most important factor driving consumers' purchase decision of apples in all countries. Country of origin takes second place while the organic attribute appears relatively less important. Interestingly, it is not the organic production method that matters for consumers, but rather the specific organic label. Especially in Germany and Norway, consumers reveal a strong preference for products displaying their national organic label. This holds despite the fact that the standards behind the respective national and the EU organic labels are the same. These results may reflect the much higher recognition and positive evaluation that national organic labels receive compared to the EU 'green leaf' organic label in Germany and Norway (Hartmann et al., 2019). While the EU is seeking to promote consumer demand for organic products as part of its Farm to Fork strategy, the organic food industry may in fact benefit from campaigns promoting respective national organic labels, which may be more effective than for the wider EU 'green leaf' label.

There is considerable consistency across the three countries regarding the importance of the behavioral constructs - attitudes, subjective norms, perceived behavioral control, trust, and personal moral norms - in determining consumers' intention to buy and their stated choice for organic apples, thereby confirming the robustness and applicability of the theoretical framework. For organic food industry practitioners and policy makers seeking to increase consumer demand, the results suggest three main recommendations. Firstly, as trust is a significant determinant of attitude, but overall consumers' level of trust in organic labels remains modest, greater attention should be given to strategies to augment trust. This may involve campaigns to promote consumer understanding of third-party auditing and the use of reassuring and credible endorsements (Darnall, Ji, & Vazquez-Brust, 2018). Secondly, while some question the importance of subjective norms within the TPB framework (Conner & Armitage, 2002), we find them to be a significant determinant of behavioral intentions across all three countries. This suggests that social norm-based messaging may be effective in stimulating demand for organic food. The latter would be consistent with field experiments regarding the effectiveness of social norm-based appeals for stimulating pro-environmental behavior (Goldstein, Cialdini, & Griskevicius, 2008). Thirdly, given the direct effect of personal moral norms on behavior intentions in two countries, and confirmation of a significant indirect effect via attitudes in all cases, improving consumer understanding as to how a transition to organic food systems can lead to environmental and social benefits (Arfini et al., 2019) appears appropriate. As long as consumer understanding of the economic, environmental and social benefits that stem from different types of food product systems and certifying labels remains weak and confused (Hartmann et al., 2019), beliefs that organic food contributes to something better are likely to remain modest.

While our model is verified empirically, the present study is subject to limitations, which can inform future research. First, a potential drawback of this research is the hypothetical nature of the choice. Though we utilized a cheap talk script to reduce this problem (Carlsson,

Frykblom, & Lagerkvist, 2005) we recognize that this does not completely eliminate the problem (Cummings & Taylor, 1999). Combining the research approach taken here with a field experiment would enhance the external validity of the modelling. Second, a further extension of the ICLV Model framework might be desirable; particularly concerning respondents' knowledge with respect to the standards underpinning labels. Given that European consumers overall exhibit a poor understanding of the meaning of certification labels and the differences between them (Hartmann et al., 2019), further research could consider the effect of improvements in knowledge and how it is communicated on consumer demand. Third, we focus on three countries and one product, apples. Although we expect that the model is valid for other European countries, given the high level of consistency of our results across the countries researched, further empirical investigation could reassure that the model is appropriate for other socio-economic contexts and similar products.

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Author contributions

CY conducted the statistical analysis and was supported by MH and MG. CY and MH took the lead with respect to study conceptualization and data collection. CY and MH, in addition, contributed to writing, and editing of the manuscript. MG and BT contributed to the study conceptualization, data collection, writing, and editing of the manuscript. VA and KKS contributed to data collection and editing of the manuscript. All authors have approved the final manuscript.

Ethical statement

The research undertaken in this paper received ethical approval by Newcastle University (Ref: P16798).

Declaration of competing interest

The authors declare no conflict of interest.

Appendix 1. Coding of the DCE as applied to the ICLV (Example German DCE design)

Attributes and attribute levels	Effect coding	
Label for production method:		
None	−1	−1
EU organic	1	0
4. German Bio and EU organic label	0	1
Country-of-origin label:		
New Zealand	−1	−1
Italy	1	0
Germany	0	1
Price (€/kg): 1.99€/2.79€/3.59€/4.39€	**Continuous variable**	

Appendix 2. Descriptive statistics for the behavioral construct items for Germany, Norway and the UK

		Germany (N = 404)				Norway (N = 407)				UK (N = 401)			
		M	SD	Sk	Kt	M	SD	Sk	Kt	M	SD	Sk	Kt
ATT	ATT1	5.50	1.33	−1.17	1.80	4.96	1.47	−0.78	0.49	5.23	1.35	−0.82	0.91
	ATT2	5.24	1.51	−0.95	0.74	4.80	1.45	−0.70	0.40	5.22	1.45	−0.91	0.75
	ATT3	5.52	1.54	−1.17	1.00	4.83	1.60	−0.62	−0.15	5.40	1.39	−0.94	0.98
	ATT4	5.26	1.54	−1.06	0.74	4.66	1.75	−0.61	−0.42	4.90	1.67	−0.69	−0.22
	ATT5	5.54	1.35	−1.13	1.55	4.80	1.57	−0.67	0.03	5.32	1.28	−0.67	0.55
	ATT6	5.28	1.57	−0.97	0.48	4.41	1.74	−0.42	−0.65	4.80	1.73	−0.61	−0.33
SN	SN1	3.60	1.78	−0.06	−0.88	3.06	1.73	0.34	−0.76	3.61	1.87	−0.02	−1.10
	SN2	3.24	1.76	0.11	−1.03	2.66	1.69	0.66	−0.54	3.22	1.88	0.29	−1.07
	SN3	3.61	1.69	−0.14	−0.82	3.20	1.56	0.15	−0.56	3.46	1.77	0.04	−0.96
PBC	PBC1	5.84	1.35	−1.19	1.15	5.92	1.44	−1.39	1.49	5.73	1.35	−1.06	1.06
	PBC2	4.82	1.57	−0.64	0.05	4.66	1.65	−0.33	−0.42	4.34	1.60	−0.41	−0.39
	PBC3	4.75	1.59	−0.58	−0.05	4.45	1.63	−0.20	−0.45	4.28	1.60	−0.40	−0.35
BI	BI1	4.48	1.68	−0.47	−0.42	3.54	1.86	0.09	−1.04	3.80	1.86	−0.08	−1.04
	BI2	4.52	1.68	−0.45	−0.36	3.33	1.81	0.21	−0.92	3.92	1.83	−0.22	−1.01
	BI3	4.37	1.35	−0.27	0.29	3.73	1.37	−0.08	−0.11	3.88	1.55	−0.15	−0.52
Trust	T1	4.86	1.46	−0.79	0.70	4.56	1.31	−0.33	0.69	4.84	1.38	−0.53	0.53
	T2	4.76	1.59	−0.82	0.41	4.62	1.36	−0.39	0.34	4.72	1.44	−0.41	0.10
	T3	4.33	1.64	−0.47	−0.34	4.24	1.48	−0.37	−0.04	4.42	1.57	−0.37	−0.14
PMN	PMN1	4.75	1.69	−0.74	0.05	4.01	1.82	−0.33	−0.83	4.43	1.67	−0.53	−0.28
	PMN2	4.75	1.70	−0.69	−0.02	3.90	1.82	−0.21	−0.81	4.42	1.69	−0.52	−0.35
	PMN3	4.14	1.81	−0.31	−0.73	3.57	1.79	−0.02	−0.88	4.19	1.73	−0.43	−0.53
DOATT	DOATT1	5.89	1.18	−1.27	2.02	5.63	1.28	−1.06	1.32	5.84	1.07	−0.57	−0.36
	DOATT2	5.64	1.26	−1.01	1.41	5.43	1.37	−0.85	0.54	5.81	1.13	−0.71	0.10
	DOATT3	5.82	1.31	−1.38	2.24	5.45	1.45	−1.01	0.79	5.81	1.19	−1.0	1.25
	DOATT4	5.88	1.26	−1.48	2.94	5.65	1.32	−1.04	1.13	5.68	1.22	−0.85	0.61
	DOATT5	5.91	1.28	−1.53	2.85	5.48	1.51	−1.07	0.78	5.77	1.25	−1.17	1.80
	DOATT6	5.89	1.35	−1.53	2.61	5.46	1.55	−0.97	0.34	5.64	1.29	−0.85	0.37

Notes: ATT: Attitude; SN: Subjective Norms; PBC: Perceived Behavioral Control; BI: Behavioral Intention; T: Trust; PMN: Perceived Moral Norm; DOATT: Domestic Country-of-Origin Attitude; M: Mean; SD: Standard deviation; Sk: Skewness; Kt: Kurtosis; α: Cronbach's alpha.

Appendix 3. Standardized factor loadings for all behavioral construct items for Germany, Norway and the UK

		Germany (N = 404)	Norway (N = 407)	UK (N = 401)
ATT	ATT1	0.74***	0.81***	0.79***
	ATT2	0.64***	0.77***	0.74***
	ATT3	0.63***	0.68***	0.74***
	ATT4	0.90***	0.91***	0.90***
	ATT5	0.76***	0.61***	0.79***
	ATT6	0.91***	0.85***	0.92***
SN	SN1	0.88***	0.86***	0.91***
	SN2	0.84***	0.88***	0.90***
	SN3	0.78***	0.79***	0.86***
PBC [a]	PBC2	0.88***	1.02***[b]	0.88***
	PBC3	0.84***	0.55***	0.81***
BI	BI1	0.96***	0.92***	0.94***
	BI2	0.92***	0.91***	0.93***
	BI3	0.88***	0.87***	0.91***
Trust	T1	0.91***	0.90***	0.92***
	T2	0.94***	0.92***	0.93***
	T3	0.94***	0.90***	0.95***
PMN	PMN1	0.94***	0.92***	0.95***
	PMN2	0.94***	0.93***	0.94***
	PMN3	0.81***	0.89***	0.94***
DOATT	DOATT1	0.85***	0.88***	0.86***
	DOATT2	0.76***	0.87***	0.87***
	DOATT3	0.85***	0.81***	0.85***
	DOATT4	0.79***	0.80***	0.85***
	DOATT5	0.84***	0.73***	0.76***
	DOATT6	0.84***	0.79***	0.83***

***$p < 0.001$.

[a] We omit the first PBC item (PBC1) in the subsequent ICLV modelling due to its low factor loadings which deviate considerably from the threshold value of 0.7 in all three countries.

[b] Standardized factor loadings can be greater than 1 with correlated factors.

Appendix 4. DCE model specification

In the present study, the DCE choice data is analysed within a random utility framework (Ben-Akiva, Lerman, & Lerman, 1985; McFadden, 1974) which assumes that a consumer's preference for apples is a function of the utility or value of that apple's attributes plus a stochastic error term and allows the analysis of the stated choice under utility maximization. Accordingly, the utility U an individual i derives from choosing alternative j in the choice set t is the sum of a systematic observed component ($\beta_i x_{ijt}$) and a random error term (ε_{ijt}):

$$U_{ijt} = \beta_i x_{ijt} + \varepsilon_{ijt} \tag{1}$$

where U_{ijt} is the utility that individual i obtains from alternative j at the choice scenario t; β_i is a vector of parameters of variables for individual i representing his/her preferences; x_{ijt} is a vector of observed attributes, and ε_{ijt} is the stochastic error term. The traditional analytic procedure for modelling choice data is to pool data from respondents' responses and estimate an aggregated logit model. However, it is essential to consider individual preference heterogeneities in the modelling process if respondents have heterogeneous preferences and differ in error variances (Train, 2009). This can be assumed for the case of food consumption. In the present study, we therefore estimated mixed logit models applying hierarchical Bayesian estimation on the choice data. The idea of the hierarchical Bayesian method is that the aggregate sample of respondents is used to determine the distribution of part-worth utilities, thus borrowing information from the overall sample to compute the part-worth utility estimates of each attribute level for individual respondents as well as the relative importance of each attribute at the individual level (Orme. 2013). This econometric approach is appropriate when there is heterogeneity in preferences (Orme, 2013; Train, 2009).

The hierarchical Bayesian mixed logit model involves a two-stage iterative procedure applying a Metropolis Hastings algorithm to estimate the utility at the attribute levels (Rossi & Allenby, 2003; Rossi, Allenby, & McCulloch, 2012). In the first hierarchical stage, the individual-level parameters are estimated via a multivariate normal distribution characterized by a vector of mean values and a matrix of covariances. In the second stage, given an individual-level parameter, respondents' likelihood of selecting specific apples in a choice scenario can be further estimated by an aggregated logit model which can be described as follows:

$$P_{ijt} = \frac{\exp(x'_{ijt}\beta_i)}{\sum_j \exp(x'_{ijt}\beta_i)} \tag{2}$$

where P_{ijt} indicates the probability that an individual i chooses the jth alternative in a given choice scenario t (Hauber et al., 2016). The process of estimating individual utilities is described in detail in Allenby and Ginter (1995) and Allenby, Brazell, Howell, and Rossi (2014; 2019). This modelling approach was motivated by the fact that compared to classical maximum likelihood mixed logit models, the hierarchical Bayesian mixed logit approach is known for its higher accuracy when heterogeneity in preferences exists in the investigated population (Allenby, Brazell, Howell, & Rossi, 2014).

Appendix 5. Bayesian estimation of the mixed logit models for Germany, Norway and UK (with linear estimation of the price attribute)

Country	Germany		Norway		UK
N	404		407		401
	Avg. Utilities[a] (S.D.)		**Avg. Utilities[a] (S.D.)**		**Avg. Utilities[a] (S.D.)**
Production Method					
No label	−14.97 (21.39)	No label	−7.84 (13.23)	No label	−5.27 (27.46)
EU organic	0.87 (14.29)	EU organic	−1.19 (9.24)	EU organic	0.80 (19.18)
German BIO	14.10 (19.75)	Norwegian organic	9.03 (15.70)	UK organic	4.47 (19.97)
Country-of-Origin					
New Zealand	−35.17 (24.91)	Chile	−34.84 (23.64)	New Zealand	−17.37 (19.41)
Italy	−18.30 (22.62)	Italy	−15.60 (18.97)	France	−16.29 (23.19)
Germany	53.47 (38.71)	Norway	50.44 (35.18)	UK	33.66 (33.20)
Price	−48.67 (28.14)		−60.15 (22.47)		−62.09 (30.17)
Opt-out	−46.60 (169.02)		−58.57 (171.04)		−83.98 (216.24)

Notes: a) The average utilities reported are zero-centered.

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