

**Marketing the sustainable -  
Fostering behavioral intentions through information  
transparency**

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*Für meine Eltern.*

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# Table of contents

<b>List of figures .....</b>	<b>IV</b>
<b>List of tables.....</b>	<b>V</b>
<b>List of abbreviations .....</b>	<b>VI</b>
<b>1 General introduction .....</b>	<b>1</b>
1.1 Relevance.....	1
1.2 Literature review and research gap.....	4
1.2.1 Forms of information disclosure .....	4
1.2.2 The ambiguity of local food production and marketing.....	8
1.3 Research outline.....	11
1.4 Abstracts .....	19
1.4.1 Article 1 .....	19
1.4.2 Article 2 .....	20
1.4.3 Article 3 .....	20
<b>2 Selecting decision-relevant ethical product attributes for grocery shopping (Article 1) .....</b>	<b>23</b>
2.1 Introduction.....	24
2.2 Conceptual development .....	26
2.2.1 The roots of ethical consumption .....	26
2.2.2 Provision of ethical product information.....	27
2.2.3 Relevance of ethical product information for purchase decisions.....	29
2.3 Methodology and measurement.....	30
2.3.1 Data collection and sample.....	30
2.3.2 Choice-based conjoint analysis .....	31
2.3.3 Choosing relevant product attributes.....	32
2.3.4 Conception of the experimental design .....	35

2.4 Empirical results .....	35
2.4.1 Attribute importance.....	35
2.4.2 Consumer segments and their information preferences .....	38
2.5 Discussion.....	41
2.5.1 Policy implications .....	43
2.5.2 Managerial implications .....	44
2.5.3 Limitations and future research .....	45
<b>3 Is it just the distance? Consumer preference for geographical and social proximity of food production (Article 2).....</b>	<b>47</b>
3.1 Introduction.....	48
3.2 Methods .....	50
3.2.1 Specification of relevant product attributes.....	51
3.2.2 CBC experiment .....	53
3.2.3 Behavioral and attitudinal characteristics.....	55
3.2.4 Sample .....	57
3.3 Results.....	60
3.3.1 Utility parameters from CBC experiment .....	60
3.3.2 Behavioral and attitudinal characteristics as drivers of utility .....	62
3.4 Discussion.....	64
3.5 Conclusion .....	67
3.5.1 Theoretical implications .....	67
3.5.2 Managerial implications .....	68
3.5.3 Limitations and avenues for future research.....	69
<b>4 Scan me, if you can – Fostering behavioral intentions toward local food with digitally provided product information (Article 3).....</b>	<b>71</b>
4.1 Introduction.....	72
4.2 Conceptual background .....	75

4.2.1	The dilemma of information asymmetry .....	75
4.2.2	Consumers information processing .....	77
4.2.3	The concept of perceived information quality.....	78
4.2.4	The impact of information types .....	80
4.2.5	The moderating role of product types .....	81
4.2.6	Fostering behavioral intentions .....	82
4.3	Overview of studies .....	83
4.4	Study 1 .....	84
4.4.1	Methods .....	84
4.4.2	Results .....	85
4.4.3	Discussion.....	87
4.5	Study 2.....	90
4.5.1	Methods .....	90
4.5.2	Results .....	91
4.5.3	Discussion.....	93
4.6	Conclusion .....	93
4.6.1	Theoretical contribution .....	94
4.6.2	Managerial implications .....	96
4.6.3	Limitations and avenues for future research.....	98
<b>5</b>	<b>Overall discussion .....</b>	<b>101</b>
5.1	Theoretical implications .....	102
5.2	Managerial implications .....	104
	<b>Appendix .....</b>	<b>109</b>
	<b>References .....</b>	<b>115</b>
	<b>Eidesstattliche Erklärung .....</b>	<b>131</b>

## List of figures

Figure 1. Dissertation framework.....	12
Figure 2. Article 1. Identified segments with attribute importances. ....	39
Figure 3. Article 2. Subjective maximum distance to justify 100% Local.....	59
Figure 4. Article 3. Conceptual framework.....	83
Figure 5. Article 3. Spotlight analysis - Study 1. ....	89
Figure 6: Article 3. Mean values of PIQ and its dimensions.....	92

## List of tables

Table 1. Overview of the articles.....	17
Table 2. Data, sample, and methodology of the articles.....	18
Table 3. Article 1. Attributes and levels of the CBCA.....	34
Table 4. Article 1. Evaluation of logit estimation. ....	35
Table 5. Article 1. Relative attribute importances.....	36
Table 6. Article 1. Rescaled part worth utilities for ordinary consumers.....	37
Table 7. Article 1. Results of latent class estimation.....	38
Table 8. Article 1. Identified consumer segments. ....	40
Table 9. Article 2. Description of attributes used in CBC experiment.....	52
Table 10. Article 2. Summary of items for personal and social norms. ....	56
Table 11. Article 2. Summary statistics.....	58
Table 12. Article 2. Utility parameters and WTP.....	60
Table 13. Article 2. Correlation matrix of individual-level utility parameters.....	61
Table 14. Article 2. Behavioral and attitudinal drivers of preference heterogeneity. ....	63
Table 15. Article 3: Summary of moderated mediation analyses (Studies 1 and 2). ....	88

## List of abbreviations

ANOVA	Analysis of variance
AvgMaxMP	Average maximum membership probability
CAIC	Consistent Akaike information criterion
CBC	Choice-based conjoint
CBCA	Choice-based conjoint analysis
CI	Confidence interval
COO	Country of origin
Cov.	Covariate
HB	Hierarchical Bayesian
HSM	Heuristic-systematic model
LC	Latent class
MCMC	Markov chain Monte Carlo
MNL	Multinomial logit
NAM	Norm activation model
PIQ	Perceived information quality
QR	Quick response
SD	Standard deviation
VBN	Value-Belief-Norm
WTP	Willingness to pay

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*Local and regional food systems are about opportunity.*

— Tom Vilsack (United States Secretary of Agriculture)

# **1 General introduction**

## **1.1 Relevance**

The benefits supposedly provided by industrialized and globalized agriculture initially caused a shift in consumers' food consumption patterns from sustainable towards non-seasonal and non-local products due to their convenience and accessible variety. However, the globalized agricultural industry barely considers the challenges our modern society is facing today such as climate change and the increased demand for natural resources (Cho, 2015; Shaw et al., 2016). According to the German Federal Environment Agency (2021), food accounts for 15-20% of per capita carbon emissions, not to mention the consequences of food production on the environment, as in over-fertilization, the use of monocultures, deforestation, insect extinction due to the excessive use of pesticide, etc. Against this background, it appears as a societal imperative to vigorously adopt new dietary habits to mitigate the negative effects of an industrialized and globalized agriculture on the environment (Weber, 2021; Lazzarini et al., 2018; Shi et al., 2018).

Increasingly, a wealth of consumers become aware of how to leverage their influence through their purchase decision to realize a more sustainable future, especially in food retailing (e.g., Gielens et al., 2021; Hasanzade et al., 2018; Vadakkepatt et al., 2021). If asked, consumers mostly enunciate to opt for organic and/or local products to counteract the downsides of industrialized and globalized food production practices. Their intentions are further intensified by governmental actions as well as NGOs' efforts to encourage consumers to act more sustainably, e.g. switching to more resilient food production methods. Retailers are responding to this growing demand by offering more organic, fair trade and/or local foodstuff. However, in view of their function as a

distributor retailers are not seen as conducive to the concept of sustainability in the first place, in contrast to farmers' markets or direct-farmer shops (Cranfield et al., 2012; Bianchi and Mortimer, 2015). In most cases, their intention is more likely to be based on capturing a greater share of consumers' food budgets (Darby et al., 2008) and on positioning themselves as a responsible marketer in a competitive marketplace, e.g. being regarded as supportive to the local economy (Lombart et al., 2018; Puncheva-Michelotti et al., 2018). To proactively market their new green assortment successfully, retailers also introduce more and more sustainability labels and sustainability related product information to consumers (Vadakkepatt et al., 2021). However, the alleged positive effects of labels are controversial in the current research literature, as most research questions their impact in empowering consumer to make well informed decisions (Grunert et al., 2014; Ikonen et al., 2020; Lazzarini et al., 2018; Song et al., 2019; Vadakkepatt et al., 2021). Consequently, research is unanimous that such well-intentioned efforts lead to an allocation of asymmetric information, as it is often unclear to consumers what labels stand for and who is responsible for certifying them. The introduction of more and more labels, therefore, hampers the adoption of new ones, amplifying the problem of information overload (Thøgersen, 2010) on the one side and adding to the prevailing confusion that already exists among consumers on the other. The difficulties in disclosing decision-relevant product information ultimately leads to a market failure (Testa et al., 2015; Verbeke, 2005), affecting both the consumers' efforts to consume more sustainable products and the short- and long-term economic benefits of retailers (e.g., by missing out consumer's higher willingness to pay for sustainable products). Either way, it leads to a low market share of sustainable products overall, which we as a society cannot afford to continue.

This asymmetrical information allocation is especially prominent in the market of credence goods (Frank and Brock, 2018), deteriorating the gap between consumer

intentions and consumer behavior (Rouseau and Vranken, 2013; Testa et al., 2015; Vlaeminck et al., 2014). Particularly affected by this are environmental and social product attributes (Brach et al., 2018; Hasanzade et al., 2018; Osburg et al., 2020), because consumers cannot verify these attributes before or after purchase (Darby and Karni, 1973). Meanwhile, the insufficient transparency in communicating relevant sustainable product information appears as a prevailing barrier when it comes to effectively promoting such food products (Chekima et al., 2016, Verbeke, 2008), reinforcing the information asymmetries already prevalent in food retailing. Therefore, understanding what information about products' credence attributes drives choice and how to provide them appropriately may reduce the market failure resulting from asymmetrical information (Verbeke, 2005; Osburg et al., 2020).

Without doubt, sustainable products inherently increase the complexity of decision making (Brach et al., 2018). It requires that consumers are able to easily identify sustainable product alternatives. Thus, having access to decision-relevant product information at the point of sale is essential to abet the choice for sustainable products (Frank and Brock, 2018; Roggeveen and Sethuraman, 2020). Previous research has shown that providing elaborate product information can mitigate purchase barriers for sustainable products (Cho, 2015; Gleim et al., 2013; Osburg et al., 2017). Elaborate product information can shape consumers' attitudes and empower them to make well informed choices (Cerri et al., 2018; Testa et al., 2015; Verbeke, 2008). It can also be an essential tool to effectively educate consumers about the consequences of their food choices (e.g., Ariely, 2000; White et al., 2019).

Accordingly, it could be assumed that elaborate information could empower consumers to make well informed choices. However, consumers effectively receive only a small subset of relevant information which they perceive merit for consideration (McGuire, 1976). Contrary to the plethora of previous opinions (e.g., Auger et al., 2008;

Cho 2015; Cho et al., 2018; De Pelsmacker and Janssens, 2007; Olsen et al., 2014), decision effectiveness is not influenced by the quantity of information but by their quality (Branco et al., 2016; Keller and Staelin, 1987; Salaün and Flores, 2001; Osburg et al., 2017; Pearson et al., 2012). In fact, an excessive number of sustainability-related product information may lead to information overload (e.g., Verbeke, 2005; Tanner et al., 2019) and consumers might end up not choosing the product (Branco et al., 2016; Testa et al., 2015). Moreover, one can not assume homogeneous information preferences, as each individual will be driven by different motives to search for and consume sustainable products (e.g., Aertens et al., 2009; Shaw et al., 2016; Steg et al., 2005; Stern, 2000). Consequently, it is advisable that information is carefully chosen and communicated depending on the target group of interest (e.g., Salaün and Flores, 2001). Otherwise, there is a risk of unnecessarily slowing down the transformation towards a sustainable diet, not to mention the negative consequences for retailers if insufficient information is provided that does not meet the needs of consumers for more transparency (see, e.g., Vadakkepatt et al., 2021). It is therefore crucial to address the question of *what* information consumers require with regard to sustainable products and *how* the information can be communicated effectively. This approach helps to both enlighten consumers about the benefits of sustainable products and to support them in their decision-making process.

## **1.2 Literature review and research gap**

The following distinguishes different forms of information disclosure techniques and then briefly discusses research literature concerning local food. By doing so, the research gap becomes evident that sets stage for the articles of this dissertation.

### **1.2.1 Forms of information disclosure**

So far, labels have been predominantly used to communicate sustainability related product information to consumers in an aggregated way (e.g. Testa et al., 2015; Vecchio

and Annunziata, 2015). They are usually a promising instrument to decrease search costs of consumers during the purchase phase by transforming credence attributes into search attributes (Caswell and Mojduszka, 1996; Messer et al., 2017). Accordingly, there is considerable research that has been devoted to understand the role of labels in facilitating consumers' sustainable food choices (e.g., Brach et al., 2018; Cerri et al., 2018; Meyerding et al., 2019; Testa et al., 2015; Vlaemink et al., 2014). Much of this research assumes a positive impact of labeling strategies on consumers' behavioral intentions. However, for consumers "labels require extensive searches prior to their use for heuristic purposes" (Papaoikonomou et al., 2018, p. 657). Moreover, product labeling increasingly becomes a pawn of political disagreement (Rousseau and Vranken, 2013), especially when meaningful pre-legislative measures are severely undermined by lobbying and become recommended, yet voluntary. This creates a situation where many stakeholders seek to promote their products as being sustainable, more sustainable, or better. Hence, third-party labeling organizations, independent cooperatives, retailers, and manufacturers alike introduce more and more sustainability labels and sustainability related product claims to consumers (e.g., Vadakkepatt et al., 2021), hoping to facilitate consumers' sustainable food choices and gain competitive advantage in the marketplace. Some of these labels might be informative, others might be redundant or even contradict themselves (Janssen and Langen, 2017). All of them, though, accelerate the amount of information cues available for consumers and lead to misperceptions, scepticism, confusion and information overload (Grunert et al., 2014; Ikonen et al., 2020; Lazzarini et al., 2018; Song et al., 2019; Vadakkepatt et al., 2021). Ultimately, they all risk that consumers opt against buying the marketed product (Branco et al., 2016) and are left insecure about the use of such cues in the future. This approach, therefore, becomes tantamount to squaring the circle and conversely leads to unsound or even wrong purchasing decisions.

Understanding and addressing consumers' (mis-)conceptions and finding ways to encourage their choice for environmentally and social friendly food could be a more effective approach (Lazzarini et al., 2018). In this regard, providing relevant product information is seen as a means to mitigate the prevalent market failure resulting from asymmetrical information (Hasanzade et al., 2018; Osburg et al., 2020; Verbeke, 2005). Especially when purchasing food products, which hold multi-layered and diverse sustainable product attributes, detailed information provision is instrumental in inducing attitude formation and decision making (De Pelsmacker and Janssens, 2007; Fernqvist and Ekelund, 2014). Consequently, research has shown that detailed product information can positively influence brand evaluation (Mohrenfels and Klapper, 2012), foster behavioral intentions when provided verbally (Gleim et al., 2013; Frank and Brock, 2018) and effectively educate consumers about the consequences of their food choice (Ariely, 2000; White et al., 2019). Moreover, detailed product information does not require prior search for the meaning of a given label, expediting their use more likely in the purchase phase. Despite the aforementioned advantages, however, detailed product information is particularly prone to the risk of information overload. Therefore, it is vital to select decision-relevant product attributes and channel them appropriately to facilitate the positive effects of detailed product information on consumer choice (Atkinson and Rosenthal, 2014; Salaün and Flores, 2001; Verbeke, 2008). How important transparency in production and marketing can be is impressively demonstrated by the German dairy brand "Du bist der Chef" (You are the boss). The brand sees itself as an alternative to conventional dairy brands and launched its first dairy product in major food retailing outlets in Germany in 2020 (Rewe Group, 2020). Beforehand, consumers could participate in choosing sustainable product attributes they expect from a sustainable dairy product. Interestingly, the results coincide with those of the Article 1 and highlight consumers' willingness to pay for sustainability-related product attributes. Driven by the

acceptance and success of the brand, the creators now want to expand their product assortment.

The high diffusion of smartphones and their ubiquitous presence in consumers' everyday lives has altered consumers' behavioral intentions (e.g., Ahmad and Zhang, 2020; Gielens et al., 2021; Kannan and Li, 2017; Roggeveen and Sethuraman, 2020). Retrieving information through smartphones (e.g., using QR codes or mobile applications) is particularly well suited to mitigate market failures and reduce information asymmetries between producers or retailers and consumers (Kannan and Li, 2017). As such, they change the way consumers gather information (e.g. Batra and Keller, 2016; Kannan and Li, 2017) and thus create tangible benefits for consumers by assisting their decision-making with relevant product information (Roggeveen and Sethuraman, 2020; Tanner et al., 2019). This becomes mainly relevant, if labels are vague or confusing to consumers (Li and Messer, 2019). Besides, conscious use of digital product information allows consumers to learn more about the product under consideration and eventually facilitates desired behavioral intentions as well as enhances positive retailer outcomes (Grewal et al., 2020). Compared to labels and detailed product information, providing digital product information is neither limited by the small packaging sizes (e.g., Li and Messer, 2019; Mohrenfels and Klapper, 2012), nor are they subject to issues of information overload (Messer et al., 2017) because each individual can independently decide whether to make use of such information. Moreover, investing effort to obtain relevant information is minimized and becomes location-independent (Atkinson, 2013; Papoikonomou et al., 2018). Despite of the promising effect of digital product information, their impact as an information retrieval technique is not yet fully understood (Tanner et al., 2019). In the light of rapidly changing retail environment driven by information technology, an in-depth appreciation on whether and how digitally provided

information are detrimental to choice is hence long overdue and constitutes a noteworthy venture.

### **1.2.2 The ambiguity of local food production and marketing**

Adding local products into the assortment represents an opportunity for food retailers to distinguish themselves from their competitors and retain loyal consumers (Lombart et al., 2018). Communicating the local aspects as a salient product feature is thus an essential prerequisite for retailers to benefit from marketing local products overall. Yet, it remains a challenge to communicate relevant local product attributes to consumers due to non-existent regulatory bodies in place (Feldmann and Hamm, 2015; Meyerding et al., 2019; Profeta and Hamm, 2019). This problem in turn results in different forms of presenting the local nature of products in practice, accelerating the aforementioned prevalent asymmetrical information allocation in food retailing.

Even the research literature struggles to provide a universally valid understanding of local foodstuffs. Overall, it is difficult to define and interpret local foodstuffs, as they can range from food miles to political boundaries (Bazzani et al., 2017). That is because definitions are mainly limited to an individual's own interpretation. Currently, local products are characterized by one of the three following criteria: (1) The geographical proximity, as in the distance declaration, is probably the widely accepted distinguishing characteristic of 'local' food (Feldmann and Hamm, 2015). Nonetheless, marketers and academia are divided over a consensus about the distance declarations. In terms of defining geographical proximity as a distance or radius options range from 30 km up to 2000 km (e.g., Byrd et al., 2018; De-Magistris and Gracia, 2016; Lim and Hu, 2016; Meyerding et al., 2019; Willis et al., 2016). The US Farm Act defines 400 miles or less as a distance for locally produced food. Yet, it still leaves room for interpretation as products are eligible for marketing as "locally produced" when goods are sold in the same state in which they are produced. That means that products can still travel up to 1200 km

(e.g. in California or Montana) and still be marketed as “locally grown”. In contrast, results of Lim and Hu (2016) reveal that Canadian consumers significantly prefer “products of province” over generally labelled “local” products, although the authors also include a ‘local’ claim as well as a distance declaration of “from within 160 vs. 320 km” in their study design. In the German context, some retailers see “local” as the sales area of the respective local company, sometimes including several federal states. A German discounter even sells locally claimed products national wide (NABU, 2016) without specifying the actual origin more pertinently. Recent empirical evidence from Germany shows that a generic "local" label has the greatest impact in driving consumer’s choice for local food. In this context, the authors also postulate that consumers view local products as those sold in the same state as it grows (Meyerding et al., 2019). Yet, there seems to be no significant differences in those claims compared to the simple distance declarations also included in their choice experiment, e.g. from within 30 km, respectively 50 km. A recent meta-analysis also postulates that the perception of ‘localness’ mostly depends on the country where the consumer lives, e.g. perceptions of US consumers with regard to ‘local’ claims will differ from those living in smaller countries in Europe, as in Germany due to the different sizes of countries (Printezis et al., 2019). (2) This leads to the second definition of local food that confines to political or administrative boundaries, as in states or protected origin information (Bazzani et al., 2017; Fernández-Ferrín et al., 2018; Sama et al., 2018). The majority of research using this second criteria of localness relinquishes the interpretation of “local” to the consumers without considering distance proximity claims (e.g., Meyerding, 2016; Profeta and Hamm, 2019; Sama et al., 2018; Telligman et al., 2017). So far, research results highlight that the boundaries between simple “local” claim and accurate distance declarations are becoming increasingly blurred. (3) Previous research, however, has identified social proximity as an additional driver of perception and choice for local foodstuffs (e.g. Denver et al., 2019; Fernández-

Ferrín et al., 2018; Jensen et al., 2019). Social proximity can be defined as the distance in the relationship among producers and consumers within the food-supply chain (Eriksen, 2013). Hu et al. (2012) as well as Jensen et al. (2019), for example, identify small firms as being a defining factor for local products, which is assumed to relate to the perceived closeness between the producing farm and the consumers. Further studies also show that consumers associate small, mostly family run farms with locally produced products (Lang et al., 2014; Meas et al., 2015). There is also evidence that social proximity increases if there is an opportunity to visit the place of production (Peterson et al., 2015). Consumers might associate this option with the experience of seeing and purchasing products right at the producer (Jensen et al., 2019; Megicks et al., 2012). The opportunity to visit the place of production might also signal some sort of transparency for the consumer, even though third party labelling initiatives are missing in place (e.g., Telligman et al., 2017). Accordingly, research has suggested to take a multidimensional view of what local food might apply for the consumers (e.g., Fernández-Ferrín et al., 2018; Telligman et al., 2017).

Yet, the majority of studies has focused on a single aspect of local food consumption, mostly on origin or distance declarations, combined with other search and credence attributes (as in health claims, brands, etc.) (Byrd et al., 2018; Chekima et al., 2016; Denver and Jensen, 2014; Denver et al., 2019; Feldmann and Hamm, 2015; Meyerding, 2016; Meyerding et al., 2019; Profeta and Hamm, 2019). However, this makes it difficult to assess the relative importance of different information cues that fit the expectations of consumers about local claims and drive their choice behavior, especially in the case of a missing consumers' knowledge on their residential area. Not knowing what information to provide to consumers – despite their subjective differences of what locality should represent – entails many perils in terms of raising barriers for

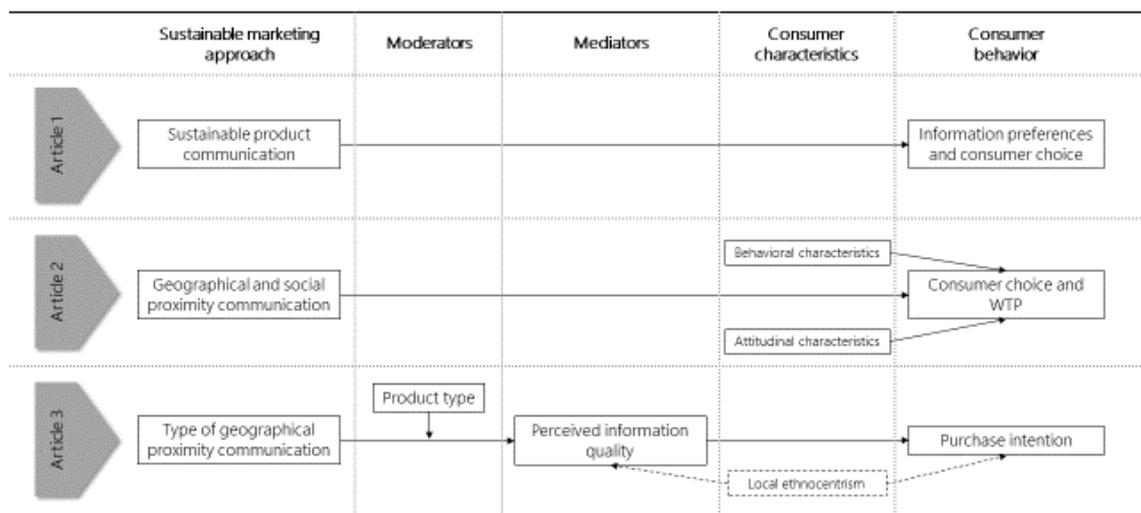
effectively promoting food that did not travel all over the world to be purchased in local supply structures (Chekima et al., 2016).

Established fair trade and organic labels usually must meet a certain level of minimum requirements. While these can serve as an orientation despite their inflationary use, especially for well-informed consumers, the situation is quite different for local foodstuff. Therefore, the author of this dissertation believes that there is a great need to incorporate the findings from individual studies to enhance our understanding of what local food might apply for the consumer, in order to gain actionable insights. In doing so, the results offer a number of contributions for theory and practice. It broadens our understanding of what drives choice, ultimately allowing a more precious marketing of local food products to support environmental-friendly food production and mindful consumption practices. It also entails economic benefits for retailers, as they are enabled to capture a larger share of consumers' willingness to pay.

### **1.3 Research outline**

This dissertation comprises three articles which respectively analyze the impact of a more elaborative information provision on consumers' behavioral intention. Each article relies on a diverse set of theoretical approaches to elaborate on the distinctive facet of each perspective on consumer choice. As a whole, this dissertation sheds light on *what* information consumers require in regards to making sustainable, especially local, food choices and *how* alternative ways of providing product-related information can counteract the negative effects of information asymmetry in retail environments. It also contributes to literature that calls for a deeper understanding of effective communication strategies to generate favorable responses regarding consumer's (sustainable) choice behavior (McFadden and Huffman, 2017; Vadakkepatt et al., 2021). Figure 1 illustrates the dissertation's framework.

Common to all three articles is the emphasis on packaged milk as a product category for several reasons. First, milk allows a valid implementation of all product attributes that this dissertation aims to investigate (local, organic, fair payment of farmers, etc.). Second, milk can be easily assessed as a product category by a large variety of consumers because it is available in all grocery stores throughout all seasons of the year. Moreover, the man-made cultural landscape in Germany allows the production of dairy products close to agglomerations. Third, fresh dairy products are perishable, thus, limiting their purchase mainly to the grocery stores where cold chains can better be maintained. Fourth, dairy products are among the most purchased products with respect to local food (German Federal Ministry of Food and Agriculture, 2021).



**Figure 1.** Dissertation framework.

In view of the information asymmetries that are present in (food) retail environments, *Article 1* aims to understand which (ethical) product information is actually decision-relevant for consumers. While the use of various labels has led to reports of consumer confusion about the meaning of a given label and its differentiation from alternative ones (e.g., Borin et al., 2011; Lazzarini et al., 2018; Song et al., 2019), recent research has suggested to provide consumers with more and detailed product information

at the point of sale to foster sustainable food choices (e.g., Cho, 2015; Frank and Brock, 2018; Gleim et al., 2013; Osburg et al., 2016). Providing detailed product information, however, also entails many perils in terms of information overload (Branco et al., 2016; Keller and Staelin, 1987; Verbeke, 2005). Thus, a selection of decision-relevant product information is of utmost importance for a targeted marketing of sustainable food. Assuming that values influence behavior across a range of situations (Stern, 2000), this article aims to identify consumers' preferences for sustainable product information items that address underlying motivators (i.e. concerns about the environment, animal welfare, other humans, or price). Accounting for differences in consumer preferences, this article also expects consumer segments that may diverge in terms of their preferences. It also contributes to literature by providing better insights on *what* information drives consumer choice, and more importantly, what consumers expect from a product being labelled sustainable and/or ethical.

Building on Article 1's evidence that consumer choice for sustainable food products is mainly driven by information regarding the local aspects of food, *Article 2* dives deeper into providing new insights on consumer preferences for the social as well the distance-based aspect of local food production. Surprisingly, the academic literature and practitioners alike have difficulties in using criteria to define and interpret local food products. These difficulties predominantly stem from a missing uniform definition of the concept of "local" (e.g., Feldman and Hamm, 2015; Meyerding et al., 2019; Profeta and Hamm, 2019), which in turn appears to be a prevailing barrier when it comes to effectively promoting local products (Chekima et al., 2016). So far, existing literature on preferences for local products has mainly focused on geographical proximity claims (such as distance or close-by regions) and how this information affects perception and choice (Bazzani et al., 2017; Byrd et al., 2018; De-Magistris and Gracia, 2016; Meyerding et al., 2019). Alongside geographical proximity, previous research also has identified aspects

of social proximity (e.g., information on producers) to drive attitudes for local food (Denver et al., 2019; Fernández-Ferrín et al., 2018; Jensen et al., 2019). However, a clear picture about the choice behavior and preference relationship of geographical and social proximity attributes (particularly when the distance declaration of locally produced food varies) is missing in current literature. As the Norm Activation Model (Schwartz, 1977) indicates, norms function as key predictors of individual behavior. This article assumes that preference heterogeneity for both proximities of local food production may be driven by norms. A jointly consideration of social and personal norms, together with consumption behaviors and sociodemographic variables (e.g., Thøgersen, 2006; Weinrich and Elshiewy, 2019) thus seems desirable, as it can shed light on whether and to what degree these variables can explain preference heterogeneity for geographical and social proximity of food production.

Results of Article 2 point out the dominant effect of geographical proximity compared to social proximity in driving consumer's preference and choice for local food. Therefore, *Article 3* investigates *how* the former claim may effectively be communicated to consumers to foster desirable behavioral intentions. In the case of local products, consumers often lack knowledge in evaluating the localness of the product marked as “local” in retail environments. In this case labels cannot be conducive to informing consumers about the true origin of products. Consistently, recent research has questioned the impact of (third-party) labels on consumer choice (Ikonen et al., 2020; Lazzarini et al., 2019; Song et al., 2019). Due to changes in information-gathering methods, mainly fueled by innovative technologies (Kannan and Li, 2017; Roggeveen and Sethuraman, 2020), this article endorses that digitally provided product information on products credence attributes can undeceive consumers to make better informed food choices. Drawing on the information-processing framework (McGuire, 1976) and the Heuristic-Systematic-Model (Chaiken, 1980), this article assumes that consumers perceive digitally

provided information, e.g. through mobile apps or (quick response) QR-codes, to be of higher quality than labels, which in turn fosters desired behavioral intentions towards local food consumption. Since the perception of local products seems to be strongly dependent on the product category (e.g., O'Rourke and Ringer, 2016; Printezis et al., 2019; Van Rijswijk and Frewer, 2012), it is crucial to ponder on the impact of situational and dispositive elements on the before mentioned relationships.

Overall, this dissertation underlines the profound importance of targeted information to induce consumers to act in a sustainably responsible manner. Drawing upon a diverse set of theoretical frameworks the results of this dissertation contribute to literature in several ways: *First*, it shows which sustainability related product information consumers value the most, also revealing their willingness to accept certain prices for decision-relevant product attributes. *Second*, it adds to a better understanding of what implies as "local" from the consumer's point of view, since previous research has largely emphasized on distance declarations only. Moreover, it sheds light on the drivers of preference heterogeneity for local food holding geographical and social proximity attributes. *Finally*, by considering more modern information retrieval techniques, this dissertation also adds to the body of knowledge on how digitally provided product information can mitigate information asymmetries in retail environments and foster desirable sustainable food choices. Table 1 recaps the research goal, the theories this dissertation draws and expands on, major findings and key contributions.

Table 2 offers an overview of the data, sample, research design, research context and the analytical approaches used throughout the articles. Each paper adopts a different methodological approach, thus, each one is facing different challenges. All articles use primary data that was gathered conducting online surveys. For Article 1, participants were recruited through social networks and flyers. In Article 2, participants from Germany were engaged via the commercial online platform Clickworker. Article 3 includes both

data from a field experiment as well as an online survey, whereby participants in the online survey were recruited via the commercial online platform Prolific. Article 1 and 2 both use a choice-based conjoint experiment to answer the research questions. Yet, they differ in their approaches. Estimations in Article 1 are based on latent class approach to map preferences by a limited number of completely homogeneous segments. Within the scope of Article 2, a between-subjects experiment (by varying the distance declaration of local food) is employed in combination with a choice-based conjoint analysis to understand preferences for geographical and social proximity of food production. Individual-level utility parameters are then estimated using a hierarchical Bayesian approach, allowing to reveal individual-level preference heterogeneity. A follow-up analysis enables to analyze behavioral and attitudinal drivers of the preference heterogeneity using linear regressions. Article 3 consists of a moderated mediation model to answer the relevant research questions. In two studies, participants are randomly assigned to one of six conditions as part of a 2x3 between-subjects design.

**Table 1.** Overview of the articles.

Article	Theories	Research goal	Key findings	Key contributions
<b>Article 1:</b> Selecting decision-relevant ethical product attributes for grocery shopping	Value-Belief-Norms (Stern, 2000): fundamental values (biospheric, altruistic, egoistic) influence ethical behavior across a range of situations.  Random Utility Theory (McFadden, 1973): Individuals will always choose the alternative that maximizes their utility.	<ul style="list-style-type: none"> <li>• Exploring consumers' preferences for food information items that address underlying motivators (i.e. environment, animal welfare, other humans, price) and drive choice behavior.</li> <li>• Identifying consumer segments that may diverge in terms of their preferences for ethical product information.</li> </ul>	<ul style="list-style-type: none"> <li>• Information about animal welfare, about labour and human rights along the supply chain and close by origin of products drive consumer choice.</li> <li>• Three consumer segments are identified (ethically motivated consumers, price-quality oriented consumers and price-oriented consumers), who differ regarding information preferences.</li> </ul>	<ul style="list-style-type: none"> <li>• Providing better insights of how to effectively support consumer choice for ethical products with decision-relevant product information.</li> <li>• Highlighting the need to carefully select ethical product information based on the target group of interest.</li> </ul>
<b>Article 2:</b> Is it just the distance? Consumer preference for geographical and social proximity of food production	Norm Activation Model (Schwartz, 1977): personal norms are key predictors of individual behavior.  Random Utility Theory (McFadden, 1973): Individuals will always choose the alternative that maximizes their utility.	<ul style="list-style-type: none"> <li>• Expanding our understanding of the importance of different facets of local food on consumer choice.</li> <li>• Revealing the effect of norms, behavioral and sociodemographic characteristics on preference heterogeneity.</li> </ul>	<ul style="list-style-type: none"> <li>• Social proximity attributes are also relevant determinants of choice. Yet, the effect of geographical proximity is more pronounced than of social proximity.</li> <li>• The level of impact of social proximity attributes depend on distance.</li> <li>• Personal norms, the preference for national brands and dense residential areas are drivers of preference heterogeneity.</li> </ul>	<ul style="list-style-type: none"> <li>• Providing a clear picture about the choice behavior for local food and preference relationship of geographical and social proximity attributes (particularly when the distance declaration of locally produced food varies).</li> <li>• Deriving precise measures for the targeted marketing of local foodstuff considering important drivers of preference heterogeneity.</li> </ul>
<b>Article 3:</b> Scan me, if you can – Fostering behavioral intentions toward local food with digitally provided product information	Information-processing framework (McGuire, 1976): Recipients perceive information selectively.  Heuristic-Systematic-Model (Chaiken, 1980): Information processing occurs through two distinct modes (heuristic vs. systematic).	<ul style="list-style-type: none"> <li>• Understanding whether and how digitally provided geographical proximity information – compared to labels - are detrimental to choice.</li> <li>• Examining the relationship between different communication types, perceived information quality and purchase intention for local food.</li> </ul>	<ul style="list-style-type: none"> <li>• Perceived information quality is found to be an important mediator.</li> <li>• Digital product information, e.g. retrieved through QR codes, are perceived to be superior than labels. They can undeceive consumers to make better informed food choices and are thus an effective alternative to labels.</li> <li>• Mixed evidence on how product type may influence the postulated relationships.</li> </ul>	<ul style="list-style-type: none"> <li>• Extending current literature on the use of mobile technologies compared to labels to support consumer's information search in the pre-purchase stage.</li> <li>• Emphasizing the superior role of digital product information, while others have neglected the effectiveness of information retrieved through mobile apps.</li> <li>• Highlighting the need for thoughtful implementation of mobile apps in retail environments for information retrieval.</li> </ul>

**Table 2.** Data, sample, and methodology of the articles.

Article	Data and Sample	Research Design	Research Context	Methodology
<b>Article 1:</b> Selecting decision-relevant ethical product attributes for grocery shopping	Online survey, Data collected through social media channels and flyers, $N = 249$ .	Choice-based conjoint, partial profile method, 20 choice tasks with each choice set consisting of four alternatives.	Packaged milk	<ul style="list-style-type: none"> <li>• Multinomial-Logit (MNL) Models</li> <li>• Latent-Class (LC) MNL Estimation</li> </ul>
<b>Article 2:</b> Is it just the distance? Consumer preference for geographical and social proximity of food production	Online experiment, Data collected through Clickworker for a nominal payment, $N = 344$ .	Choice-based conjoint, between-subjects manipulation (distance declaration: 50 km vs. 100 km), full profile method, 12 choice tasks with each choice set consisting of four alternatives.	Packaged milk	<ul style="list-style-type: none"> <li>• Multinomial-Logit (MNL) Models</li> <li>• Hierarchical Bayesian (HB) MNL Estimation</li> <li>• Linear Regressions</li> </ul>
<b>Article 3:</b> Scan me, if you can – Fostering behavioral intentions toward local food with digitally provided product information	<p>Study 1: Field experiment, conducted in the pedestrian zone of a German mid-sized city, <math>N = 613</math>.</p> <p>Study 2: Online experiment, collected through Prolific for a nominal payment, <math>N = 600</math>.</p>	<p>Study 1: 2 (product type: milk, lettuce) x 3 (information type: address code, third party label, app) between-subjects design.</p> <p>Study 2: 2 (product type: milk, tomatoes) x 3 (information type: retailer owned label, third party label, app) between-subjects design.</p>	Packaged milk, lettuce, tomatoes	<ul style="list-style-type: none"> <li>• ANOVA</li> <li>• Moderated mediation (using PROCESS Model 7 with 10,000 bootstrap samples; Hayes, 2018)</li> </ul>

## **1.4 Abstracts**

### **1.4.1 Article 1**

Despite the existence of various approaches for promoting ethical consumption, it remains a challenge to determine which ethical product features are actually decision relevant for consumers. Based on the assumption that values influence behavior across a range of situations, this paper explores the utility of product information items that address underlying motivators (i.e., concerns about the environment, animal welfare, other humans, price). Information preferences are also determined for different consumer segments separately, enabling one to target consumer groups with specific decision-relevant information. A German online survey was conducted with mainly young consumers. The survey used a choice-based conjoint analysis (CBCA) with the relevant product information items chosen based on an analysis of the attributes of dairy products and the guidelines for eco- and fair trade labels. The identified items were assigned to the ethical criteria of animal welfare, environmental protection, and labor and human rights. These criteria, along with price and country of origin, represent the attributes of the CBCA. Results indicate that information about animal welfare increases consumer choice the most, followed by information about labor and human rights, and the close by origin of products. Three identified segments differ with respect to their decision-relevant product information: ethically motivated consumers (53.8%), price-oriented consumers (12%) and price-quality-oriented consumers (34.2%). This study contributes to a better understanding of how ethical product information can most effectively be communicated to consumers, particularly for dairy products. The results highlight the need to carefully select ethical product information based on the target consumer segment in order to promote ethical consumption.

### **1.4.2 Article 2**

Consumption of locally-produced food is one important contribution to promote a more sustainable economy. Several previous studies have focused on distance declarations, denoted as geographical proximity of food production, and how it affects choice. All without consensus about what distance should hold for local food. Other previous research has identified social proximity as a local-related product characteristic that drives perception and choice (e.g., family-run farms). However, there is no previous study providing a clear picture regarding the choice behavior and preference relationship of geographical and social proximity attributes (particularly when the distance declaration of locally-produced food varies). To fill this research gap, we employed a between-subjects experiment (i.e., varying the distance declaration of local food) in combination with a choice-based conjoint analysis to understand consumer preferences for geographical and social proximity of food production in Germany. Results indicate a higher preference and willingness to pay for food with greater geographical and social proximity, with the effects more pronounced for geographical proximity. A follow-up analysis provides novel insights by explaining preference heterogeneity for geographical and social proximity attributes with important implications for research and practice.

### **1.4.3 Article 3**

Sustainable products inherently increase the complexity of decision making because consumers often lack knowledge about a product's sustainable attributes. This especially holds for local foodstuff, as relevant regulatory bodies are missing. In the past, labels have predominantly been used to nudge consumers toward more sustainable choices. However, it is questionable whether and to what extent they can empower consumers to make informed decisions. While technological advances in retail environments have changed consumers' information-gathering methods, it remains unclear whether and when digitally provided information on products' credence attributes is detrimental to

choice. To tackle this question, we conducted two experiments: one in the pedestrian zone of a mid-sized city using iPads and another online. The results reveal that digital product information – provided through QR codes or retailers’ mobile applications – can undeceive consumers to make better informed sustainable food choices, even when compared to third-party labels. Furthermore, the results show that the effect is mediated by perceived information quality, demonstrating the importance of information quality and how it translates into purchase intentions. Taking a more nuanced view, this paper also provides insights regarding the product types for which digitally provided information is most promising, highlighting the need for thoughtful implementation of mobile apps for information retrieval in retail environments. Together, these insights guide practitioners to conclude generalizable and well-targeted implications to convey consumers and boost local food consumption.

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## 2 Selecting decision-relevant ethical product attributes for grocery shopping (Article 1)

(with Victoria-Sophie Osburg and Waldemar Toporowski)<sup>1</sup>

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*Keywords:* segmentation, ethical decision making, ethical consumption, country-of-origin information, ethical product information, price information.

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## **2.1 Introduction**

Consumers are becoming increasingly aware of their responsibility and their role to realize a more sustainable future, especially in food retailing. The willingness to leverage their influence through purchase decisions regarding socially and/or environmentally friendly products (Bezençon and Blili, 2010; Schenkel-Nofz and Walther, 2014), also known as ethical consumerism, represents a fast-growing trend worldwide (Ruiz de Maya et al., 2011; Pino et al., 2012). It requires that consumers are able to easily identify eco-friendly and socially responsible product alternatives. However, the current information asymmetry in retailing is the opposite of that with products' ethical features being difficult to recognize. A reduction of this information asymmetry in regards to ethical features of a product is therefore needed (Sammer and Wüstenhagen, 2006).

From an economic point of view, producers and marketers should be interested in finding out how relevant information can be identified, established, and exchanged. In reality, however, it remains a challenge to communicate ethical information to consumers in a way that makes them consider ethical product features in their purchase decision process. Labels are a commonly used approach to reveal ethical product features in an aggregated way (Loureiro and Lotade, 2005; Testa et al., 2015; Vecchio and Annunziata, 2015). Nevertheless, the wide variety of labels presented in the marketplace has led to reports of consumer confusion about the meaning of a given label and its differentiation from alternative ones (Borin et al., 2011). The Ecolabel Index (2016) records 465 different ecolabels in 199 countries and 25 industry sectors. This status quo inevitably leads to uncertainties among consumers who do not always grasp the particular significance of each label and, for that reason, lose interest in ethical goods (Borin et al., 2011; De Pelsmacker and Janssens, 2007). It is therefore not surprising that studies have been undertaken to examine whether providing consumers with more detailed product

information might be a promising alternative to certification labels (Mitchell et al., 2005; Osburg et al., 2016; Salaün and Flores, 2001).

Recent studies have suggested that the provision of detailed product information helps to overcome purchase barriers of ethical goods (Cho, 2015; Gleim et al., 2013). Such information may increase consumers' knowledge and thereby redirect their decision-making for food choices at the same time (Verbeke, 2008). However, it is not the volume of available information that plays a decisive factor in the purchasing behavior of the consumer but rather the information type (Auger et al., 2010). In fact, an excessive number of product information items may lead to information overload (De Pelsmacker et al., 2005b; Fernqvist and Ekelund, 2014), which can aggravate the decision-making process of potential consumers (Mitchell et al., 2005; Verbeke, 2008). Therefore, it is important to determine which ethical product information items interest consumers the most.

Although several articles examine the role of ethical attributes in the purchase decision-making process, most of them focus on a single aspect of ethical consumption, such as social or environmental characteristics, combined with other product attributes. This makes it difficult to assess the relative importance of all aspects of ethical goods, as in animal welfare, environmental, and fair trade issues. Furthermore, it remains unclear which information is actually decision relevant to consumers (Pieniak et al., 2013; Salaün and Flores, 2001). As information preferences may differ among consumers, it should also be determined whether (and how) the valued information varies among consumer segments (Atkinson, 2013; Salaün and Flores, 2001; Verbeke, 2008). Therefore, this explorative study addresses the following questions:

- Which ethical product attributes do consumers value the most?
- What consumer segments can be distinguished in terms of their information preferences?

- How does the preference for ethical information vary among these segments?

In order to investigate these questions, milk is being selected as a reference product that includes the three elements of ethical consumption which are environmental protection, animal welfare, and labor legislation and human rights. While labels on milk packages often reveal ethical product features, such as organic certification or animal welfare labels, a growing number of producers also provide more detailed ethical product information by describing the milk's origin and how the animals have been treated for example. Furthermore, media continuously highlights the ethical implications of dairy products (e.g., Deutsche Wirtschafts Nachrichten, 2015), creating consumer awareness of ethical criteria related to dairy consumption.

This article is structured as follows: First, the investigated nomological framework is introduced, and literature on disclosing ethical product attributes to consumers is briefly reviewed. Second, the methodology of the empirical study is described in depth. The following section presents the results obtained for aggregate information preferences and the ethical information items valued by each consumer segment. The article concludes with a discussion of the results and implications regarding the elements that marketing should prioritize, in order to promote ethical grocery shopping.

## **2.2 Conceptual development**

### **2.2.1 The roots of ethical consumption**

Extensive research has shown that ethical consumption is based on individual characteristics. Consumers' attitudes (Hustvedt and Dickson, 2009; Shaw et al., 2016), norms (Andorfer and Liebe, 2015; Steg et al., 2005), self-identity (Hustvedt and Dickson, 2009; Webb et al., 2014), and values (Aertens et al., 2009; Steg et al., 2005) have all been identified as drivers of ethical consumption. Values are of particular interest because they represent fundamental guiding principles that influence consumer behavior over time and across a range of situations (Steg et al., 2005; Stern, 2000). This is illustrated by the value-

belief-norm theory (VBN; Stern, 2000), which is one of the most established frameworks for explaining environmental behavior. The VBN theory postulates that fundamental value orientations affect an individual's general beliefs about human–environment interactions. These beliefs in turn influence an individual's awareness of consequences, followed by the ascription of responsibility and norm activation, which is the direct determinant of environmental behavior. Accordingly, the VBN theory illustrates the importance of underlying values.

As such, the VBN framework may also be used to explain ethical consumer behavior according to three value orientations: altruistic, biospheric, and egoistic values (Stern, 2000). Altruistic values focus on concerns for other humans, biospheric values include concerns for both nonhuman beings and the environment, and egoistic values reflect motivations to maximize an individual's benefits (Steg et al., 2005). Depending on their value orientation, the VBN theory suggests that individuals may prioritize different ethical criteria. Hence, ethical consumer behavior can result from different underlying values and motivations. While some individuals may buy ethical products out of concern for the environment and animal welfare (biospheric value orientation) as well as other humans (altruistic), others may choose ethical products for purely egoistic reasons (e.g., if an ethical product is less expensive than the conventional alternative). All these motivators of ethical consumption can be addressed through the disclosure of various product information items.

### **2.2.2 Provision of ethical product information**

Although consumers value product information, disclosing too many product information items bears the risk of an information overload (Cho, 2015; Fernqvist and Ekelund, 2014), and results in increased (search) costs for the consumer (Grunert et al., 2000; Mitchell et al., 2005; Salaün and Flores, 2001). Excessive information can overwhelm consumers and prevent effective processing, resulting in ill-informed decisions (Wansink, 2003).

Accordingly, several consumer studies have scrutinized the influence of detailed product information on purchase decisions (e.g., Auger et al., 2010; De Pelsmacker et al., 2005b). Previous studies have examined consumers' information preferences concerning wood products (Cai and Aguilar, 2013; O'Brien and Teisl, 2004; Osburg et al., 2016); groceries, such as fruits, milk, or meat (Napolitano et al., 2007; Rousseau and Vranken, 2013; Tonsor et al., 2009; Travisi and Nijkamp, 2008; Zander and Hamm, 2010); and nondurable goods, such as shoes, soap, or batteries (Auger et al., 2008; Auger et al., 2010). These studies show that consumers value animal, social and environmental product information, and indicate that consumers are also willing to pay a price premium for revealing these features (e.g., Auger et al., 2008; O'Brien and Teisl, 2004; Rousseau and Vranken, 2013; Travisi and Nijkamp, 2008). However, it is not fully understood which of these attributes are most important. While some studies highlight the influence of social attributes on purchase probability (Auger et al., 2008; Auger et al., 2010), others suggest a high relevance of environmental aspects (O'Brien and Teisl, 2004; Travisi and Nijkamp, 2008). Taking yet another view, Napolitano et al. (2007) demonstrate that provided information positively affects the consumer's perceptions and find that information about animal welfare may be used to differentiate meat products. Furthermore, other studies reveal an influence of country-of-origin (COO) information on consumer choice (Cai and Aguilar, 2013; Fernqvist and Ekelund, 2014; Moser et al., 2011; Wirth et al., 2011).

Although no product should be considered as purely ethical, the majority of existing research only focuses on selected aspects of ethical goods. Moreover, ethical attributes are often not considered in isolation from other product attributes. There has been no wide discussion of providing consumers with further detailed information nor about which specific product information consumers prefer in their decision-making processes. Only one study by Zander and Hamm (2010) considers consumers' preferred

ethical product information. Yet, the authors examine consumers' information search behavior, rather than identifying which ethical product information is most beneficial to them. It is therefore difficult to conclude whether or not consumers prefer specific aspects of ethical goods, since all product varieties analyzed in that study were produced in an organic manner. Furthermore, the study does not address the importance of segment-specific product information communication. However, the literature indicates that segment-specific information preferences should be determined, given that consumers vary with respect to their information demand (Osburg et al., 2016; Salaün and Flores, 2001).

### **2.2.3 Relevance of ethical product information for purchase decisions**

In general, ethical consumerism is a complex phenomenon that is based on a broad expression which focuses on fair trade and organic products, and extends to boycotting companies that do not operate for the good of the environment or society (Harrison et al., 2005). Ethical products are meant to minimize – in the best case eliminate – the negative impacts of consumerist society (Auger et al., 2008; Bezençon and Blili, 2010). Thus, organic and fair trade products can be considered as ethical products (De Pelsmacker et al., 2005b; Shaw and Clarke, 1999), which are characterized by three aspects that address central facets of sustainable action: animal welfare, environmental protection, and labor legislation and human rights. While organic products relate to environmental protection and the preservation of animal rights (EG-Öko-Verordnung, 2007; Thøgersen, 2010), the fair trade movement includes fair trade relations and a fair payment of producers (Arnot et al., 2006; De Pelsmacker and Janssens, 2007). However, it must be noted that “no product can be completely, unreservedly ethical” (Crane, 2001, p. 369). Instead, an ethical product can be viewed as a bundle of ethical product attributes (Crane, 2001). These product characteristics are the source of consumers' utility (Lancaster, 1966); consumers choose the product that maximizes their utility, depending on their preferences with

respect to the given product attributes and their budget (Ubilava et al., 2010). In this context, one can distinguish three product attributes: search attributes, experience attributes, and credence attributes (Darby and Karni, 1973; Nelson, 1970, 1974). Search attributes – such as price –, as well as experience attributes – such as taste – can be evaluated by the consumer before, respectively after their purchase. However, the consumer must rely on the correctness of the information provided when being confronted with credence attributes, since (s)he cannot verify them. Although food is characterized by all three product attributes, the credence attribute is becoming increasingly important due to consumers' greater environmental and health awareness (Grunert et al., 2000; Moser et al., 2011).

## **2.3 Methodology and measurement**

The following presents a study that examines consumers' preferred ethical product information and segment-specific information preferences. The segmentation is beneficial for determining consumer groups that are interested in ethical products and for deriving marketing communications strategies to target them successfully. This approach reduces complexity, as marketing communication can focus on consumer segments instead of individual consumers.

### **2.3.1 Data collection and sample**

A German online survey was conducted using Sawtooth Web SSI software from February to March 2016. Participants were recruited through social networks and flyers. In order to motivate participation and to increase the predictive accuracy of our data (Wlömert and Eggers, 2016), all participants were entered into a prize draw for four vouchers, each worth 15 euro. The study mainly relies on a sample of young consumers because they seem to be particularly interested in detailed product information (Kanchanapibul et al., 2014). Thus, they represent a suitable target group for examining product information

preferences (Osburg et al., 2016). Furthermore, as young consumers become more active in the marketplace, they represent an important generation for marketing research (Noble et al., 2009).

In total, 385 respondents participated, but 136 of them had to be excluded. First, 118 questionnaires were omitted because they were incomplete, meaning that the respondents completed fewer than six tasks of the choice-based conjoint analysis.<sup>2</sup> Furthermore, 18 participants were excluded due to either short response times (fewer than three minutes for the entire questionnaire) or response patterns (e.g., 1, 2, 3, 4, 1, 2, 3, 4). In both cases, it can be assumed that the incentive was the only motivation for participating in the survey (Homburg and Krohmer, 2008). Hence, the data analysis relies on 249 participants.

The respondents' mean age was 26.78 years ( $SD = 8.47$ ), and 65% were female. The majority were students (75.5%), while 18.9% were employees. More than half of the participants reported that they consume ethical products at least once a week.

### **2.3.2 Choice-based conjoint analysis**

A choice-based conjoint analysis (CBC; also known as choice experiment) was conducted to determine consumers' information preferences. This method is most frequently used in market research because of its similarity to real purchase decisions (Green and Srinivasan, 1990; Huber, 2005, Wlömert and Eggers, 2016). A social desirability bias results in a discrepancy between stated preferences and actual preferences (Ding et al., 2005). Previous research has shown that a CBC, combined with incentives, can successfully reduce the occurrence of social desirability bias (De Pelsmacker et al.,

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<sup>2</sup> At least six choice tasks are required to achieve good results, and about ten choice tasks or more to establish robust predictions (Sawtooth, 2017a), especially for a high number of attributes and levels combined with relatively small sample sizes. In accordance with this, Johnson and Orme (1996) argue that "later tasks are better predictors of results from the total interview" (p. 10).

2005a; Ding et al., 2005; Hainmueller et al., 2014), as respondents are presented with different variants of a good and are expected to select their most preferred alternative (Desarbo et al., 1995; Louviere and Woodworth, 1983; Wallander, 2009). Thus, they find multiple justifications for a given choice (Hainmueller et al., 2014).

The CBC assumes that consumers derive utility not from the good per se but from its multiple attributes (Tonsor et al., 2009; Wirth et al., 2011). According to Louviere and Woodworth (1983), the CBC is a decompositional method that estimates the structure of consumer preferences in terms of the levels of the attributes of the choice alternative (Desarbo et al., 1995; Rao, 2014). Utility estimates are determined at the aggregate level, but further analysis in terms of latent class or hierarchical Bayes should be used to avoid systematically distorted benefit parameters (Sawtooth, 2013). Preference heterogeneity occurs discretely in latent class analysis (Train, 2009). Rather than estimating average part worth utilities as in logit models for the whole group, latent class analysis detects subgroups with differing preferences and estimates part worths for each segment simultaneously (Orme, 2007). Thus, the heterogeneity in the preferences can be mapped by a limited number of completely homogeneous segments (Desarbo et al., 1992; Desarbo et al., 1995). As this paper aims to identify the information demands of different consumer groups, the estimations are based on latent class analysis.

### **2.3.3 Choosing relevant product attributes**

Table 3 summarizes the attributes and attribute expressions that form the basis of the CBC. Two steps were implemented to determine potentially relevant ethical product features: First, ethical attributes of 28 dairy products were identified by examining the current presentation of ethical product information. Second, overlapping standards with regard to the three aspects – animal welfare, environmental protection, and labor legislation and human rights – were chosen after considering the guidelines of the largest German organic associations and fair trade organizations (e.g., Alsfeld, 2014a, b; Bender,

2016; Bioland e.V., 2015; Ecoland e.V., 2011; EC-Regulation, 2008; Gää e.V., 2014, 2015; WFTO, 2009, 2011). A pretest was carried out with 34 respondents (mean age of 30.21 years [ $SD = 10.49$ ], 50% female, 53% students) to examine the comprehensibility of the product information items developed. Participants indicated for each item whether they understood it, and they were asked to comment on each item. After the pretest, misleading ethical product information items were reformulated.

The price levels were determined by analyzing actual milk prices. The average price per liter was 1.22 euros. An interval of +/- 15%, and +/- 30%, was chosen to reflect the actual price range of organic, fair trade, and conventional milk.

A “no-choice” option was not included, because it has been shown that this leads to more unstable utility estimates (Backhaus et al., 2013). Furthermore, a “no-choice” option does not adequately reflect reality, because consumers will generally buy milk in real purchase situations even if their favorite milk is unavailable. Nonresponses are also “often used as a way to avoid difficult choices” (Johnson and Orme, 1996, p. 21), which does not reflect how consumers would react in reality.

To avoid the “number of level” effects, an equal number of characteristics is recommended for all attributes (see Wittink et al., 1990). Therefore, each property of ethical goods was described by two attributes, which were then assigned five expressions.

Apart from the price attribute, the fifth characteristic of all attributes corresponded to information retention, i.e., a blank expression.

**Table 3. Article 1. Attributes and levels of the CBCA.**

Aspect	Attribute	Level	Description
<b>Environmental protection</b>	Preservation of biodiversity	Crop rotation (mixed cultivation) instead of monocultures to preserve biodiversity and to reduce soil erosion	E1.1
		Less manipulation of landscape	E1.2
		No clearing of national and international virgin forests	E1.3
		Ecologically produced seed and seedlings	E1.4
		[no information shown]	E1.5
<b>Environmental protection</b>	Protection of valuable resources	No use of chemical synthetic pesticides	E2.1
		No use of nitrogen and animal meal fertilizer (e.g., fish meal, bone meal)	E2.2
		Limited extent of permitted ecological fertilizer (e.g. manure, compost) to avoid salinization of soil and water	E2.3
		Economical use of energy and raw materials in dairy production	E2.4
		[no information shown]	E2.5
<b>Animal welfare</b>	Species-appropriate husbandry	Cows are frequently and regularly out on the pasture	A1.1
		Sufficient space and comfort in the stable	A1.2
		Animals are not fixed to their place	A1.3
		No use of growth hormones or preventive drugs (e.g. antibiotics)	A1.4
		[no information shown]	A1.5
<b>Animal welfare</b>	Food	Meadow/hay/grass/clover as feed	A2.1
		Organic feed out of own cultivation	A2.2
		Feed without genetic engineering	A2.3
		No food from overseas (soya, maize, etc.)	A2.4
		[no information shown]	A2.5
<b>Labor legislation and human rights</b>	Payment of dairy farmers	Dairy farmers receive prices to cover production costs (min. 0.40€/liter)	S1.1
		Dairy farmers receive prices to generate profit (min. 0.45€/liter)	S1.2
		Reliable and long-term contracts for farmers	S1.3
		Guarantee for the purchase of milk products from the farmer	S1.4
		[no information shown]	S1.5
<b>Labor legislation and human rights</b>	Social responsibility	Financing projects / promotion of farmers	S2.1
		High safety and health standards for workers on the farm	S2.2
		Local processing to maintain value added in the region	S2.3
		Strengthening social development in rural areas (accessibility of schools, doctors, associations etc.), especially for dairy farmers	S2.4
		[no information shown]	S2.5
<b>Miscellaneous</b>	Country of origin	Of regional/local origin	C1
		Of national origin	C2
		Of supra-national (EU) origin	C3
		Of international origin	C4
		[no information shown]	C5
<b>Willingness to pay</b>	Price	0.86€/liter	P1
		1.04€/liter	P2
		1.22€/liter	P3
		1.40€/liter	P4
		1.58€/liter	P5

### 2.3.4 Conception of the experimental design

A partial-profile method was implemented because a full factorial design would include 390625 ( $= 5^8$ ) varieties. The attributes were rotated to ensure a more realistic shopping situation (Orme, 2009; Rao, 2014), with the exception of price as “price tends to carry less weight, relative to other attributes, when estimated under partial-profile CBC rather than full-profile” (Orme, 2009, p. 5).

Each choice set consisted of four product alternatives. Respondents received 20 choice tasks as suggested by Johnson and Orme (1996), two of which were fixed to test the internal validity of the simulation model (Orme, 2009). The balanced overlap method was selected because it results in a limited overlap within a choice set (Sawtooth, 2013). Furthermore, a design test confirmed an optimal estimation of the main effects with the present design.

## 2.4 Empirical results

### 2.4.1 Attribute importance

Table 4 shows the evaluation of the logit estimation, which indicates that the model accurately reflects the respondents’ information preferences.

**Table 4. Article 1.** Evaluation of logit estimation.

<b>Results of the Multinomial Logit Model</b>	
Log-Likelihood for this model	-5786.94
Log-Likelihood for null model	-6903.75
Difference	1116.81
Chi Square	2233.62
Relative Chi Square	69.80
Degrees of Freedom	32
Alpha	< 0.0001

Table 5 summarizes the relative attribute importance for each aspect included in the current study. The aspect of animal welfare provides the greatest benefit for the respondents, with the largest (cumulative) relative importance (30.25%). Within the

aspect of animal welfare, species-appropriate husbandry is of greatest significance for consumer choices (19.77%). Labor legislation and human rights exhibit the second-largest (cumulative) relative importance (19.50%), while the payment of dairy farmers is of greater relevance (10.95%) than the social responsibility attribute (8.55%). Ranked last, the aspect of environmental protection has a (cumulative) relative importance of 15%. Interestingly, COO (18.36%) and price (16.81%) show a higher relative importance than the ethical aspect of environmental protection.

**Table 5. Article 1.** Relative attribute importances.

Attribute	Importance	Cumulated importance	Ranking
Preservation of biodiversity	6.86		
Protection of valuable resources	8.21	15.07	5
Species-appropriate husbandry	19.77		
Food	10.48	30.25	1
Payment of dairy farmers	10.95		
Social responsibility	8.55	19.50	2
Country of origin	18.36	18.36	3
Price	16.81	16.81	4

Table 6 reveals which specific ethical product information items respondents value the most. First, the provision of no product information always results in a negative utility. Second, most ethical product items positively affect consumer choices. Respondents particularly value the items “no use of chemical synthetic pesticides” and “ecologically produced seed and seedlings” (environmental protection), “cows are frequently and regularly out on the pasture” and “organic feed out of own cultivation” (animal welfare), as well as “dairy farmers receive prices to generate profit (min. 0.45€/liter)” and “local processing to maintain value added in the region” (labor legislation and human rights). These items indicate that respondents have a good understanding of ethical consumption, as they are more likely to choose products that not only cover production costs but also generate profit for dairy farmers. Third, not all ethical

product information items increase consumer choices, such as “animals are not fixed to their place” or “no food from overseas (soya, maize, etc.)”. This finding underlines that ethical product information must be carefully chosen in order to increase ethical consumption patterns.

In addition to ethical product information, COO also influences consumer choices. Interestingly, however, only regional and national origins have a positive utility, whereas supranational and international origins have an even stronger negative effect on consumer preference, compared with nondisclosed COO information. Finally, prices up to 1.22 euros per liter have a positive value, with lower milk prices being preferred.

**Table 6. Article 1.** Rescaled part worth utilities for ordinary consumers.

Attribute	Rescaled Part Worth Utilities	t-ratio
E1.1	6.60	1.47
E1.2	9.85**	2.22
E1.3	8.88*	1.98
E1.4	14.79**	3.33
E1.5	-40.12***	-8.05
E2.1	24.29***	5.55
E2.2	11.08**	2.47
E2.3	5.00	1.12
E2.4	1.04	0.23
E2.5	-41.41***	-8.33
A1.1	77.92***	18.81
A1.2	4.43	0.97
A1.3	-22.38***	-4.61
A1.4	20.27	4.57
A1.5	-80.23***	-14.08
A2.1	20.90***	4.75
A2.2	39.68***	9.28
A2.3	3.14	0.70
A2.4	-19.55**	-4.11
A2.5	-44.18***	-8.74
S1.1	8.51*	1.89
S1.2	39.23***	9.17
S1.3	2.23	0.49
S1.4	-1.63	-0.36
S1.5	-48.34***	-9.47
S2.1	3.90	0.86
S2.2	2.80	0.62
S2.3	28.22***	6.53
S2.4	5.27	1.18
S2.5	-40.18***	-8.07

C1	83.39***	20.36
C2	32.09***	7.37
C3	-33.44***	-6.71
C4	-63.51***	-11.71
C5	-18.53***	-3.85
P1	60.91***	19.32
P2	38.01***	11.75
P3	9.15**	2.69
P4	-34.48***	-9.13
P5	-73.59***	-17.48

Note. \*  $p < 0.1$  \*\*  $p < 0.05$  \*\*\*  $p < 0.01$ .

## 2.4.2 Consumer segments and their information preferences

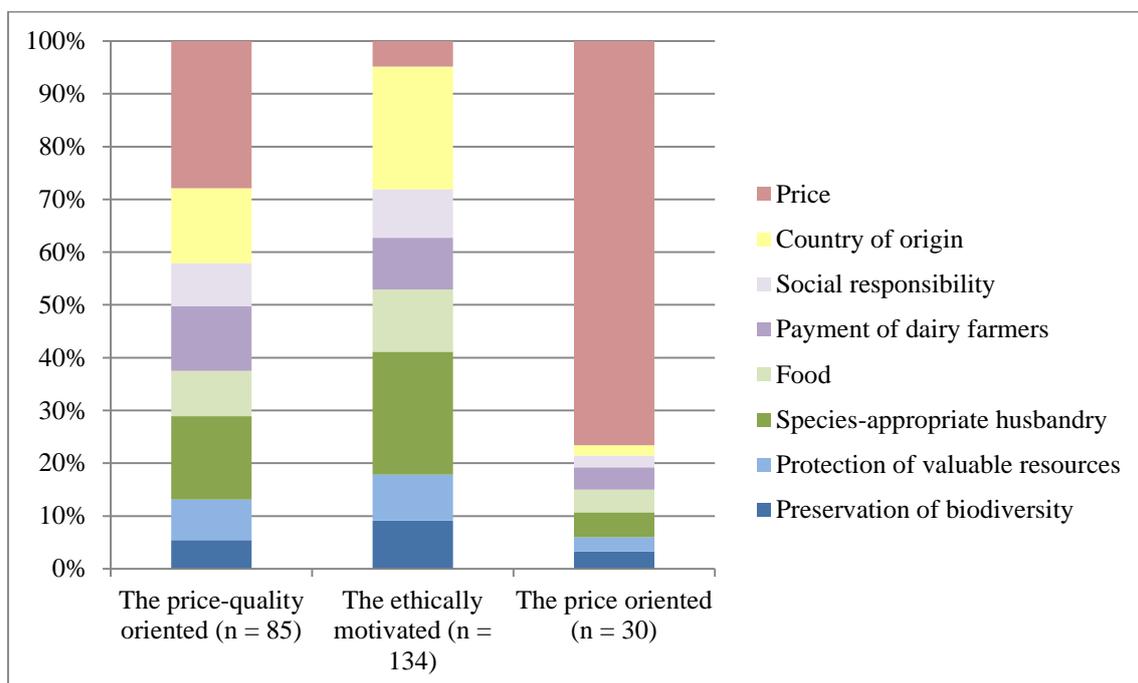
A latent class analysis was performed to identify segments differing in their preference structures. The consistent Akaike information criterion (CAIC) was chosen as a criterion to determine the segment number, leading to a three-segment solution (Table 7).

**Table 7. Article 1.** Results of latent class estimation.

Number of Segments	CAIC	Chi Square	AvgMaxMP
1	11878.29	2233.62	-
2	11215.82	3210.03	0.9830
3	11200.10	3559.68	0.9657
4	11254.26	3799.46	0.9490
5	11391.76	3975.89	0.9523
6	11590.39	4091.20	0.9528

Figure 2 provides the results obtained from the latent class segmentation, including the relative importance each segment places on each attribute. The *ethically motivated segment* ( $n = 134$ ) particularly values animal welfare aspects (cumulative relative importance of 35.05%), followed by COO (23.24%), labor legislation and human rights (19.04%), and environmental protection (17.85%). Hence, this segment seems to be particularly interested in ethical information and perceives price to be less crucial. This is a promising result, especially as it represents the largest segment. The *price-oriented segment* ( $n = 30$ ) predominantly focuses on price (76.60%), whereas ethical attributes are negligible, except for animal welfare (cumulative relative importance of 9.06%). Hence,

ethical product information seems to be ineffective for this segment, and alternative strategies are needed (e.g., ethically related criteria with an individual benefit, such as health impacts). The *price–quality–oriented segment* ( $n = 85$ ) takes an intermediate position. It exhibits a strong preference for price (27.88%), followed by ethical product information related to animal welfare (24.39%), and labor legislation and human rights (20.38%). Consequently, two out of three segments – 87.95% of the respondents – benefit from a disclosure of detailed information about ethical product features.



**Figure 2. Article 1.** Identified segments with attribute importances.

Table 8 presents the rescaled part worth utilities for the ethical product information items, separately for each segment. In total, 11 ethical product items were of high relevance for at least one segment, and 7 ethical product information items were of high relevance for at least two segments. The only information favored by all segments is “no use of growth hormones or preventive drugs (e.g., antibiotics)”. Respondents might have been particularly interested in this item, as it allows one to draw conclusions about the product’s health impact. While the price-oriented segment only valued one additional information item, the ethically motivated and the price–quality–oriented segment asked

for more and even similar ethical product information items. The core difference between these segments is that ethically motivated consumers show stronger preferences for ethical items and favor even more information items than price–quality–oriented consumers, while being less interested in product price. Hence, both segments can be addressed with the disclosure of similar ethical product information items. However, the role of price must be discussed further. The generated value of price for the price–quality–oriented segment decreases as price increases, whereby a price of 1.22 euros per liter still generates a positive value. Against all odds, the lowest price shows a negative utility for the ethically motivated segment; an average price of 1.22 euros per liter is most beneficial for these consumers. Hence, this segment is characterized by reasonable price assumptions, suggesting that ethically motivated consumers have a realistic understanding of fair prices and are willing to pay a surcharge for high-quality products.

**Table 8. Article 1.** Identified consumer segments.

	Consumer Segments		
	The price-quality oriented	The ethically motivated	The price oriented
E1.1	10.12*	11.04*	-3.76
E1.2	7.19	10.87*	-12.20*
E1.3	8.66	5.35	13.75*
E1.4	7.55218	22.94***	-0.12
E1.5	-33.52***	-50.19***	2.33
E2.1	31.13***	21.19***	12.79*
E2.2	2.95	16.92**	-8.89
E2.3	-7.21	11.83*	-2.27
E2.4	3.37	-1.43	3.80
E2.5	-30.25***	-48.52***	-5.43
A1.1	49.17***	101.64***	0.30
A1.2	17.63***	-5.33	5.26
A1.3	-4.38	-31.81***	-8.90
A1.4	14.86**	20.25***	20.66***
A1.5	-77.29***	-84.74***	-17.31**
A2.1	-1.03	35.05***	15.35**
A2.2	33.41***	41.77***	8.65
A2.3	8.67	-3.90	4.04
A2.4	-5.83	-20.67***	-8.80
A2.5	-35.23***	-52.25***	-19.24**
S1.1	12.16*	1.63	0.44
S1.2	41.82***	38.15***	3.29

S1.3	-0.03	4.20	4.78
S1.4	1.69	-3.44	12.67*
S.1.5	-55.63***	-40.54***	-21.18**
S2.1	7.43	2.20	-3.48
S2.2	7.20	0.48	4.06
S2.3	22.61**	33.28***	6.63
S2.4	5.71	4.37	3.70
S2.5	-42.95***	-40.34***	-10.91
C1	65.33***	102.49***	4.82
C2	33.37***	36.19***	7.60
C3	-15.42**	-45.10***	-8.14
C4	-48.52***	-83.46***	-3.48
C5	-34.75***	-10.12	-0.80
P1	80.47***	-12.11**	202.07
P2	76.07***	1.62	131.38
P3	29.19***	22.92***	63.14
P4	-43.17***	3.15	14.02
P5	-142.56***	-15.57***	-410.61

Note. \*  $p < 0.1$  \*\*  $p < 0.05$  \*\*\*  $p < 0.01$

Finally, the two biggest segments differ significantly in terms of their self-reported ethical consumption ( $t = 2.558, p = 0.011$ ). The ethically motivated segment claimed to consume ethical goods at least once a week, whereas the price–quality–oriented segment stated to consume ethically two to three times a month. Furthermore, the segments differ with respect to consumer characteristics: the price-quality-oriented segment has a higher income compared with the price-oriented segment ( $t = 2.135, p = 0.035$ ), while there are no significant differences between the two biggest segments. The ethically motivated segment is older ( $t = 1.745, p = 0.083$ ), more educated ( $t = 1.908, p = 0.058$ ), and has a higher income ( $t = 2.330, p = 0.021$ ) compared with the price-oriented segment. These findings are in line with the different utilities these segments derive from ethical product information.

## 2.5 Discussion

This study examines which specific ethical product information increases consumer choice for ethical products. Based on the example of dairy products, the results reveal that consumers value the disclosure of animal welfare aspects the most. Interestingly, both

COO declaration and price generate slightly higher utilities than the environmental aspect, but still less than labor legislation and human rights. The results are therefore in line with the findings of Zander and Hamm (2010), although their study is based on a different approach. Furthermore, the present study extends previous findings by determining not only which general attributes are important (e.g., animal welfare) but also which specific information items are valued by consumers (e.g., “cows are frequently and regularly out on the pasture”).

The results also confirm the assumptions of Bond et al. (2008), who postulate that the support of local farmers might be a stronger purchase driver than environmental concerns. The relatively low importance of environmental aspects could also be ascribed to the high importance of the COO declaration. Moreover, current media reports about inadequate animal welfare standards and dubious payments of dairy farmers within the EU may have increased consumer awareness. The constant media confrontation would thus reflect consumers’ preferences for different ethical product features. Consistent with previous research, this study also points to an effect of COO declaration as a credence attribute (Fernqvist and Ekelund, 2014). The findings confirm the theory of domestic country bias, according to which domestic products are preferred over imports (Auger et al., 2010).

With respect to specific ethical product information items, this study identifies 11 items as relevant for the average consumer, supporting the idea that consumers are relatively limited in their information search and processing (Crane, 2001). It is noteworthy to mention that two ethical product information items even generate a negative utility, i.e., “animals are not fixed to their place” and “no food from overseas (soja, maize, etc.)”. This could be attributed to either a lack of knowledge or understanding (Auger et al., 2003; Pieniak et al., 2013).

Furthermore, the present study identifies three consumer segments that differ in their information preferences. The *price-oriented segment* mainly focuses on price. However, the results must be interpreted with caution. Although the results reveal that prices up to 1.40 euros per liter of milk are of positive utility for this segment, these consumers will probably always choose the cheapest alternative. Correspondingly, the two product information items valued by this segment refer to hedonistic rather than ethical aspects. The *price–quality–oriented* and the *ethically motivated segments* prefer almost the same ethical product information items. As their preferred ethical product information is related, these segments can be targeted in a similar way. Segment-specific differences mainly refer to the price attribute. The price–quality–oriented segment focuses more on price than the ethically motivated segment does. While an average price of 1.22 euros per liter is most beneficial for ethically motivated consumers, the price benefits decrease with increasing prices for the other segment. Hence, ethically motivated consumers seem to be aware of the costs required for the production of ethical products and are more driven by a desire to consume ethically (Arnot et al., 2006). However, if a higher price can be justified through ethical or quality-related product attributes, the price–quality–oriented segment would still benefit from a price up to 1.22 euros per liter. This segment therefore needs a balance between ethical product attributes and price. Moreover, the results identify price as a barrier for ethical purchase (Andorfer and Liebe, 2015; Gleim et al., 2013), as consumers with a restricted budget choose the product which maximizes their utility (Ubilava et al., 2010).

### **2.5.1 Policy implications**

A planned, systematic education and marketing initiatives can convince consumers to consider ethical problems arising from current consumption patterns (Davies et al., 2010). The societal discourse on social and ecological questions can be further intensified by providing ethical product information (Schenkel-Nofz and Walther, 2014). This study

enriches current debates about revealing specific product information to consumers (e.g., nutrition disclosure) and suggests that a more detailed presentation of ethical product information can contribute to a more responsible future. If ethical products become socially acceptable and more transparent through information disclosure, sustainable consumer patterns can be strengthened (Pino et al., 2012).

### **2.5.2 Managerial implications**

Social and environmental information is difficult to communicate for tangible goods, as these products are mostly characterized by credence attributes. It is therefore important to address these concerns directly through marketing instruments, for instance by increasing the availability of ethical product information. If ethical related information is presented in an understandable manner, it will positively affect consumers' product evaluations (Borin et al., 2011). Accordingly, some producers (e.g., Alnatura, Arla) already disclose some ethical information items in part, which generate a high value. It is noteworthy to mention that these brands have a higher average price for ethical products and charge more than conventional alternatives do. However, the current findings indicate that all producers can benefit from a detailed presentation of ethical product information, as it allows them to better target two out of the three consumer segments identified. As the present study underlines the importance of presenting a variety of ethical product information, practitioners should aim to disclose the full range of ethical criteria (i.e., environmental protection, animal welfare, labor legislation and human rights), instead of focusing on selected elements. Furthermore, practitioners should carefully determine what ethical product information is truly relevant and use the items identified in segment-specific product communication.

In addition, digitization opens up further opportunities to provide accurate information (Berry and McEachern, 2005). Using QR codes could help strengthen consumer trust by providing detailed and context-specific information to consumers when

needed (Atkinson, 2013; Osburg et al., 2016). The most important product information items could be placed on product packages, while QR codes could direct consumers to more detailed ethical product information disclosure. Presenting labels on packages in combination with ethical product attributes may also increase the effectiveness and strengthen the credibility of the information provided (Wansink, 2003).

### **2.5.3 Limitations and future research**

The following limitations of this study must be considered, which also provide directions for future research. First, information preferences regarding environmental protection and animal welfare should be interpreted with caution because they might be influenced by an individual's health concerns. As self-enhancement effects could also have appeared, future studies should focus on investigating ethical product attributes in combination with consumers' general values. Second, although a CBC was chosen to simulate real purchase decisions, online surveys do not fully reflect reality. Despite employing an incentive-aligned CBC and not revealing the study's goals to participants, the results may still be affected by a social desirability bias. Given that the majority of participants fell into the ethically motivated segment, some socially desirable responses could have occurred. It would therefore be beneficial to rely on market data for future research. Third, the relevance of ethical product aspects can be dependent on product category and further product characteristics (e.g., brand). Future studies should investigate whether the results can be generalized to other product categories and if they apply to the same extent when taking other product aspects into account. Finally, as the present study relies on a sample of primarily young, German consumers, future research should determine whether the information preferences also apply for a more diverse sample.

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### **3 Is it just the distance? Consumer preference for geographical and social proximity of food production (Article 2)**

(with Ossama Elshiewy and Waldemar Toporowski)<sup>3</sup>

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### **3.1 Introduction**

In light of climate change and global warming, shifting consumption to locally-produced food is one compelling way to contribute to a more sustainable economy (Cranfield et al., 2012; Jensen et al., 2019). Consumers are therefore increasingly opting for locally-produced food that is grown and manufactured near their homes (Bazzani et al., 2017; Meyerding et al., 2019). Against this background, existing literature on preferences for local product attributes has mainly focused on distance declarations and how the distance affects perception and choice (Bazzani et al., 2017; Byrd et al., 2018; Chekima et al., 2016; Meyerding, 2016; Meyerding et al., 2019; Profeta and Hamm, 2019). For local food, the geographical proximity is the commonly used criterion, referring to the distance between food production and the place of food purchasing (Feldmann and Hamm, 2015; Fernández-Ferrín et al., 2018). However, there is no consensus about what declaration of maximum distance should hold for a food to be considered local, with previous research analyzing ranges between 30 and 2000 km (Byrd et al., 2018; De-Magistris and Gracia, 2016; Meyerding et al., 2019; Willis et al., 2016).

Alongside geographical proximity, previous research has identified social proximity as an additional driver of perception and choice (Denver et al., 2019; Fernández-Ferrín et al., 2018; Jensen et al., 2019). Social proximity can be defined as the perceived distance in the relationship among all agents of the supply chain (Eriksen, 2013). For example, some previous studies identify family-run farms to increase the perceived closeness between the producing farm and the consumer, similar to local products using distance declarations (Hu et al., 2012; Jensen et al., 2019; Lang et al., 2014; Meas et al., 2015). There is also evidence that social proximity increases, if there is an opportunity to visit the place of food production, even if one does not actually visit the farm (Peterson et al., 2015). However, the question remains as to whether social

proximity (compared to geographical proximity) can influence choice for locally-produced and promoted goods.

Previous research has also highlighted the importance of norms for product perception and choice (Bianchi and Mortimer, 2015; Denver and Jensen, 2014; Feldmann and Hamm, 2015; Wenzig and Gruchmann, 2018). Despite the significance of norms in the local food literature (Bazzani et al., 2017; Fernández-Ferrín et al., 2018; Hasanzade et al., 2018; He and Wang, 2015), previous research analyzing the impact of norms on preferences for local food attributes is still scarce. Therefore, it seems desirable to elucidate whether preference heterogeneity for geographical and social proximity is driven by norms.

From this background, we aim to provide new insights into consumer preferences for geographical and social proximity of food production. To do so, we employ a between-subjects experimental design, where we first manipulate the distance declaration of locally-produced food (50 vs. 100 km). This allows us to analyze preferences for local food depending on the specific distance declarations. Within each between-subjects condition, we used a choice-based conjoint experiment to reveal preferences for geographical proximity. We then added attributes for social proximity to the choice-based conjoint experiment to understand how these local-related product characteristics further influence choice. We are particularly interested in the preference relationship between the geographical and social proximity attributes when the distance declaration of locally-produced food is varied from 50 to 100 km. As typical consumption behavior and sociodemographic variables are also drivers of preference heterogeneity, we included them in our analysis to enhance our understanding of how to promote a more sustainable economy.

Taken together, our study contributes to the literature in two ways: First, we help satisfy the need to further investigate the multidimensional nature of local food in terms

of geographical and social proximity, instead of emphasizing only distance declarations (Fernández-Ferrín et al., 2018). Second, our study increases the body of knowledge on what drives local food choice by linking consumption behavior, sociodemographic variables, as well as norms to explain heterogeneity in preferences for geographical and social proximity of food production.

The remainder of our paper is structured as follows: First, we describe our empirical approach. Thereafter, we present the results. We then proceed with a discussion of our results and conclude with implications for research and practice.

## **3.2 Methods**

We used a choice-based conjoint (CBC) experiment to answer our research questions. Based on predefined attributes, participants are instructed to choose one out of  $J$  alternatives in repeated hypothetical choice situations (see, e.g., Alberini et al., 2018). From these choices, we then estimate utility parameters which capture preference for each attribute and attribute-level (Louviere and Woodworth, 1983). To do so, attributes and attribute-levels are randomly varied within and across the hypothetical choice situations to form choice alternatives. Observing choices being made within the CBC experiment allows us to infer what drives choice behavior (i.e., preferences). To gain a better understanding of choice behavior, we estimate individual-level utility parameters using a hierarchical Bayesian approach (see, e.g., Lévesque et al., 2021; Steiger et al., 2020). Doing so enables us to (i) reveal individual-level preference heterogeneity, (ii) assess the preference relationship between the geographical and social proximity attributes, and (iii) analyze behavioral and attitudinal drivers of the preference heterogeneity.

In our study, we analyzed preferences for packaged milk. We chose this product as our experimental stimulus for several reasons: First, milk allows for a valid implementation of all product attributes investigated in our research (local, organic, etc.).

Second, it can be easily assessed as a product category by a large variety of consumers, as milk is available in all grocery stores year round. Third, dairy products are among the most purchased with respect to local food (German Federal Ministry of Food and Agriculture, 2021). Consequently, only consumers who buy milk were eligible to participate in our experiment.

### **3.2.1 Specification of relevant product attributes**

We used four food labeling attributes to describe the choice alternatives of packaged milk in our experiment: 100% Local (yes / no), Farm Visit (yes / no), Family-run Farm (yes / no), and Organic Production (yes / no). Within our study, participants had the opportunity to inform themselves about the specifics of these attributes and attribute-levels (see details in Table 9).

The selection of the attributes was based on an analysis of the actual marketplace and an extensive literature review of consumer preferences for local product attributes. We analyzed a large number of typical milk packages in various grocery stores that sell milk branded as ‘local’ or similar. The majority of brands use a criterion of localness that leave the interpretation of ‘local’ to the consumers without explicitly mentioning distance declarations (a large focus in previous research; see, e.g., Maes et al., 2015; Meyerding et al., 2019; Sama et al., 2018; Telligman et al., 2017). Some brands included exact distance declarations, while others marketed their products by leveraging the social proximity between the producer and the consumers (e.g., giving information about the family behind the farm or the farm itself). For the attribute 100% Local, we built in a between-subjects manipulation of the distance declaration (50 vs. 100 km) to represent the different specifications of geographical proximity. This means that in our CBC experiment, half of the participants only saw the attribute 100% Local with 50 km as distance declaration, while the other half only saw it with 100 km given. The attributes Farm Visit and Family-run Farm represent the dimension of social proximity. Several

articles have identified small, family-run farms to be definitional for local products (Hu et al., 2012; Jensen et al., 2019; Lang et al., 2014), which is assumed to relate to the perceived closeness between the producing farm and the consumers. Meas et al. (2015) also found that consumers in the United States tend to link local food systems with small family farms. Moreover, there is evidence that products are seen as local if there is an opportunity to visit the place of production (Peterson et al., 2015), as consumers might associate this option with the experience of seeing and purchasing products directly from the producer (Brune et al., 2021; Jensen et al., 2019; Megicks et al., 2012). Merely being able to visit the place of production might therefore signal some sort of transparency for the consumer, even without actually visiting the farm. In addition to attributes capturing geographical and social proximity, we included the attribute Organic Production to account for the well-known preference relationship between organic and local food (Hempel and Hamm, 2016a; Jensen et al., 2019; Printezis and Grebitus, 2018). We also included price per liter for the packaged milk to estimate willingness to pay (WTP). Following typical market values, we defined the attribute-levels in euro as 0.79, 0.99, 1.19, 1.39, 1.59, and 1.79.

**Table 9. Article 2.** Description of attributes used in CBC experiment.

Attribute	Attribute-level	Description
100% Local	Yes	“The milk comes from a farm located no more than 50 km [100 km] from the grocery store. All upstream production steps (such as the origin of the feed for the cows) and the entire downstream processing of the raw milk also take place within a radius of 50 km [100 km].”
	No	
Farm Visit	Yes	“It is possible to visit the farm on site (entrance is free; you must pay your own travel expenses). Visits are possible daily between 10:00 and 18:00 without an appointment.”
	No	
Family-run Farm	Yes	“The farm is managed by a farmer exclusively in cooperation with relatives. In this case, the farmer is self-employed on the own farm.”
	No	
Organic Production	Yes	“The label marks food from controlled organic cultivation. The milk meets the criteria of the EC Organic Regulation [official German organic label] and accordingly also takes animal welfare aspects into account.”
	No	
Price per liter in €	0.79, 0.99, 1.09, 1.19, 1.39, 1.59, 1.79	“Below the milk packages you can see the price (in €) that you would have to pay for 1 liter of milk.”

To reduce experimental complexity and to avoid confounding effects, we kept a number of attributes that were unrelated to our research questions fixed within our CBC experiment (e.g., the size of the milk package was set as 1 liter, package type and fat content could be defined as preferred, GMO-free, fair working conditions).

### 3.2.2 CBC experiment

From our predefined attribute-levels, our attribute space holds 96 possible experimental stimuli ( $2 \cdot 2 \cdot 2 \cdot 2 \cdot 6 = 96$ ). The number of choice situations for each participant was set to 12 and the choice-set size for each choice situation was set to three alternatives plus a No-choice option (Sawtooth, 2017b). This CBC experimental setting allowed us to present participants with a sufficiently large number of stimuli combinations, providing valid variation for parameter estimation without overwhelming choice tasks. The No-choice option within each choice situation avoids forced choices, which can result in biased preferences. After data collection, the participant's choice of alternative  $i$  from the alternatives  $J$  (with  $j = 1, \dots, J$  and  $J = 4$ : Three choice alternatives + the No-choice option) becomes the multinomial dependent variable and the attribute-levels represent the explanatory variables  $X$ . Linking the choice to the explanatory variables allows identification of the utility parameters, which then describe preferences for attributes and attribute-levels (Louviere and Woodworth, 1983).

Based on random-utility theory (McFadden, 1973), participants choose the alternative  $i$  out of  $J$  based on maximizing their utility. The utility of participant  $n$  for any alternative  $j$  in the choice set becomes  $U_{nj} = X_{nj} b + e_{nj}$ . Here,  $X_{nj} b$  is the deterministic part of utility and connects the attribute-levels  $X_{nj}$  and the utility  $U_{nj}$  via the utility parameters  $b$ . For parameter identification, a stochastic part of utility  $e_{nj}$  must be defined as a random variable. We used an i.i.d. Type I Extreme Value distribution for  $e_{nj}$ , which leads to the well-known multinomial logit model (McFadden, 1973). From this, the choice probability  $P$  of alternative  $i$  for participant  $n$  becomes the ratio of the utility of

alternative  $i$  to the sum of utilities of all alternatives  $j^*$  in the choice-set (taken to the power of  $e$ , denoted as  $\exp$ ; see Train, 2009, p. 14):  $P_{ni} = \exp(U_{ni}) / \sum_{j^*} \exp(U_{nj^*})$ . After parameter estimation, we can evaluate preferences for attributes and attribute-levels by the sign and magnitude of the utility parameter  $b$  (Louviere and Woodworth, 1983). With price as an attribute in the CBC experiment, we can compute WTP for attribute-levels using the negative value of a utility parameter of interest divided by the utility parameter of the price attribute (Jedidi and Zhang, 2002).

Advances in Bayesian Markov chain Monte Carlo (MCMC) methods allow us to estimate individual-level utility parameters for each participant, which is interpreted as preference heterogeneity for the attributes and attribute-levels (see, e.g., Priessner and Hampl, 2020; Steiger et al., 2020; for further elaboration, we refer the reader to Train, 2009, Ch. 12). To arrive at individual-level utility parameters ( $b_n$ ), we used a hierarchical Bayesian (HB) approach for our multinomial logit model. We specified the prior for the individual-level utility parameters as a multivariate Normal distribution with mean  $b$  and a full covariance matrix  $W$ . Following common practice in Bayesian MCMC, we further specified diffuse/non-informative prior settings and employed the hybrid Gibbs sampler proposed by Rossi et al. (2005, Ch. 5). After 300,000 MCMC draws, we discarded the first 200,000 as burn-in and kept the remaining 100,000 to summarize our posterior distribution. Visual inspection of the MCMC chains provides evidence for convergence after 200,000 burn-in draws. We summarized the marginal posterior distributions of  $b$  by the mean as our parameter estimates (Post  $b$ ) and evaluated the uncertainty using the 95% confidence interval.

Our HB method allows us to analyze the individual-level utility parameters for each attribute-level as dependent variable and any participant-specific characteristics as explanatory variables to explain preference heterogeneity (in our case, preference for the attributes of geographical and social proximity). Our choice of participant-specific

explanatory variables in the form of behavioral and attitudinal drivers are described in the next section.

### **3.2.3 Behavioral and attitudinal characteristics**

To explain preference heterogeneity, we asked our participants a number of questions both before and after the CBC experiment regarding their behavior and attitudes with respect to milk and local food.

Our first block of questions addressed general milk consumption behavior. We asked participants how many liters of milk they typically buy per week, with what fat content, in which type of packaging, what type of brand they choose, and at what retail format they buy milk (see answer options in Table 11).

Our second block of questions measured participants' agreement with statements concerning norms related to purchasing local milk (rated on a 5-point Likert scale ranging from 1 = *fully disagree* to 5 = *fully agree*). Norms are described as an individual's internal or external expectations of how to behave appropriately (Cialdini et al., 1990). In our research, we distinguish between personal norms and social norms. While personal norms are held by individuals themselves to act in a specific manner for the benefit of others (internal), social norms are reliant on the presumed influence of others (external) (Ajzen, 1991; Hofenk et al., 2019; Thøgersen, 2006). We used two items for personal norms and two items for social norms, as proposed by Wenzig and Gruchmann (2018). We adapted the item wording to our context and introduced item rotation into our questionnaire to avoid any order effects. Item formulation and summary statistics for the operationalization of social and personal norms can be found in Table 10.

**Table 10. Article 2.** Summary of items for personal and social norms.

Construct	Item	Mean	SD
Personal Norm 1/2	I feel committed to buying local milk.	2.84	1.27
Personal Norm 2/2	I feel guilty when I buy non-local milk.	2.91	1.30
Social Norm 1/2	People who are important to me expect me to buy local milk.	2.26	1.13
Social Norm 2/2	I believe that many people in the society buy local milk.	2.89	1.10

*Note.* Items measured on a 5-Point Likert Scale with 1 = *fully disagree* to 5 = *fully agree*. Cronbach's alphas for the respective two-item operationalization were  $\alpha = 0.79$  for personal norm and  $\alpha = 0.74$  for social norm.

Next, we explained to participants the product characteristics that hold for a 100% Local label [i.e., “...*that the entire production process of the milk takes place in the immediate vicinity (of the place of purchase). This applies to upstream production steps (such as the origin of the feed for the dairy cows) as well as the entire downstream processing of the raw milk...*”]. We did not specify the distance that would hold for the 100% Local label, explicitly explaining that there exists no regulation for its use. Instead, we asked participants to indicate the maximum distance in kilometers that they believe would justify a 100% Local label for milk. Participants could give their answer on a continuous scale from 10 to 150 km. After this question, we introduced participants to our CBC experiment and divided them randomly between the two between-subjects conditions (50 vs. 100 km distance declaration). Participants then entered the respective CBC experiment (see previous section).

Our final block of questions was designed to collect sociodemographic information. We asked participants to state their age, gender, highest level of education, household size, and household income. We also asked participants to specify the first three digits of their 5-digit postal code (which raises fewer privacy concerns and results in a higher response rate compared to asking for the full postal code).

To ensure that participants were attentive, we included two attention checks into our experiment. The first was integrated as an additional item in the block of norm-related statements (“Please indicate ‘fully agree’ for this question”). Our second attention check

asked participants at the end of the experiment to repeat the maximum distance holding for the 100% Local label (i.e., the between-subjects manipulation).

### **3.2.4 Sample**

For our experiment, we recruited 400 participants from Germany in January 2021 via the commercial online platform Clickworker. We excluded participants from our data if they failed one of our attention checks or showed “straight lining” in the CBC experiment (see, e.g., Allenby et al., 2014). Straight lining means that participants always choose the option in the same position of the choice set (e.g., always the left-most alternative), which is not a plausible response pattern in a CBC experiment. After data exclusion, we observed a total sample size of  $N = 344$  (with a highly similar distribution across the two between-subjects groups:  $N_1 = 174$  for 100% Local within 50 km;  $N_2 = 170$  for 100% Local within 100 km). We summarize descriptive statistics of our final sample in Table 11.

On average participants were 36.3 years ( $SD = 12.7$ ) and 40.7% stated their gender as female. We observed that 45% of participants were holding a university degree. Average household size was 2.42 ( $SD = 1.06$ ) and close to equally distributed shares across the income levels. Based on the first three digits of the postal code, we classified participants coming from urban areas and from rural areas. We follow the classification by the German Federal Agency for Civil Education (Küpper, 2020) and define urban areas as counties with more than 100.000 residents. By doing so, we observe that the majority of participants (75.6%) come from urban areas (which is representative for the German population).

With respect to behavior, participants stated to buy 2.92 liters of milk on average per week ( $SD = 1.96$ ), with 45% preferring milk with a fat content of 1.5–1.9% and 50.6% preferring milk with 3.5–3.9% fat. The majority of participants buys milk in Tetra Pak (92.4%). While more than half of the participants typically purchase private-label brands (54.6%), close to one third of them opt for national brands (35.2%). The typical retail

formats for milk purchases were split fairly even between discounters (46.8%) and supermarkets (48.5%).

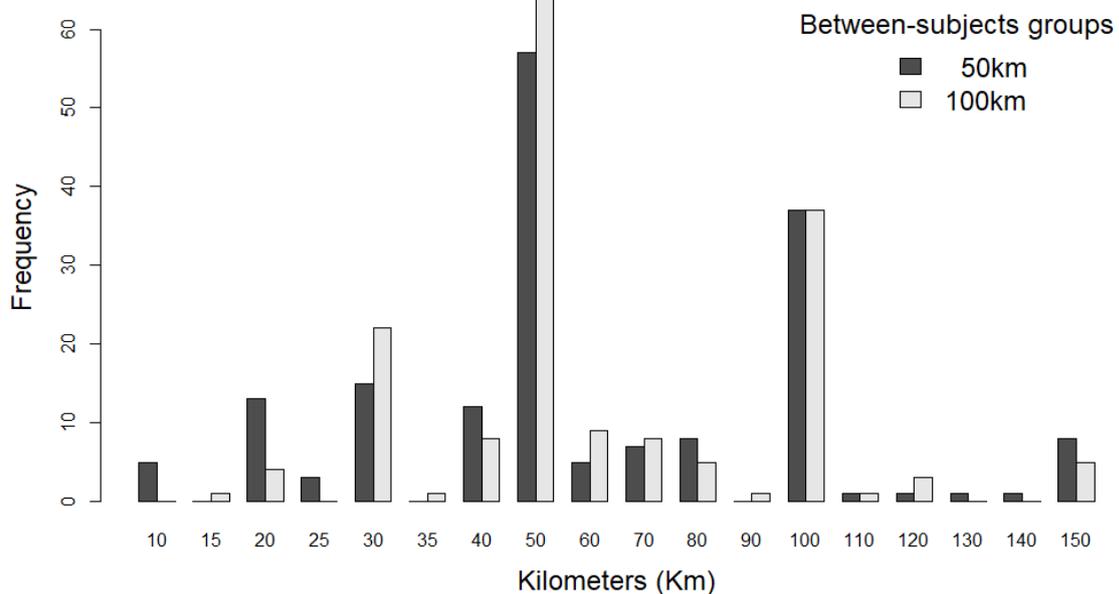
**Table 11. Article 2.** Summary statistics.

Variable	Description	Total (in %)
Age	18–30 years	30.5
	31–45 years	45.1
	46–60 years	17.4
	Over 60 years	4.4
	n.i.	2.6
	Mean (SD) = 36.3 (12.7)	
Gender	Female	40.7
	Male	58.1
	Non-binary	0.6
	n.i.	0.6
Education	No qualification	0.0
	Secondary school	18.9
	High school	31.7
	University degree	45.0
	Ph.D.	2.9
	n.i.	1.5
Household size	1	22.7
	2	33.4
	3	24.4
	4+	18.3
	n.i.	1.2
	Net household income/month	Less than 1,000€
1,001–2,000€		16.5
2,001–3,000 €		20.1
3,001–4,000 €		16.9
4,001–5,000 €		14.5
More than 5,000 €		7.8
n.i.		16.6
Residential area		Urban
	Rural	19.2
	n.i.	5.2
Milk consumption in liter/week	Mean (SD) = 2.92 (1.96)	
Fat content [%]	Less than 0.5%	4.4
	1.5–3.5%	45.0
	3.5–3.9%	50.6
Type of packaging	Tetra Pak	92.4
	Glass	6.7
	Other	0.9
Preferred brand	National brand	35.2
	Private label brand	54.6
	I don't know	10.2
Retail format		

Maximum distance (to justify 100% Local)	Discounter	46.8
	Supermarket	48.5
	Organic specialty store	3.5
	Other	1.2
	<hr/>	
	10–50 km	59.9
	51–100 km	34.0
	101–150 km	6.1
	Mean (SD) = 63.56 (32.27)	

*Note.* N = 344. n.i. = not indicated.

The maximum distance in kilometers that participants believed would justify a 100% Local label for milk resulted in an average value of 63.56km (SD = 32.27). We plot the responses to the subjective maximum distance in kilometers in Figure 3. With this, we can show that participants in our experiment dominantly perceived the 50 km distance declaration for the 100% Local label to be more appropriate than the 100 km distance declaration.



**Figure 3. Article 2.** Subjective maximum distance to justify 100% Local.

### 3.3 Results

#### 3.3.1 Utility parameters from CBC experiment

In Table 12, we begin with a summary of the CBC experiment and the utility parameters  $b$ . For parameter identification, we used dummy coding for the four food labeling attributes (with 1 = yes, 0 = no). Hence, the utility parameters for 100% Local, Farm Visit, Family-run Farm, and Organic Production capture the preferences as well as attribute importance in our CBC analysis. Following common practice, we used price as a linear attribute in the utility equation (Allenby et al., 2014). We tested our utility parameters against zero using the 95% confidence interval (CI) of the marginal posterior distribution.

**Table 12. Article 2.** Utility parameters and WTP.

Attribute-Level	Local within 50 km (N = 174)			Local within 100 km (N = 170)		
	Post $b$	95%CI	WTP	Post $b$	95%CI	WTP
100% Local	1.844*	[1.524, 2.176]	€0.36	1.672*	[1.377, 1.978]	€0.31
Farm Visit	0.917*	[0.645, 1.198]	€0.18	0.644*	[0.380, 0.911]	€0.12
Family-run Farm	0.937*	[0.677, 1.198]	€0.19	1.058*	[0.804, 1.326]	€0.20
Organic Production	1.969*	[1.570, 2.388]	€0.39	1.967*	[1.600, 2.354]	€0.36
Price	-5.062*	[-5.922, -4.279]		-5.413*	[-6.320, -4.586]	
No-Choice	-8.352*	[-10.045, -6.915]		-8.548*	[-10.249, -7.081]	

*Note.* Post  $b$  = Mean of marginal posterior distribution; 95%CI = 95% confidence interval; WTP = willingness to pay

\* indicates a 95%CI that does not cover zero (“significant”).

From our CBC experiment, we observe the following results. The attribute 100% Local exhibits the largest relative importance in both between-subjects conditions, followed by Family-run Farm, while preference for Farm Visit is the lowest. All 95%CI did not cover zero, however, the overlap in the respective 95%CI indicated that the difference in the two utility parameters across the between-subjects conditions cannot be considered different from zero. For Organic Production, we also observe positive utility parameters in both between-subjects conditions and 95%CI that did not cover zero. Following the law of demand, the utility parameter for price is found negative with a 95%CI that does not cover zero. The utility parameter for the No-choice option is negative

in both between-subjects conditions and both 95%CI did not cover zero. This indicates that participants preferred to choose the milk packages in our experiment than to opt out through the No-choice option.

For WTP, we observe the following values (in €) for the participants in the within 50 km condition: 100% Local = 0.36, Farm Visit = 0.18, Family-run Farm = 0.19, Organic Production = 0.39; and in the within 100 km condition: 100% Local = 0.31, Farm Visit = 0.12, Family-run Farm = 0.20, Organic Production = 0.36. Taken together, participants are willing to pay a price premium for milk with attributes of geographical and social proximity.

Next, we focus on the preference relationship among the attributes in our CBC experiment. We calculated correlations of the individual-level utility parameters for the two between-subjects conditions (see Table 13).

**Table 13. Article 2.** Correlation matrix of individual-level utility parameters.

	100% Local	Farm Visit	Family-run Farm	Organic Production	Price
100% Local		0.197***	0.411***	0.207***	.394***
Farm Visit	0.062		0.250***	0.132*	.452***
Family-run Farm	0.288***	0.324***		-0.046	.481***
Organic Production	0.157**	0.117	-0.076		.505***
Price	.485***	.295***	.346***	.355***	

*Note.* Upper triangle = correlations for within 50km condition (N = 174); Lower triangle = correlations for within 100km condition (N = 170); \*\*\* $p < 0.01$ ; \*\* $p < 0.05$ ; \* $p < 0.10$

For the preference relationship, we observe that the correlation coefficients for the individual-level utility parameters are all positive among the geographical and social proximity attributes. For 100% Local within 50 km, we observed that participants with a higher utility for local milk also prefer milk from a producer that allows farm visits, is family-run, and provides organic production. We observe a similar relationship for 100% Local within 100 km, although it does not hold for the farm-visit option and all

magnitudes of the correlation coefficients become smaller (but not significantly smaller based on tests for comparing correlation coefficients; see Zou, 2007; all  $p > 0.10$ ).

### **3.3.2 Behavioral and attitudinal characteristics as drivers of utility**

To explain preference heterogeneity, we used linear regression models with the individual-level utility parameters for the attributes of geographical and social proximity as dependent variables, and the behavioral and attitudinal characteristics described in section 3.2.3 as explanatory variables. We estimated our regression models for each between-subjects condition. To facilitate interpretation, we recoded some of the explanatory variables as binary variables. Gender was recoded to 1 = female, 0 = else. We used 1 = single household, 0 = else instead of household size. For education, we created a binary variable with 1 = at least a university degree, 0 = else, while for income we coded 1 = high income (more than €3,000), 0 = else. The different levels of preferred fat content for the milk became 1 = 3.5–3.9%, 0 = else; packaging type then 1 = Tetra Pak, 0 = else; preferred brand type 1 = national brand, 0 = else; and retail format 1 = discounter, 0 = else. We transformed milk consumption in liters per week using the natural logarithm, and we also created a variable measuring population density for each 3-digit postal code by dividing its population by the area in square kilometers (then also transformed by the natural logarithm). Importantly, the results of our regression models are not sensitive to our choice of coding and variable transformation, but simplify presentation and interpretation. We present the parameter estimates for our models in Table 14. The largest variance inflation factor across all models and explanatory variables is 2.001. From this, we can conclude that our results do not suffer from multi-collinearity. In terms of overall model fit, we observe  $R^2$  values between 0.100 and 0.270. Following Cohen (1988), we therefore interpret our model fit as moderate, and are confident to report and interpret significant parameter estimates with sufficient explanatory power. Nevertheless, the moderate model fit suggests that other explanatory variables may also

explain the preference heterogeneity in our CBC analysis in addition to the behavioral and attitudinal drivers in our study.

The results from the regression models can be summarized as follows. The preference heterogeneity for 100% Local within 50 km is significantly explained by higher personal norms regarding local milk purchases ( $b = 0.228, p < 0.01$ ), lower age ( $b = 0.015, p < 0.05$ ) and for participants that prefer national brands over private label brands when buying milk ( $b = 0.299, p < 0.10$ ). The preference heterogeneity for 100% Local within 100 km is also significantly explained by higher personal norms ( $b = 0.127, p < 0.10$ ) and for participants that prefer national brands over private label brands ( $b = 0.390, p < 0.01$ ), but now also for participants living in more densely populated areas ( $b = 0.117, p < 0.05$ ). For the two attributes representing social proximity, we observe a highly similar pattern with respect to personal norms. The impact is positive and significant for Farm Visit in both between-subject conditions ( $b = 0.155, p < 0.05$  vs.  $b = 0.145, p < 0.05$ ), and for Family-run Farm in the 100% Local within 50 km condition ( $b = 0.164, p < 0.05$ ). Other significant coefficients for the preference heterogeneity of the social proximity attributes are that female participants show a greater preference for Farm Visit in the 100% Local within 50 km ( $b = 0.250, p < 0.1$ ) condition, while the same holds for more educated participants in the 100% Local within 100 km condition ( $b = 0.243, p < 0.05$ ). All other behavioral and attitudinal drivers showed no significant impact in terms of explaining the individual-level utility parameters.

**Table 14. Article 2.** Behavioral and attitudinal drivers of preference heterogeneity.

<b>100% Local within 50km</b> (N = 174)						
	<b>100% Local</b>		<b>Farm Visit</b>		<b>Family-run Farm</b>	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
Intercept	<b>1.945***</b>	0.587	<b>0.961**</b>	0.463	<b>0.837**</b>	0.407
Social Norm	0.055	0.094	-0.038	0.074	0.004	0.065
Personal Norm	<b>0.228***</b>	0.087	<b>0.155**</b>	0.068	<b>0.164***</b>	0.060
Age	<b>-0.015**</b>	0.007	-0.006	0.006	-0.001	0.005
Female	-0.059	0.161	<b>0.250*</b>	0.127	0.081	0.112
Single Household	-0.175	0.209	-0.177	0.165	0.017	0.145

University Education	0.211	0.165	-0.144	0.130	-0.079	0.114
High Income	-0.105	0.174	-0.101	0.137	-0.038	0.121
Density Residential Area	-0.060	0.061	-0.024	0.048	-0.065	0.042
Milk consumption in liters	-0.164	0.116	-0.127	0.092	-0.029	0.081
High fat content	0.007	0.164	-0.152	0.129	-0.003	0.114
Tetra Pak	0.163	0.312	-0.220	0.246	-0.327	0.216
National Brand	<b>0.299*</b>	0.178	<b>0.376***</b>	0.140	0.136	0.123
Discounter	0.067	0.172	0.221	0.135	0.128	0.119
<i>R</i> <sup>2</sup>	0.164		0.163		0.100	
<b>100% Local within 100km (N = 170)</b>						
	<b>100% Local</b>		<b>Farm Visit</b>		<b>Family-run Farm</b>	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
Intercept	0.260	0.447	0.320	0.406	<b>1.032***</b>	0.344
Social Norm	0.099	0.084	-0.045	0.076	0.070	0.065
Personal Norm	<b>0.127*</b>	0.075	<b>0.145**</b>	0.068	0.081	0.057
Age	-0.007	0.006	0.001	0.006	-0.002	0.005
Female	0.166	0.144	0.059	0.130	-0.082	0.111
Single Household	0.005	0.181	-0.084	0.164	-0.048	0.139
University Education	-0.055	0.130	<b>0.243**</b>	0.118	0.022	0.100
High Income	0.151	0.146	0.131	0.132	0.022	0.112
Density Residential Area	<b>0.117**</b>	0.057	-0.007	0.052	-0.047	0.044
Milk consumption in liters	-0.050	0.095	-0.119	0.086	-0.080	0.073
High fat content	0.221	0.134	0.020	0.122	0.007	0.103
Tetra Pak	0.471	0.304	-0.131	0.276	0.148	0.234
National Brand	<b>0.390***</b>	0.150	0.111	0.136	0.117	0.115
Discounter	0.004	0.138	-0.152	0.125	-0.014	0.106
<i>R</i> <sup>2</sup>	0.270		0.125		0.101	

Note. *b* = Parameter estimate; SE = Standard Error; \*\*\**p* < 0.01; \*\**p* < 0.05; \**p* < 0.10. Significant parameter estimates are marked in **bold**.

### 3.4 Discussion

Overall, our results show that social proximity can drive choice (see also Jensen et al., 2019; Meas et al., 2015). However, geographical proximity remains dominant. Our utility parameters show that the order of preference for the food-labeling attributes appears to follow the order of how effective these attributes are in terms of their objective contribution to sustainability, with the greatest preferences for organic milk, followed by the geographical proximity of milk production. These findings can also be explained by how widespread the respective labels are in food marketing, which leads to the most and second widespread label holding the highest and second highest preference (first organic,

then local). This pattern follows heuristics-based decision making (Chaiken, 1980), which is common in choice behavior when confronted with unfamiliar product attributes (Thøgersen et al., 2019). While we found the preference order to be independent of the distance declaration for the local milk, non-significant differences suggest the following (based on WTP and less on the utility parameters): Participants value locally-produced milk and the possibility to visit the farm slightly more if the milk is produced within 50 km as opposed to 100 km. This result is in line with our observation that participants deem it more appropriate to call milk “locally produced” if it was made within 50 km rather than 100 km. This finding can be explained by a closer geographical proximity better fulfilling the goals associated with purchasing local food (i.e., sustainable food production; Jensen et al., 2019). It is also conceivable that the greater travel distance for products may increase concern or distrust (e.g., Profeta and Hamm, 2019). Across the two between-subjects conditions, we also found that the preference relationship among all food labeling attributes hints to a weaker association of these attributes (due to lower correlations among the individual-level utility parameters). One exception is the preference relationship between the two social proximity attributes, which becomes slightly larger in the within 100 km condition. These findings are in line with our distinction between geographical and social proximity attributes and how participants appear to increase contrasting for the less attractive local milk (within 100 km instead of 50 km).

In line with previous research, we found participants to have a greater WTP for locally-produced milk (e.g., Meas et al., 2015; Onozaka and McFadden, 2011; Printezis and Grebitus, 2018; Profeta and Hamm, 2019). Our CBC experiment revealed that participants are willing to pay a price premium of €0.36 per liter of milk that is produced within 50 km and €0.31 if it is produced within 100 km. For milk, Profeta and Hamm (2019) found slightly higher results for their attribute-level “100% Local” (€0.41).

However, their definition of local included a nearby region, while our study focused on a generalizable distance declaration (with exogenous between-subjects variation: 50 vs. 100 km). For the two attributes representing social proximity, we also observed that participants are willing to pay a price premium. However, it remains an open question, if the lower WTP for the farther away option of a farm visit is due to lower social proximity or the anticipated greater travel distance required to make use of this option (or even both). The preference relationship among the food labeling attributes shows that a nearby family-run farm with the option to visit can bring those farmers additional income (with the potential of reinforcing perceived social proximity for those that chose to visit; see, e.g., Brune et al., 2021, for the topic of agritourism).

When explaining preference heterogeneity for attributes of geographical and social proximity, our results highlight the need to adopt a differentiated view of personal and social norms (e.g., Hofenk et al., 2019; Thøgersen, 2006). In line with Bianchi and Mortimer (2015), we found that having higher perceived personal norms with respect to buying local food increases preference and WTP for local milk for both distance declarations. In contrast, the effect of perceived social norms was not found to be significant. From this, we can conclude that participants prefer the local food labeling attributes based solely on their internal (personal) standards and that external (social) influences do not increase choice or WTP. This outcome can be explained by regional ethnocentrism (see, e.g., Bianchi and Mortimer, 2015; Fernández-Ferrín et al., 2018; Fernández-Ferrín and Bande-Vilela, 2013; Lorenz et al., 2015): Individuals can evolve a feeling of belongingness and a perceived obligation to their region based on personal norms. This then defines what purchase behavior is deemed acceptable, resulting in greater preference for both geographical and social proximity attributes.

The positive effect of higher population density on the preference for local milk in the within 100 km condition can presumably be attributed to a lower preference for food

production close to dense areas compared to food production in less dense areas (which then leads to a higher tolerance for the distance of local food). The negative effect for higher population density in the within 50 km condition corroborates this interpretation but was not found to be significant in our study. Another noteworthy finding is the greater preference for local milk in the within 50 km condition among young consumers. This finding is interesting in that most studies have assumed an opposite direction of this effect (Feldmann and Hamm, 2015; Sama et al., 2018) or did not find any evidence at all (Bazzani et al., 2017). A greater preference for local food among participants who favor buying national brands over private-label brands (for both conditions) also informs a more targeted marketing of local food. All other participant-specific variables show no systematic impact in terms of explaining preference heterogeneity for the geographical and social proximity attributes in combination with the between-subjects manipulation of the distance declaration. This finding is in line with previous research, which has also found few sociodemographic characteristics that reliably describe choice for local food (see, e.g., Feldmann and Hamm, 2015; Peterson et al., 2015).

## **3.5 Conclusion**

### **3.5.1 Theoretical implications**

The increasing interest of various stakeholders in supporting locally produced food makes it more important to understand the associated consumer preferences. From this background, our study provides a number of important contributions for research, practitioners, and policymakers to influence choice of food holding geographical and social proximity attributes: First, our results endorse the positive effects of social proximity on consumer choice and enhance our understanding of the preference relationship between the geographical and social proximity of food production (especially when distance declarations are varied). Interestingly, the importance of a family-run farm

increases with greater distance, while the option of visiting the farm shows lower preference with increasing distance. Second, our results reveal a differentiated effect of norms on preference heterogeneity for attributes of geographical and social proximity. Personal norms drive preferences, while social norms show no impact. Moreover, our findings shed light on further drivers of preference heterogeneity and thus provide a number of important contributions for researchers, practitioners, and policymakers to influence choice for local food.

### **3.5.2 Managerial implications**

Based on our findings, food marketers and retailers should be aware that disclosing attributes of social proximity can complement the geographical proximity claims examined in our study. Practitioners should also address consumers' personal norms when advertising such proximity attributes. For example, emphasizing personal commitment to the local economy can increase WTP for local dairy products (e.g., Fernández-Ferrín et al., 2018). The preference relationships revealed in our study imply that a family-run farm that allows visits can provide an additional economic mainstay, especially in light of increasing agritourism (Brune et al., 2021). Ultimately, the possibility of a farm visit would strengthen the social proximity between producers and consumers and allow farmers to charge a surplus for their products. While the aspect of a farm visit may seem contra productive in terms of sustainability, the mere possibility of a visit may increase perceived transparency and consumer trust. Moreover, we believe that even one visit will offer educational opportunities for consumers. This potentially results in subsequent choice of such food, which then contributes to sustainability in total. As information gathering benefits from technological advances in retailing (Gielens et al., 2021; Hasanzade et al., 2018), providing additional digital information (e.g., pictures and videos of the farm) could also complement the aspect of a farm visit in a more modern and timely manner. Furthermore, our results indicate that products can be marketed as

local with an extended distance declaration of 100 km (vs. 50 km) in dense counties. The results further show that consumers who prefer national brands have a greater preference for local products and the option to visit the farm, assuming the milk is produced in the immediate vicinity of the place of purchase.

### **3.5.3 Limitations and avenues for future research**

Despite providing novel and important insights, our study bears some limitations that set the stage for future research opportunities. For example, future studies could analyze whether our results can be extended to other product categories, as previous research has suggested that the perception of localness can depend on the product category (Printezis et al., 2019). Moreover, we focused on family-run farms as an indicator of social proximity and did not elaborate on the role of cooperatives (see, e.g., Bianchi and Mortimer, 2015; Eriksen, 2013). Further studies are therefore encouraged to investigate whether cooperatives can also represent claims of social proximity and how this ultimately drives consumer choice for local food. Furthermore, CBC experiments are suitable for eliciting consumer preferences in hypothetical environments, but they can be prone to social desirability bias with sustainability-related attributes (De Pelsmacker et al., 2005b; Hasanzade et al., 2018). Hence, it would be beneficial for future research to also consider real-market data. Lastly, future studies could replicate and add to our findings with insights from other populations to establish cross-country implications for food marketing regarding geographical and social proximity attributes.

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## **4 Scan me, if you can – Fostering behavioral intentions toward local food with digitally provided product information (Article 3)**

(with Waldemar Toporowski)<sup>4</sup>

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- 48<sup>th</sup> EMAC Conference (2019), Hamburg, Germany. [VHB: D]
- 13<sup>th</sup> Global Brand Conference (GBC) (2018), Newcastle upon Tyne, England.
- 19<sup>th</sup> International Conference on Research in the Distributive Trades of the European Association for Education and Research in Commercial Distribution (EAERCD) (2017), Dublin, Ireland.

*Keywords:* labels, sustainability, digital product information, perceived information quality

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## 4.1 Introduction

A wealth of people must adopt new dietary habits to mitigate the negative environmental effects of an industrialized and globalized agriculture (Weber, 2021; Lazzarini et al., 2018; Shi et al., 2018). Shifting consumption from globalized to localized products is one compelling means to stymie such negative impacts and promote a more sustainable economy (Chekima et al., 2016). Consumers are becoming increasingly aware of their responsibility in this regard (Cerri et al., 2018; Hasanzade et al., 2018; Vadakkepatt et al., 2021) and are opting more and more for locally produced food (Bazzani et al., 2017; Meyerding et al., 2019) to counteract the downsides of industrialized food production practices (Cranfield et al., 2012; Onozaka and McFadden, 2011). Despite the increased demand for local products, communicating local aspects of products to consumers in an effective manner remains challenging. To support an environmentally friendly food production and mindful consumption practices, however, effective communication tools must be deployed.

With the aim of overcoming purchase barriers, information provision is given central importance in the current literature (Cho, 2015; Cho et al., 2018; Gleim et al., 2013; Osburg et al., 2017). Undeniably, elaborate information about product attributes can shape consumers' attitudes and redirect their decision making in terms of food choices (Cerri et al., 2018; Osburg et al., 2016; Testa et al., 2015; Verbeke, 2008). Deliberate provision of information can also be effective in educating consumers about the actions and consequences of making sustainable food choices (Ariely, 2000; Cho, 2015; White et al., 2019). However, the information provided must be of high quality to enhance consumer evaluation and behavior accordingly (Branco et al., 2016; Keller and Staelin, 1987; Salaün and Flores, 2001; Osburg et al., 2017; Pearson et al., 2012). So far, labels have predominantly been used to reveal the local origin of a product to consumers in an aggregated way (Testa et al., 2015; Meyerding et al., 2019; Vecchio and Annunziata,

2015). However, it is unclear whether and to what extent labels can empower consumers to make informed decisions (Grunert et al., 2014; Hasanzade et al., 2018; Ikonen et al., 2020; Lazzarini et al., 2018; Song et al., 2019, Vadakkepatt et al., 2021). The communication of local product attributes in particular seems to pose a special challenge: A non-uniform definition of local products (Feldmann and Hamm, 2015; Meyerding et al., 2019) results in diverse formats of presenting the local nature of products in practice, such as different non-regulated local food labels. Such inadequacies in disclosing relevant product information not only appear to be a prevailing barrier when it comes to effectively promoting local products (Chekima et al., 2016, Messer et al., 2017; Verbeke, 2008) but also reinforce the information asymmetries already prevalent in food retailing. Providing detailed product information verbally, as suggested by Hasanzade et al. (2018) and others, is also not conducive, as presenting detailed product information without consumers having basic knowledge about the particular region does not seem target oriented and facilitates the risk of information overload (e.g., Batra and Keller, 2016; Branco et al., 2016; Grunert et al., 2014; Verbeke 2005). It is therefore crucial to consider alternatives that allow consumers to make more informed decisions (Atkinson and Rosenfield, 2014; Lazzarini et al., 2018).

Innovative technologies have changed the way customers gather information (Batra and Keller, 2016; Gielens et al., 2021; Kannan and Li, 2017; Roggeveen and Sethuraman, 2020; Sun and Tyagi, 2020; Tanner et al., 2019). For example, the barcoo and CodeCheck apps provide consumers with detailed ecological product information. Prior research has indicated that mobile applications can be used to support consumers' decision making processes (Abao et al., 2018; O'Rourke and Ringer, 2016; Roggeveen and Sethuraman, 2020) and shape brand evaluations (Mohrenfels and Klapper, 2012). Given their steady growth in the retail context, these applications offer great potential in terms of offering consumers more and context-specific information about relevant

product attributes at the point of sale (Atkinson and Rosenthal, 2014; Grewal et al., 2020; Hasanzade et al., 2018; Osburg et al., 2017). Therefore, they are seen as a prudent approach to encourage consumers to make better informed choices, without being forced to everyone (Messer et al., 2017).

Despite the considerable research that has been devoted to understanding how consumers' behavioral intentions are influenced by labels (Brach et al., 2018; Cerri et al., 2018; Gleim et al., 2013; Grunert et al., 2014; Meyerding and Merz, 2018; Meyerding et al., 2019; Lazzarini et al. 2018; Song et al., 2019) and detailed product information (Hasanzade et al., 2018; Zander and Hamm, 2010; Osburg et al., 2016), the question of whether and when digitally provided information on products credence attributes are detrimental to choice remains open (Tanner et al., 2019; Vadakkepatt et al., 2021). To tackle this question of digital information effectiveness, we conducted two experimental studies, each with a 3×2 between-subjects design. These studies were designed to help us understand how consumers perceive the quality of information provided to them via three different types of information provision, two of which are currently used in the marketplace. In the two studies, we examine how consumers' perceived information quality (PIQ) differs across product types and how it influences purchase intentions, taking into account consumers' diverse expectations regarding the distance they deem appropriate to consider a food local. Thus, this study contributes to research in several ways. First, we show that mobile-based product information can indeed be an effective alternative for promoting credence attributes, especially for locally produced food. By doing so, our research advances the body of knowledge that has thus far focused on the effectiveness of analog information-retrieval techniques. Second, it also highlights the role of PIQ as a mediator between information disclosure and behavioral intentions. By taking a more nuanced view, this paper finally provides insights regarding the product types for which digitally provided information is most promising. Together, these insights

guide marketing and retailers to conclude generalizable and well-targeted implications to convey consumers and boost local food consumption.

The remainder of this paper is structured as follows: We begin with a brief review of the current literature. Afterward, we develop our hypotheses regarding how information type affects PIQ and purchase intentions together with the moderating effect of product type on those relations. We then describe the methodology of our two empirical studies. After presenting and discussing their results, we conclude with implications regarding which elements marketing should prioritize to promote the choice for local products.

## **4.2 Conceptual background**

In the following, we address the prevailing problem of information asymmetries within the retail context. Afterward, we describe the nomological framework and provide a theoretical background. We then introduce our hypotheses on the effects of information type on information perception and purchase intention.

### **4.2.1 The dilemma of information asymmetry**

Sustainable products inherently increase the complexity of decision making (Brach et al., 2018), as consumers often have insufficient knowledge about a product's sustainable attributes (Gleim et al., 2013). This is especially the case for local produce because relevant regulatory bodies are nonexistent (Feldmann and Hamm, 2015; Meyerding et al., 2019) but also partially applies to organic and fair-trade declarations (e.g., Cho et al., 2018). Hence, having access to decision-relevant product information at the point of sale is essential in supporting the choice for sustainable products (Frank and Brock, 2018; Grewal et al., 2020; Roggeveen and Sethuraman, 2020). However, the current information asymmetry in retailing is the opposite and products' sustainable features are therefore difficult to recognize (Cho et al., 2018; Hasanzade et al., 2018). This asymmetry

deteriorates the gap between consumer preferences and behavior (Rouseau and Vranken, 2013; Testa et al., 2015; Vlaeminck et al., 2014), particularly in the case of credence product attributes (e.g., environmental and social; Brach et al., 2018; Hasanzade et al., 2018; Osburg et al., 2020), which consumers cannot verify before or after purchase (Darby and Karni, 1973).

It is therefore possible that providing elaborate information about a product's credence attributes discloses its superior features in a more transparent and convincing manner while also reducing the market failure resulting from asymmetrical information (Verbeke, 2005; Osburg et al., 2020). In the case of local product claims, efforts have been made to achieve transparency and mark the local nature of products in Germany with a putative standardized label (Regionalfenster, 2020). However, producers can still choose which definition of local products they use and which standards they adhere to when applying this particular label. Moreover, consumers have diverse perceptions of what "local" implies (e.g., Feldmann and Hamm, 2015; Meyerding et al., 2019). Thus, the only third-party label in Germany may itself "function as a credence attribute which consumers struggle to evaluate" (Brach et al., 2018, p. 254). Furthermore, because this particular labeling is voluntary and involves license fees, many retailers have introduced their own labels to promote their products' localness. Ironically, the widespread use of non-regulated labels leads to consumer confusion and increases information asymmetry, thus diminishing the intended positive effects on local product choices (e.g., Borin et al., 2011; Dendler, 2014; Grunert et al., 2014; Testa et al., 2015; Hasanzade et al., 2018).

Digital technologies are particularly well suited for mitigating market failures and reducing information asymmetries between producers or retailers and consumers (Kannan and Li, 2017). As information-gathering methods are evolving due to technological advances in retailing (Gielens et al., 2021; Kannan and Li, 2017; Roggeveen and Sethuraman, 2020), consumers often rely on such information as a basis

for making decisions. Moreover, the provision of digital information is not limited by packaging size (e.g., Li and Messer, 2019; Mohrenfels and Klapper, 2012) or subject to issues of information overload (Messer et al., 2017). However, the literature has lamented the lack of understanding regarding what types of communication generate the best consumer responses in terms of (sustainable) choice behavior (McFadden and Huffman, 2017; Vadakkepatt et al., 2021).

#### **4.2.2 Consumers information processing**

To understand how consumers process the information provided to them, this article draws on McGuire's (1976) information-processing framework and Chaiken's (1980) heuristic-systematic model (HSM). McGuire's framework assumes several stages of information processing, which ultimately result in consumer choice. According to the framework, perception is seen as a selective processing of the information a consumer is exposed to in the first place. However, consumers effectively receive only a small subset of relevant information that they perceive worthy of consideration. In the next steps, perceived information must meet several criteria – it must be comprehensible and credible – to affect choice. Consumers “must go beyond mere perception and effectively encode the information in [their] meaning system[s] so that [they] can grasp its importance” (McGuire, 1976, p. 306). Consumers' agreement with what is recognized then leads them to accept the information provided and act accordingly by making a purchase decision. The HSM allows one to frame decisions about sustainably motivated food choices by building upon the aforementioned framework. The model proposes that individuals process persuasive information through two distinct modes: heuristic and systematic. Heuristic processing is typically used when individuals understate detailed information processing due to having low motivation or processing capacity (Chaiken, 1980). They focus on simple rules to make their choices, as this mode permits low resource-intensive inferences (e.g., Verbeke, 2005). Conversely, systematic processing takes place when

individuals actively endeavor to understand and evaluate the message they have been presented (Chaiken, 1980). It manifests itself in a detailed and critical evaluation of the information provided, presuming that the information is of high relevance for the recipient (e.g., Verbeke, 2005). Within the HSM, both modes can occur and interact. Normally, consumers tend to base their decisions on heuristics (Chaiken, 1980), such as certified labels, without critically evaluating the information available. However, heuristic processing can only occur if a heuristic cue is available (Bradu et al., 2014). This is not necessarily the case in the context of local products. Due to missing regulations for claims of localness (Meyerding et al., 2019), existing labels usually address different aspects and even contradict themselves (e.g., Janssen and Langen, 2017). In the case of ambiguous information, the HSM assumes that systematic processing is biased toward heuristic cues. Unless local concerns or claims are adequately labeled, consumers will pay little attention to the attribute (Ehrich and Irwin, 2005), instead using other heuristic cues (e.g., known brands or price) to make purchase decisions and thus hindering the development of socially and environmentally desirable products (Hasanzade et al., 2018; Nikolova and Inman, 2015; Thøgersen et al., 2019). It can therefore be assumed that providing quality product information (e.g., on local aspects) can help nudge consumers toward more mindful food consumption (Ikonen et al., 2020), as it can counteract the problems mentioned above.

#### **4.2.3 The concept of perceived information quality**

It is important to distinguish between the quality and quantity of provided information. Contrary to a wealth of previous opinions (e.g., Auger et al., 2008; Cho 2015; Cho et al., 2018; De Pelsmacker et al., 2007; Olsen et al., 2014), decision effectiveness is not influenced by the volume of information presented but by its quality (Branco et al., 2016; Keller and Staelin, 1987; Gleim et al., 2013; Verbeke, 2005; Pearson et al., 2012). To be perceived as high quality and thus foster consumer decisions, the information provided

must meet several framing requirements (McGuire, 1976; Salaün and Flores, 2001). For example, McGuire (1976) cited three important characteristics when framing information: comprehensibility, credibility, and relevance. The greater the quality of the information, the more persuasive it will be for information processing.

Prior research has steadily attempted to identify characteristics of high-quality information. Information quality is typically considered a multidimensional framework, with different characteristics used to describe it. In general, any information provided should be easily accessible and understandable to facilitate consumer choice (Cho, 2015; Osburg et al., 2017; Pieniak et al., 2013; Salaün and Flores, 2001; Testa et al., 2015). However, merely understanding the message will not ensure its application (Salaün and Flores, 2001); perceiving information is only relevant for decision making if consumers deem the information to be useful (Osburg et al., 2020; Salaün and Flores, 2001; Verbeke, 2005) and credible (Atkinson and Rosenthal, 2014; Brach et al., 2018; Olsen et al., 2014; Osburg et al., 2017; Papaoikonomou et al., 2018; Pearson et al., 2012; Salaün and Flores, 2001), with the latter being strongly linked to trust. Accurate information also attracts greater attention and is therefore more likely to be used in the decision-making process (Atkinson and Rosenthal, 2014; Gleim et al., 2013; Testa et al., 2015; Lazzarini et al., 2018). Hence, any information provided must be complete, meaning it must be as much or as good as necessary to help the purchase decision (Cho, 2015; McKinney et al., 2002; Papaoikonomou et al., 2018; Testa et al., 2015; Vlaeminck et al., 2014). Following McGuire (1976) and based on previous findings, we therefore define the concept of perceived information quality (PIQ) as the sum of the recipient's individual evaluations of information features or dimensions to which they have been exposed. PIQ ultimately consists of the subjective perceived degree of fulfillment of the individual information-quality dimensions, their consumer-individual prioritization, and the degree to which the expectations and needs regarding the information are fulfilled (Ariely, 2000; McKinney

et al., 2002). Hence, consumers will only make inferences about their product choices based on the interplay of the characteristics they value. However, the evaluation of these factors always depends on further contextual (e.g., environment) and individual influences (e.g., experience).

#### **4.2.4 The impact of information types**

When exposed to information on products' credence attributes, consumers initiate a selective perception of information, leading to inferences regarding choice (McGuire, 1976; Thøgersen, 2010). As indicated above, a variety of information types are used to convey information about a product's localness. In addition to legally required information on local origins (so-called address codes), there are various internal (retailer-implemented) and external (third-party) labels. Merely providing vague claims (e.g., "local produce") will be perceived insufficient (Gleim et al., 2013). Furthermore, the inflationary use of labels to overtly promote local products (and sustainable products in general) often seems to entail both pitfalls and benefits, with some labels being informative while others are redundant or even contradict themselves (Janssen and Langen, 2017). Accordingly, consumers find that labels are not easily understandable (Pieniak et al., 2013) and that most of them are not credible (Borin et al., 2011). With current research questioning the ability of labels to empower consumer choice in general (e.g., Grunert et al., 2014; Hasanzade et al., 2018; Ikonen et al., 2020; Lazzarini et al., 2018; Song et al., 2019), there is an urgent need to understand what type of information provision generates the best responses in terms of choice behavior (Vadakkepatt et al., 2021).

For the German retail landscape, because all information types used vary in content and structure, there are likely to be differences in how consumers perceive their effectiveness in helping assess a product's localness (e.g., Ariely, 2000). The commonly used definition for local food employs the distance between places of food production

and purchase (Feldmann and Hamm, 2015; Fernández-Ferrín et al., 2018). However, both manufacturers and retailers often circumvent concrete distance declarations by instead referring to specific locations or a certain radius, incentivized by a lack of regulation of the term “local.” Accordingly, consumers must often rely on their knowledge of the local geography to judge whether the product advertised meets their understanding of what is local. Digital information provides reasonable information in a more salient format, such as displaying a map showing the local origin, which can foster elaboration in the pre-purchase stage and bridge the gap between consumers’ lack of knowledge about the region and their purchase intentions (Grewal et al., 2020; Roggeveen and Sethuraman, 2020). Therefore, we propose the following hypothesis:

**H1:** *Digital product information increases PIQ to a greater extent than mere address codes (H1a) or local labels (H1b) do.*

#### **4.2.5 The moderating role of product types**

PIQ is affected not only by the information types used but also by situational and dispositive elements (O’Rourke and Ringer, 2016). Hence, consumers may perceive information differently for different product types (Kehagia et al., 2007; O’Rourke and Ringer, 2016). Studies have indicated that information needs can vary greatly among product categories. In a qualitative study, Van Rijswijk and Frewer (2012) found that participants required no information for fresh products, whereas their need for elaborate information increased for other product categories (e.g., animal products). Along similar lines, research has proposed significant differences in consumers’ use of information sources depending on the food product (Ellison et al., 2016; Pieniak et al., 2013). Likewise, brand evaluation (e.g., Olsen et al., 2014) and preferences (e.g., Hempel and Hamm, 2016a,b) seem dependent on product type. A recent meta-analysis has also suggested that the perception of localness can depend on the product of interest (Printezis et al., 2019). One possible rationale for such findings is the occurrence of some spillover

or halo effects from the look or freshness of vegetables on product evaluation. However, for other product categories, e.g. for perishable, animal based food, making inferences based on the product's appearance may be insufficient (Van Rijkswijk and Frewer, 2012). We therefore predict that the strength of the effect of information type on PIQ will be moderated by product type, such that it will be stronger for perishable, animal goods. Hence, we hypothesize the following:

**H2:** *The effect in H1 is stronger for animal products (vs. non-animal products).*

#### **4.2.6 Fostering behavioral intentions**

Once the information's inherent quality is evaluated, we assume that consumers will act accordingly to make informed decisions regarding local foods (McGuire, 1976; Keller and Staelin, 1987). As a strong elaboration with the information provided has already taken place (following the systematic mode of information processing within the HSM), the change in behavior is likely to be less prone to changes. Moreover, research has shown that mobile applications with a clear, informative character are likely to increase behavioral intentions (Bellman et al., 2011). Well-informed consumers are more confident in their judgments (Ariely, 2000) and are also more likely to purchase sustainable products (Gleim et al., 2013; Vlaeminck et al., 2014; White et al., 2019). Hence, we believe that PIQ will foster purchase intentions (Ahmad and Zhang, 2020; Chang and Wildt, 1994; De Pelsmacker and Janssens, 2007; Gao et al., 2012; Osburg et al., 2017; Pearson et al., 2012) while helping to mitigate the prevailing information asymmetries in the retailing context (e.g., Frank and Brock, 2018). Therefore, we propose the following:

**H3:** *Perceived information quality will positively influence purchase intentions.*

### 4.3 Overview of studies

Our study set out to assess how information type affects consumers' purchase intentions, taking into account the mediating role of PIQ and the moderating role of product type. Figure 4 depicts our conceptual framework. For the sake of simplicity, we use “apps” as a synonym for digital product information, although such information is not only provided within apps but can also be retrieved by scanning a QR code.



**Figure 4. Article 3.** Conceptual framework.

Before testing our propositions, we performed a preliminary study to check the reliability of our measurements and whether our manipulation acted as intended. In Study 1 we manipulated the product type (milk vs. lettuce) to check for the predicted moderating effect of product type on perception and choice. Our results offer mixed support for our predictions, revealing that the successful deployment of digital product information at the point of sale must be carefully thought out and is depends greatly on product type. In Study 2 we included an internal (retailer-made) label, an information type that most retailers use to promote their own local assortment. We also checked whether further product types (milk vs. tomatoes) affect PIQ. Within Study 2 we found support for the positive impact of apps on purchase intention compared to labels. The results also show that apps outperform third-party labels along the observed dimensions, providing support for Hypothesis 1. However, as we found no evidence for the moderating role of product type in the second study, Hypothesis 2 can only be partially accepted. Moreover,

throughout both studies our results offer converging evidence for a mechanism that links information type via PIQ to purchase intention, providing support for Hypothesis 3. Overall, the results indicate that apps can indeed be an effective alternative to labels in fostering local food consumption.

## **4.4 Study 1**

### **4.4.1 Methods**

For Study 1, we randomly approached consumers in a mid-sized German town's pedestrian zone and invited them to participate in our study using iPads. To motivate participation and increase the predictive accuracy of our data, all participants were entered in a prize drawing and additionally received minor incentives after completing the questionnaire. In total, 613 individuals ( $M_{\text{age}} = 35.64$ ,  $SD = 17.29$ ; 56.0% female, 44.2% university education) were included in the data analysis after data cleaning.

We randomly assigned our participants to one of six conditions as part of a 3 (display format: address code, third-party label, app)  $\times$  2 (product type: milk, lettuce) between-subjects design. To avoid estimation biases regarding individual perceptions of what counts as local, we first asked participants to indicate the maximum distance at which they would consider food products to be local (from 25 km up to more than 100 km from the retail store). All scenarios shown afterward used the ambit participants gave in these answers. Next, we asked our participants to imagine being on a typical shopping trip in a retail store. The scenario dictated that among other things, they want to buy lettuce or milk (two product-type conditions) and go to the relevant aisle. They find their product of interest but are unsure whether it meets their personal expectation of "local". Therefore, they look for other cues on the product and find the following information (one of three display-format conditions): In the mobile app condition, a digital map can be opened by scanning the QR code placed on the product. In the third-party label condition,

the certified label is set up by an independent regulatory body (Regionalfenster e.V.) and indicates the origin of the product as local, showing the the approximate location of production and a more specific packaging location (e.g., milk from Lower Saxony, filled/packaged in town X). In the control condition, the participant finds an address code that shortly shows the manufacturer's address (mostly very cryptic but obligatory for German products, especially for dairy goods). Afterward, respondents were requested to evaluate the information quality. We adapted item scales modeling the different dimensions of PIQ from McKinney et al. (2002) using a 7-point Likert scale. Cronbach's alphas for PIQ indicate high reliability (ranging from .888 to .921). We then computed PIQ as an average of the dimensions (Cronbach's  $\alpha = .943$ ). We also asked participants to assess their purchase intentions (using three items adapted from Baker and Churchill, 1977; Cronbach's  $\alpha = .845$ ). Moreover, we included consumer's local ethnocentrism (adapted from Fernandez-Ferrin et al., 2018; Cronbach's  $\alpha = .863$ ) as a covariate to be able to eliminate any effects of these personal characteristics on perception and purchase of local products. We also rotated all items to avoid order effects. Two dichotomous manipulation checks (information type, product type) confirmed that our manipulation worked ( $\chi^2 = 507.192, p < .01$ ;  $\chi^2 = 581.433, p < .01$ ). All scenario groups were quite equally distributed (address code <sub>lettuce</sub> = 94, address code <sub>milk</sub> = 109, label <sub>lettuce</sub> = 103, label <sub>milk</sub> = 93, app <sub>lettuce</sub> = 105, app <sub>milk</sub> = 109). See Appendix for all construct measures and sociodemographic information.

#### **4.4.2 Results**

To assess the mediating role of PIQ and the moderating role of product type in the relationship between information type and consumers' purchase intentions, we performed a moderated mediation analysis (using PROCESS Model 7 with 10,000 bootstrap samples; Hayes, 2018). We summarized our results in Table 15 (Study 1).

The results show that only the third-party label has a positive, significant effect on PIQ ( $b = 0.334, p < .05$ ). Disclosing local origin information via address codes and apps does not appear to be significantly relevant in directly affecting PIQ ( $b = -0.114, p > .1$  and  $b = -0.221, p > .10$ , respectively). In both cases, only the combined consideration of product type (milk = 1) as a moderator qualifies the direct effect of information type on PIQ. It seems that information provision through digital maps is more relevant for milk than for lettuce. The interaction of information and product types shows negative, significant effects on PIQ for the address code as information type ( $b = -1.023, p < .01$ ). Labels ( $b = 0.396, p < .1$ ) and apps ( $b = 0.690, p < .01$ ) do have positive and significant effects, whereas the interaction of information and product types is greater for the app than for the label. Thus, the results provide support for Hypothesis 2 and are visualized in Figure 5.

Moreover, the results indicate a positive, significant direct effect of PIQ on purchase intention ( $b = .541, p < .01$ ) for disclosing information via apps. Yet there are no (significant) differences compared to the other information types. Thus, our outcomes offer support for Hypothesis 3, highlighting the important role that the evaluation and perception of the information provided plays in the decision-making process. Furthermore, the covariate consumer's local ethnocentrism reveals a significant effect that may further explain consumers' purchase intentions ( $b = 0.246; p < .001$ ).

Because the confidence interval for the index of moderated mediation does not cover zero for all information types, we can conclude that the indirect effect of information type through PIQ on purchase intention depends on the product type (address code:  $b = -0.560$ , 95% confidence interval [CI]  $[-0.0792, -0.341]$ ; label:  $b = 0.221$ , 95% CI  $[0.007, 0.450]$ ; app:  $b = 0.373$ , 95% CI  $[0.154, 0.600]$ ). Accordingly, information disclosure through apps increases purchase intention through PIQ if consumers intend to buy milk.

### **4.4.3 Discussion**

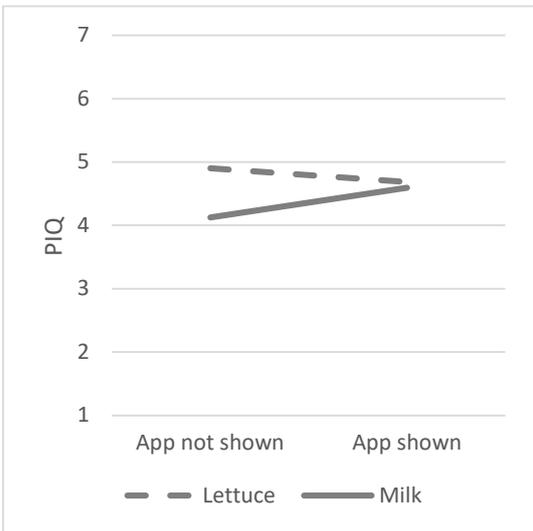
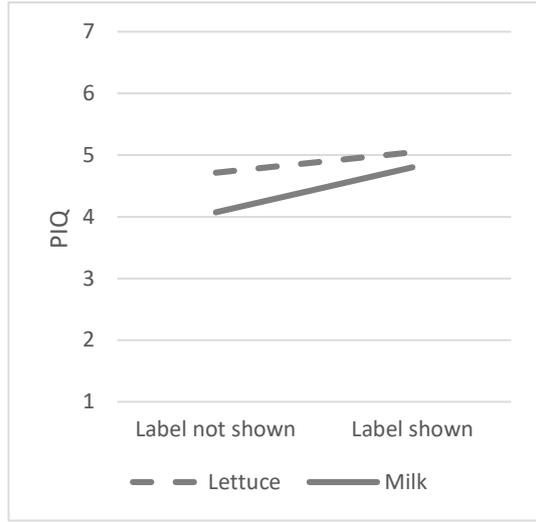
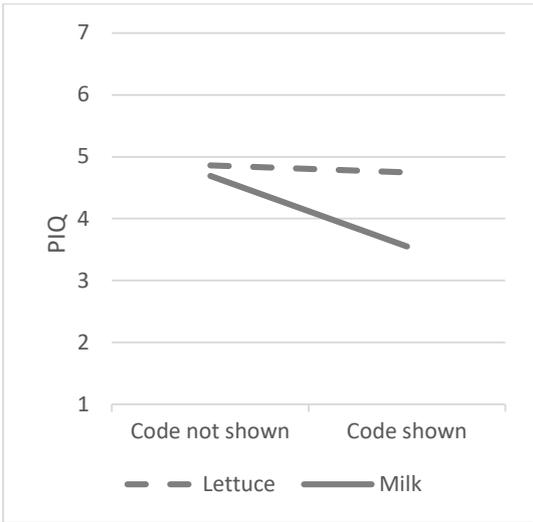
The results of this experimental study show that both labels and apps reliably increase PIQ for milk. For those who perceive better information quality through app usage, purchase intention also increases. These findings corroborate the assertion that labels are an effective way of disclosing product origin attributes to consumers. However, the comparison of labels and apps reveals similar effect of both information disclosure types. There could be various reasons for apps underperforming labels in some cases: While some participants stated that they typically leave their smartphones in the car while grocery shopping, others lamented the poor signal coverage in retail stores, which prevents them from using their smartphones at all. Our results indicate that consumers make inferences based on a product's appearance, as they might be more efficient for a product type as lettuce.

**Table 15.** Article 3: Summary of moderated mediation analyses (Studies 1 and 2).

		address code		external label		app		
		<i>b</i>	<i>t</i>	<i>b</i>	<i>t</i>	<i>b</i>	<i>t</i>	
Study 1	DV: PIQ							
	<i>R-sq</i>	.156		.105		.082		
	<i>Direct effects</i>							
	Information type	-.114	-.798	.334	2.374**	.221	-1.632	
	Product type (milk=1)	-.173	-1.468	-.640	-5.375***	.778	-6.242***	
	Information type x Product Type	-1.023	-5.051***	.396	1.907*	.690	3.380***	
	Local ethnocentrism (cov.)	.132	3.170***	.124	2.957***	.141	3.372***	
	<i>Conditional effects</i>							
	Product type (lettuce)	-.114	-.798	.334	2.374**	.221	-1.632	
	Product type (milk)	-1.137	-8.044***	.730	4.783***	.469	3.062***	
	DV: Purchase intention							
	<i>R-sq</i>	.317		.321		.319		
	<i>Direct effects</i>							
	Information type	.041	.392	-.205	-2.011**	.152	1.541	
PIQ	.547	11.700***	.559	11.992***	.541	11.770***		
Local ethnocentrism (cov.)	.240	6.131***	.244	6.251***	.246	6.284***		
<i>Indirect effects</i>								
	<i>B</i>	95% CI	<i>B</i>	95% CI	<i>B</i>	95% CI		
Product type (lettuce)	-.063	[-.222, .090]	.187	[.033, .352]**	.119	[-.267, .022]		
Product type (milk)	-.622	[-.803, -.451]**	.408	[.236, .585]**	.254	[.091, .423]**		
<i>Index of moderated mediation</i>								
	-.560	[-.079, -.341]**	.221	[.007, .450]**	.373	[.154, .600]**		
Study 2			internal Label		external Label		app	
			<i>b</i>	<i>t</i>	<i>b</i>	<i>t</i>	<i>b</i>	<i>t</i>
	DV: PIQ							
	<i>R-sq</i>	.334		.064		.160		
	<i>Direct effects</i>							
	Information type	-1.399	-10.166***	.484	3.905***	.881	7.710***	
	Product type (milk=1)	-.039	-.465	-.058	-.456	.074	-.596	
	Information type x Product type	.009	.047	-.010	-.058	.075	.459	
	Local ethnocentrism (cov.)	.145	3.524***	.161	3.209***	.165	3.761***	
	<i>Conditional effects</i>							
	Product type (tomatoes)							
	Product type (milk)							
	DV: Purchase intention							
	<i>R-sq</i>	.284		.287		.319		
<i>Direct effects</i>								
Information type	.136	1.405	-.193	-2.170**	.113	1.294		
PIQ	.521	10.499***	.505	11.060***	.473	9.4813***		
Local ethnocentrism (cov.)	.190	4.706***	.193	4.782***	.195	4.799***		
<i>Indirect effects</i>								
	<i>B</i>	95% CI	<i>B</i>	95% CI	<i>B</i>	95% CI		
Product type (tomatoes)	-.728	[-.907, -.554]**	.244	[.119, .374]**	.417	[.294, .543]**		
Product type (milk)	-.724	[-.912, -.551]**	.239	[.108, .378]**	.452	[.313, .605]**		
<i>Index of moderated mediation</i>								
	.0047	[-.193, .193]	-.005	[-.184, .179]	.035	[-.107, .190]		

Note. DV = dependent variable; PIQ, Perceived Information Quality; CI = confidence interval. Perceived information quality, purchase intention, and local ethnocentrism have been mean centered. Unstandardized path coefficients are reported.

\* $p < .10$  \*\* $p < .05$  \*\*\* $p < .01$ .



**Figure 5. Article 3. Spotlight analysis - Study 1.**

## 4.5 Study 2

### 4.5.1 Methods

Fueled by the current COVID-19 pandemic, consumers have become more familiar with the use of QR codes or apps to retrieve information (Kannan, 2020). In addition, their demand for regional foods has increased substantially (Béné, 2020; O'Hara and Toussaint, 2021). In the meantime, more and more retailers have implemented new generic labels to promote their assortments (e.g., “local produce” or “from your hometown”), the negative consequences of which have been debated in the research literature (Ikonen et al., 2020; Lazzarini et al., 2018; Song et al., 2019; Vadakkepatt et al., 2021). This is particularly the case for retailers' own private label brands. Thus, Study 2 aimed primarily to extend our findings from the first study.

We obtained 600 German participants ( $M_{\text{age}} = 30.28$ ,  $SD = 10.20$ ; 51.5% female, 48.3% university education) via the online recruitment platform Prolific and employed a 3 (information type: retailer-owned label, third-party label, app) x 2 (product type: milk, tomatoes) between-subjects design.

As in Study 1, we first asked participants about their distance preferences for local food (ranging from 25 to 100+ km) to use as a metric in the subsequent scenarios. Next, we requested that our participants imagine being on a typical shopping trip in a retail store. In the scenario they find a product of interest (tomatoes or milk). However, they are unsure whether this product labeled “local” meets their expectations of the term. Therefore, they search for more information and find one of the three different information types. The internal label presents a generic claim of localness; the third-party label and app scenarios were the same as in Study 1. Again, respondents had to evaluate the information quality on a 7-point Likert scale (adapted from McKinney et al., 2002). Cronbach's alphas for PIQ indicate high reliability (from .884 to .941). We then computed

PIQ as an average of the five dimensions (Cronbach's  $\alpha = .951$ ). We also asked participants to assess their purchase intentions (using three items adapted from Baker and Churchill, 1977; Cronbach's  $\alpha = .907$ ). Furthermore, we included consumer's local ethnocentrism (using five items adapted from Fernández-Ferrín et al., 2018; Cronbach's  $\alpha = .855$ ) as a covariate. Again, we rotated all relevant items to avoid order effects.

Two dichotomous manipulation checks (information type, product type) confirmed that our manipulation was successful ( $\chi^2 = 934.327, p < 0.01$ ;  $\chi^2 = 600.000, p < 0.01$ ). The scenario groups are quite equally distributed (retailer-owned label<sub>tomatoes</sub> = 99, retailer-owned label<sub>milk</sub> = 100, third-party label<sub>tomatoes</sub> = 105, third-party label<sub>milk</sub> = 98, app<sub>tomatoes</sub> = 104, app<sub>milk</sub> = 94). See Appendix for all construct measures and information on sociodemographics.

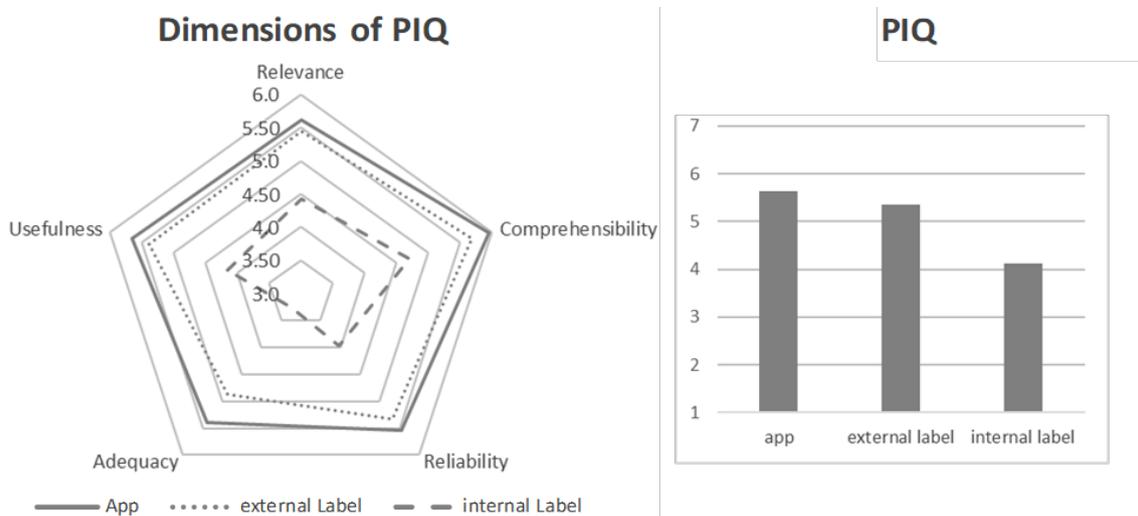
#### **4.5.2 Results**

We again performed a moderated mediation analysis (using PROCESS Model 7 with 10,000 bootstrap samples; Hayes, 2018). We recapped our results in Table 15 (Study 2).

Our results reveal that internal labels have a negative, significant effect on PIQ ( $b = -1.399, p < .10$ ). Showing local origin information via external labels or apps is significantly relevant in affecting PIQ, with the effect of apps higher ( $b = 0.881, p < .01$ ) than that of external labels ( $b = 0.484, p < .01$ ). A closer look at the mean values of PIQ and its dimensions reveals significant differences between the app and the labels. Yet the mean values of two dimensions (relevance and reliability) are not significantly different between the third-party label and the app ( $p > .05$ ). Figure 6 depicts the differences within the respective dimensions. Our results thus confirm Hypothesis 1 that digital information provision is superior to other information types. Moreover, the interaction of information and product types is not significant for any case considered. Hence, PIQ does not depend on product category, contrary to what was previously assumed and confirmed. Accordingly, we cannot confirm Hypothesis 2.

Our results also indicate a positive, significant direct effect of PIQ on purchase intention ( $b = 0.473, p < .01$ ) for disclosing information via apps. Yet there are no (significant) differences compared to the other information types. Thus, the outcomes offer support for Hypothesis 3, underpinning the role of PIQ as a mediator within the decision-making process. Furthermore, consumer’s local ethnocentrism as a covariate is revealed to have a significant effect, which may add further explanation for consumers’ purchase intentions ( $b = .195; p < .001$ ).

Because the confidence interval for the index of moderated mediation covers zero for all information types, we can conclude that the indirect effect of information type through PIQ on purchase intention does not depend on the product type (internal label:  $b = 0.0047, 95\% \text{ CI } [-0.193, 0.193]$ ; external label:  $b = -0.005, 95\% \text{ CI } [-0.184, 0.179]$ ; app:  $b = 0.035, 95\% \text{ CI } [-0.107, 0.190]$ ).



**Figure 6: Article 3.** Mean values of PIQ and its dimensions.

### **4.5.3 Discussion**

Our results show that third-party labels (=1, remainder = 0) and apps (=1, remainder = 0) consistently increase PIQ, while the retailer-owned label negatively influences consumers' perception and choice intentions. The superior performance of digital product information is of particular interest. As a means of information delivery, it significantly increases PIQ as compared to third-party labels and internal, retailer-owned labels. Taking a closer look at the respective dimensions of PIQ, the results indicate that consumers find information imparted digitally to be just as credible and relevant as third-party labels, despite there being no certification body in charge of providing and monitoring said information. Within the other dimensions, digital product information even seems to outperform labels. Contrary to our expectations, product type revealed no moderating effect in this study. Once again, our results confirm the importance of PIQ as a mediator that links the impact of information type to purchase intention. Overall, our findings indicate that apps can indeed be an effective alternative to labels in fostering local food consumption.

### **4.6 Conclusion**

A growing body of research has been questioning the role of labels in empowering sustainable consumer behavior (Grunert et al., 2014; Hasanzade et al., 2018; Ikonen et al., 2020; Lazzarini et al., 2018; Song et al., 2019, Vadakkepatt et al., 2021). Our results not only endorse those citing the deficient effects of labels in general but also enhance our understanding of how consumers' perceptions and behavioral intentions are affected by digitally provided product information, particularly for local goods. Both studies support our assumptions that apps are an effective method for enhancing favorable behavioral intentions – but only if consumers actually use them – while labels provide unsolicited information. Our findings hint at a willingness to adopt and use digitally provided product information, potentially accelerated by the COVID-19 pandemic

(Kannan, 2020). Moreover, our research corroborates the importance of information quality and how it translates into purchase intentions (e.g., Ahmad and Zhang, 2020; Keller and Staelin, 1987; McKinney et al., 2002; Pearson et al., 2012). Thus, our results are consistent with McGuire's information processing framework. At the same time, however, our results provide mixed evidence on how product type may influence the postulated relationships. While the results from Study 1 support our assumptions, Study 2 failed to find significant interactions. One explanation for this difference could be that it might be easier to make inferences based on a product's appearance for the case of lettuce (Study 1) than it is for tomatoes (Study 2). Tomatoes in Germany often have to travel long distances for consumption, which is not the case with lettuce. The associated uncertainty may then lead to a higher demand for quality information. In the case of animal products, presenting digitally provided information will always have a positive effect on purchase intentions. Our results provide a number of contributions for theory and practice, which we address in the following.

#### **4.6.1 Theoretical contribution**

The increasing interest of various stakeholders in supporting more environmentally friendly food production has heightened the need to understand consumers' salient information processing and behavioral intentions regarding local food. This research was encouraged by Inman and Nikolova (2017), who proposed gaining a clear picture of how retailers can successfully implement mobile apps into their environments to support consumers' decision-making processes, and Vadakkepatt et al. (2021), who suggested investigating which types of communication generate the best response from consumers in terms of sustainable purchasing behavior. Following their lead, our research contributes to the literature in several ways: *First*, by demonstrating the potential of digital product information in empowering better informed choices, we extend current literature on the use of mobile technologies in the pre-purchase stage (e.g., Roggeveen

and Sethuraman, 2020). In line with Mohrenfels and Klapper (2012) and Abao et al. (2018), we show that digital product information – provided through QR codes or retailers’ mobile applications – can undeceive consumers to make better informed, more sustainable food choices (see also Grewal et al., 2020, for a conceptual framework on the future of in-store technology). Our findings also corroborate those of Bradu et al. (2014). While their results suggest that heuristic information processing takes place, our results hint toward a more deliberate information processing. In addition, our results indicate that consumers perceive information retrieved via smartphone to be of greater quality than that retrieved from labels. Despite having no regulatory bodies to monitor and control the information provided, digital product information is even perceived to be as credible as third-party labels. Accordingly, our work offers an important contribution to this field of research, as past literature has largely contested the effectiveness of product information provided through mobile apps (e.g., Li and Messer, 2019), their credibility (e.g., Tanner et al., 2019) or did not find any support for the superior role of mobile applications as an information retrieval technique (e.g., Weber, 2021) to reinforce sustainable consumption patterns.

*Second*, our results find converging evidence for a mechanism that links information type via PIQ to purchase intention (Keller and Staelin, 1987). For local products in particular, labels do not seem to represent suitable heuristic cues at all. A thorough provision of relevant product information is therefore key to ensuring the effectiveness of digital product information and facilitating sustainable behavioral outcomes (e.g., Osburg et al., 2017).

*Third*, contributing to the finding of O’Rourke and Ringer (2016) and Van Rijswijk and Frewer (2012), our results highlight the need for thoughtful implementation of mobile apps in retail environments for information retrieval. The decisive factor is the product type for which digital product information could be considered a pull-marketing

tool. In this regard, products that do not permit low resource-intensive inferences (e.g., animal products or processed food) seem to be particularly suitable.

#### **4.6.2 Managerial implications**

Our results also endorse a more precious marketing of local food to support food-production practices that are environmentally friendly. In general, increasing the availability of information regarding local products through direct marketing instruments (e.g., Hasanzade et al., 2018) is crucial to improving consumer orientation (e.g., Weber, 2021). Given the increasing demand for local food and the interest of major retailers to respond accordingly, we suggest that practitioners refine their marketing efforts to promote local products (e.g., Tangari et al., 2015).

Practitioners should especially refrain from marketing their local assortments with self-implemented “local” labels or claims; consumers will perceive these declarations as irrelevant for their behavioral intentions. It is conceivable that consumers are skeptical of such claims due to the prevalence of green washing (Cho, 2015, Vadakkepatt et al., 2021) and therefore require more rigorous information regarding these aspects (e.g., Branco et al., 2016). Conversely, our results indicate that product information provided digitally (e.g., through QR codes or even embedded in retailer apps) regarding the local aspects of grocery goods can indeed be effective in meeting consumers’ information demands and fostering their behavioral intentions. Mobile applications allow consumers to better match their personal preferences for localness with a given product. Thus, consumers perceive information provided via apps to be high in quality, which then facilitates positive retailer outcomes. More interestingly, consumers perceive the quality of information provided by retailers through mobile applications to be significantly higher than for third-party labels, while there are no differences in their credibility. Accordingly, using digital product information allows retailers to effectively market their local assortment without having to pay licensing fees for third-party labels. This form of extended packaging also enables

retailers to provide more information to encourage consumers to make choices that are better informed, without being force-fed to everyone (Messer et al., 2017). The uncomplicated sharing of digital information (e.g., via QR codes) permits diverse stakeholders, such as manufacturers, small retailers, and market leaders, to use this strategy with low entry costs (Mohrenfels and Klapper, 2012). Such sophisticated communication can also lead to competitive advantages in a highly concentrated retail landscape (Osburg et al., 2017). If the information is embedded into a retailer application, it is conceivable that gamification elements could further expand engagement with the app and thus the retail brand (Grewal et al., 2020; Roggeveen and Sethuraman, 2020; Villanova et al., 2021), while at the same time bolstering consumers' perceptions and supporting their sustainable decision making. In addition, mobile apps could allow retailers to support small farmers without any major certification efforts or royalties. In addition to distance declarations, previous research has identified social aspects (e.g., information on farmers and farms, farm visits) to be drivers of perception and choice for local food (e.g., Denver et al., 2019; Fernández-Ferrín et al., 2018; Jensen et al., 2019). Because digital product information is not restricted by the size of packaging (e.g., Li and Messer, 2019), pictures and videos offering further information about the farm or animal husbandry could be used to strengthen behavioral intentions toward the brand itself and local food in general. Based on our results, we recommend that the implementation of digital product information not be extended to all product types at once; as a general rule, one should first consider the product types for which a visual inference regarding localness is infeasible.

The growing importance of smartphones in everyday life can also offer educational opportunities for consumers (Hirsh-Pasek et al., 2015). Apps have the potential to undeceive consumers' knowledge regarding the impacts of food products and can thus drive responsible consumption (O'Rourke and Ringer, 2016; Weber, 2021). We

see a huge importance and potential of using mobile technologies to support the disclosure of relevant ethical product information, where both consumers and business can benefit (Inman and Nikolova, 2017).

#### **4.6.3 Limitations and avenues for future research**

Despite providing novel and important insights, our research presents some limitations that set the stage for future research opportunities. *First*, we used participants' stated distance requirements for calling food "local" as a metric for our scenarios. This endogenous specification with respect to the information types has the distinct advantage of taking into account individual perceptions of local food. However, it might also bias estimations, as different perceptions might lead to different effects. Further research should therefore take an exogenous view on the influence of diverse information types on information elaboration and behavioral outcomes. It would be interesting to understand how consumers would react to analog and digital information if their perceptions of local food (and sustainable food in general) were violated.

*Second*, we did not include other (local) product aspects in our analysis. Social aspects of local food (e.g., information about the family behind the farm) might also be interesting (Hasanzade et al., forthcoming), especially when certain distances for deeming a food local cannot be assured. Furthermore, we chose not to include organic or fair-trade labels, as their licensing and use is regulated by law. However, it is worthwhile for future research to augment our understanding on whether and how apps influence attitudinal and behavioral patterns by examining how these effects change in the presence of greater information regarding a products organic and fair-trade background.

*Third*, as online surveys do not fully reflect reality – owing to sample size and the use of scenarios – it is difficult to predict actual purchase effectiveness. Furthermore, because of time pressure in shopping situations, using a smartphone to retrieve information could actually be a barrier to purchase (Weber, 2021). Future research could

therefore conduct experiments in the field to extend our understanding of actual app usage and their effects on real purchase behavior.

*Last*, future research should undertake a cross-product investigation and might consider replicating this study for other product categories.

In conclusion, providing digital product information via QR codes – or even embedded into (retailer) apps (see, e.g., Grewal et al., 2020) – offer a win-win-win situation for customers, manufacturers, and retailers alike: While customers' information needs are satisfied, enabling them to make more informed food choices, positive retailer outcomes are enhanced in terms of short- and long-term relationships. Moreover, manufacturers and retailers alike can market their local goods without paying any license fees for third-party certification. Overall, the insights derived from our research allow for a more targeted marketing of local food in order to support environmentally friendly food production.

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## 5 Overall discussion

Reshaping our diets to sustainable forms represents a powerful lever in meeting the impending challenge of climate change. Against the background of increasing demand for sustainable, and especially local products, this dissertation was motivated to understand how and to what extent an elaborative provision of product information can empower consumers to make sustainable food choices. While labels have predominantly been used in the past to reveal sustainable product-related information to consumers in an aggregated way (Testa et al., 2015; Vecchio and Annunziata, 2015), recent research has questioned their influence on consumer behavior (Ikonen et al., 2020; Lazzarini et al., 2018; Song et al., 2019, Vadakkepatt et al., 2021). Yet, practitioners and research alike have largely neglected this rationale, still focusing on labels as means of affecting consumer behavior (see, e.g., Meyerding et al., 2019; Profeta and Hamm, 2019; Weber, 2021). Meanwhile the inflationary use of these labels seems to be taking its toll. As consumers cannot always grasp the meaning of each label, they might lose interest in sustainable food products (see, e.g., Borin et al., 2011, Hasanzade et al., 2018; Vadakepatt et al., 2021). To counteract this development and fill this research gap, the studies of this dissertation aimed to investigate consumers' needs for detailed sustainability-related product information and the impact of their deliberate provision on consumer's choice behavior. Drawing on a diverse set of theoretical approaches, the findings of this dissertation are able to shed light on consumer preferences for sustainable, especially local, food product information and how alternative ways of providing product-related information (e.g. through QR codes or apps) can foster desired behavioral intentions. Thus, the combined results of these studies offer a more precious marketing of local food in order to support environmentally-friendly food production. The following sections summarize academic and practical implications that arise from this new understanding.

## 5.1 Theoretical implications

This dissertation contributes to current literature, which has lamented the lack of an understanding of what types of communication generates best consumer responses regarding consumers' sustainable choice behavior (e.g., McFadden and Huffman, 2017; Vadakkepatt et al., 2021). Beyond doubt, the results of the articles highlight the need and the importance to accurately address consumer needs for more transparency regarding sustainable food product information. This dissertation exposes the inadequacy of research which has aimed at the role of labels in shaping behavioral intentions of consumers for sustainable products, while their impact to empower consumers to make informed decisions remains questionable (e.g., Grunert et al., 2014; Ikonen et al., 2020; Lazzarini et al., 2018; Song et al., 2019, Vadakkepatt et al., 2021). Findings reveal that sustainable food production and marketing go beyond organic and fair-trade. Consumers are increasingly willing to opt for locally produced alternatives (e.g., Meyerding et al., 2019; Profeta and Hamm, 2019), presumably to counteract the downsides of industrialized food production practices (Cranfield et al., 2012; Onozaka and McFadden, 2011) and/or of food that travels all around the world while having a massive impact on climate change, in terms of carbon footprint (see, e.g., Bianchi and Mortimer, 2015). Accordingly, local food production and consumption in particular will have to take on a vital role in order to meet the challenges of the future. Targeted marketing is therefore essential to further promote the purchase of local food.

Drawing on the Value-Belief-Norm theory (Stern, 2000), results of *Article 1* reveal that fundamental values (biospheric, altruistic, egoistic) will mirror the preference for sustainable product information across a range of situations. Consequently, results shed light on how three consumer segments differ regarding their information preference, while broadening our understanding of their desire for food production practices. In particular, results show that consumer choice for sustainable food products is mainly

influenced by information regarding the social as well the distance-based aspect of food production.

Encouraged by these findings and by Fernández-Ferrín et al. (2018) proposing to investigate the multidimensional nature of localness instead of ubiquitously emphasizing the distance-based aspects of local products, *Article 2* endeavored to provide a clear picture regarding the choice behavior and preference relationship of social and distance-based aspects (so called social and geographical proximity) of local food production, particularly when the distance declaration of locally-produced food varies. The results contribute to local food literature by indicating higher preference and willingness to pay for food with greater social and geographical proximity claims, with those effects being more strongly pronounced for the latter. In line with the Norm-Activation-Model (Schwartz, 1977), this study also identifies personal norms as a key predictor of preference heterogeneity for food holding social and geographical proximity attributes, while the effect of social norms in explaining preference heterogeneity is negligible.

Considering the dominant role of geographical proximity claims in promoting locally-produced food, *Article 3* was set to examine whether and when digitally provided information on the geographical proximity of local food is detrimental to choice. Drawing on information-processing framework (McGuire, 1976) and on Heuristic-Systematic-Model (Chaiken, 1980), the results of this article underline the protruding potential of digital product information in undeceiving consumers to make better informed food choices. Thus, the results suggest that consumers are more likely to perceive digital information (e.g. accessed via smartphones) as being of higher quality than labels, although some research points to the opposite (e.g., Li and Messer, 2019; Tanner et al., 2019; Weber, 2021). This positive effect then results in favored behavioral intentions towards local food. In addition, this article reveals that digital information on products

which does not permit low resource-intensive inferences (e.g., animal products or processed food) seem to be particularly suitable for this kind of marketing technique.

With their mixed method approaches, all three articles provide converging evidence for an elaborative provision of relevant product information, which is central to facilitate sustainable behavioral outcomes.

## **5.2 Managerial implications**

Along with the increased demand for sustainable food products, consumers increasingly demand greater transparency and more information about the products' sustainability features (Feldmann and Hamm, 2015). This dissertation's findings guide practitioners to conclude generalizable and well targeted implications to convey consumers and boost favorable behavioral intentions with regards to (local) food consumption. Overall, it is important to increase the availability of decision-relevant product information through direct marketing approaches in order to give consumers a better orientation (e.g., Weber, 2021).

As *Article 1* outlines, it is particularly important to carefully select decision-relevant product information based on the targeted consumer segment. While a small segment of consumers focuses solely on price when making a choice, the majority of respondents seem to be receptive to sustainable product information. Overall, consumers seem to perceive sustainable products as those where production and distribution take place in close proximity to the point of sale and accordingly place their decision on when planning to purchase these products. The social aspect of food production also seems to play a crucial role in this regard and thus emphasizes the standing that locally-produced food has in consumers' minds, especially when it comes to products being perceived as sustainable. Moreover, results show that consumers are willing to accept higher prices for products that are produced in a sustainable manner in the near vicinity.

However, the targeted communication of local aspects appears to be more challenging, as there is no uniform understanding of what implies as ‘local’ from the consumer’s point of view, in both academia and practice (e.g., Meyerding et al., 2019; Profeta and Hamm, 2019). As *Article 2* elucidates, disclosing attributes of social proximity can complement the geographical proximity claims, while the latter stills remains as a dominant driver of local food choice. However, results highlight the need to wisely match marketing efforts depending on varying distances and based on the density of the districts in which local goods are purchased. Since personal norms influence preference heterogeneity for both social and geographical proximity claims, practitioners should emphasize the personal commitment of consumers to the local economy in order to increase their willingness to pay for local products (e.g., Fernández-Ferrín et al., 2018). Furthermore, results provide novel insights for practice by explaining preference heterogeneity for geographical and social proximity claims depending on behavioral (preference for national over private label brands) and sociodemographic aspects (age, gender). Referring to preference for national brands, retailers should abstain from marketing their own private label brands as local. One opportunity could be choosing a brand name that is associated with the producer’s name (e.g., Family Joes’ Milk Farm). Referring to the preference for national over private label brands one conceivable and quite promising idea in this respect might be the direct marketing of food within grocery stores. While farmers can achieve higher margins with this type of direct marketing, food retailers can also benefit, especially when it comes to positioning themselves as a responsible entity in the marketplace, e.g. being reputed to support the local economy (Puncheva-Michelotti et al., 2018). Moreover, this option might allow to further strengthen the social proximity between producers and consumers and create more awareness for consuming more mindfully. Referring to younger consumers, food retailing

must take care of the needs of the next customer generation in order to remain competitive.

To help achieve a more elaborate provision of geographical proximity claims (Article 1 and 2) in a more modern and timely manner, results of *Article 3* should encourage practitioners to provide digital product information (e.g., through QR codes or even embedded in retailer apps) about the local aspects of grocery goods. As information gathering benefits from technological advances (e.g., Gielens et al., 2021), digital information is seen as a prudent approach to effectively meet consumer's information demand and foster their behavioral intention (Messer et al., 2017). As Article 3 points out, digitally provided product information is more effective than labels. Accordingly, practitioners should refrain from marketing their local assortments with self-implemented or third-party local labels. In case of self-implemented local labels and/or claims, consumers perceive them not to be decisive of their behavioral intentions. Compared to third-party labels digital product information are characterized by their uncomplicated use (e.g., via QR codes) and permit divers stakeholders to use this form of information provision with low entry costs without any major certification efforts and royalties. Because providing digital product information is not restricted by small package sizes (e.g., Li and Messer, 2019), additional information about the social aspects of food production (see Article 2) or the animal husbandry (see Article 1) in form of pictures and videos could further strenghten trust and behavioral intentions towards the product itself and towards local food in general.

Taken together, the findings of this dissertation highlight the need for retailers to establish a more elaborate provision of information in order to bolster consumers' purchase intention towards local food, which ultimately contributes to more sustainable food consumption patterns (e.g., Roggeveen and Sethuraman, 2020; Vadakkepatt et al., 2021).

To paraphrase the United States secretary of agriculture, Tom Vilsack, “local and regional food systems are about opportunity”. While this statement has so far been followed by less action than hoped, we must nevertheless seize the opportunity to shift our consumption patterns back to a more resilient sustainable food system in order to proactively tackle the challenges we will face in terms of climate change. A transformation process in this regard has already been initiated. This dissertation is dedicated to be a small, yet personal contribution to this transformation process from a marketing point of view. Every single action we take becomes stronger and more effective the more people participate. And much would be achieved if these insights can encourage people to downsize on their approach and focus on their small, personal piece of the jigsaw, rather than getting stuck ruminating about the bigger picture.

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# Appendix

## Appendix A. Article 1: An exemplary choice card used in the study.

			
<ul style="list-style-type: none"><li>- Sufficient space and comfort in the stable</li><li>- Of national origin</li><li>- Meadow/hay/grass/ clover as feed</li> <li>- Less manipulation of landscape</li><li>- Guarantee for the purchase of milk products from the farmer</li></ul> <p>1.04€/liter</p> <p><input type="radio"/></p>	<ul style="list-style-type: none"><li>- Of supra-national (EU) origin</li><li>- Feed without genetic engineering</li> <li>- Financing projects / promotion of farmers</li></ul> <p>0.86€/liter</p> <p><input type="radio"/></p>	<ul style="list-style-type: none"><li>- Cows are frequently and regularly out on the pasture</li><li>- Of local origin</li><li>- Organic feed of own cultivation</li><li>- Limited extent of permitted ecological fertilizer (e.g., manure, compost) to avoid salinization of soil and water</li><li>- Ecologically produced seed and seedlings</li><li>- Dairy farmers receive prices to generate profit (min. 0.45€/liter)</li><li>- Local processing to maintain value added in the region</li></ul> <p>1.58€/liter</p> <p><input type="radio"/></p>	<ul style="list-style-type: none"><li>- Cows are frequently and regularly out on the pasture</li><li>- Feed without genetic engineering</li><li>- No use of chemical synthetic pesticides</li> <li>- Ecologically produced seed and seedlings</li><li>- Guarantee for the purchase of milk products from the farmer</li><li>- High safety and health standards for workers on the farm</li></ul> <p>1.22€/liter</p> <p><input type="radio"/></p>

**Appendix B. Article 2:** A choice card used in the study.

Stellen Sie sich vor, Sie sehen folgende Produktetiketten auf den Verpackungen der Milchalternativen. Bitte geben Sie unten an, welche Alternative Sie wählen würden.

(1 von 12)

<p><b>Frische Vollmilch</b> 3,5% Fett</p> <p><b>Hofbesuch</b></p> <p>1 Liter</p> <p><b>€ 0,99</b></p>	<p><b>Frische Vollmilch</b> 3,5% Fett</p> <p><b>Hofbesuch</b></p> <p><b>Familien Betrieb</b></p> <p>1 Liter</p> <p><b>€ 1,39</b></p>	<p><b>Frische Vollmilch</b> 3,5% Fett</p> <p><b>100% Regional</b></p> <p><b>Familien Betrieb</b></p> <p><b>Bio</b> nach EU-Öko-Verordnung</p> <p>1 Liter</p> <p><b>€ 1,59</b></p>	<p><b>Ich würde keines der abgebildeten Produkte kaufen.</b></p>
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### Appendix C. Article 3: Summary statistics.

Variable	Description	Study 1	Study 2
		%	%
Age	Mean ( <i>SD</i> )	35.64 (17.29)	30.28 (10.17)
Gender	Female	56.0	51.5
	Male	42.0	47.2
	Non-binary	0.0	1.3
	n.i.	2.0	0.0
Education	No qualification	0.7	0.2
	Secondary school	11.9	9.6
	High school	37.2	41.3
	University degree	48.3	48.3
	n.i.	1.9	0.5
Net monthly income	< €500	20.1	16.0
	€500–1,000	26.3	22.3
	€1,001–2,000	16.5	14.6
	€2,001–3,000	14.0	18.0
	€3,001–4,000	5.4	6.0
	> €4,000	4.4	4.7
	n.i.	13.4	8.3
Maximum distance (to justify “local”)	up to 25 km	14.4	7.8
	up to 50 km	34.9	33.5
	up to 75 km	18.1	18.2
	up to 100 km	25.6	35.3
	more than 100 km	7.0	5.2
<i>N</i>		613	600

*Note.* n.i. = not indicated.

**Appendix D. Article 3: Situation description.**

Please take a moment and image the following situation:

You are currently in Göttingen. The university town is located in southern Lower Saxony. To the south of Göttingen is the city of Kassel and to the north the state capital of Hanover (see map).

You have spent a beautiful summer day with friends in your hometown of Göttingen. You remember that you still have to do the grocery shopping for the next few days. Among other things, you want to buy local milk and enter the supermarket for this purpose. While shopping, you stop in front of the refrigerated shelf with the dairy products. You discover a milk and you are interested in it. However, you are not sure whether the milk meets your personal expectation of milk being local and coming from a radius of XX km.

Therefore, you look for further cues about the origin of the milk and find the following:

**Appendix E. Article 3: Construct measures.**

Constructs	Measures	Factor Loadings		Cronbach's $\alpha$	
		Study 1	Study 2	Study 1	Study 2
<b>Perceived information quality</b> (McKinney et al., 2002)	The information about the localness of the shown product is <i>applicable</i> to my purchase decision.	.796	.816	.943	.951
	The information about the localness of the shown product is <i>related</i> to my purchase decision.	.730	.798		
	The information about the localness of the shown product is <i>pertinent</i> to my purchase decision.	.805	.809		
	The information about the localness of the shown product is <i>understandable</i> .	.736	.750		
	The information about the localness of the shown product is <i>easy to read</i> .	.641	.611		
	The information about the localness of the shown product is <i>clear in meaning</i> .	.724	.822		
	The information about the localness of the shown product is <i>trustworthy</i> .	.670	.780		
	The information about the localness of the shown product is <i>reliable</i> .	.642	.808		
	The information about the localness of the shown product is <i>credible</i> .	.683	.779		
	The information about the localness of the shown product is <i>accurate</i> .	.699	.841		
	The information about the localness of the shown product is <i>sufficient</i> to my purchase decision.	.770	.836		
	The information about the localness of the shown product is <i>complete</i> to my purchase decision.	.758	.811		
	The information about the localness of the shown product <i>contains necessary topics</i> to my purchase decision.	.729	.794		
	The information about the localness of the shown product is <i>valuable</i> to my purchase decision.	.742	.743		
	The information about the localness of the shown product is <i>useful</i> to my purchase decision.	.782	.787		
	The information about the localness of the shown product is <i>informative</i> to my purchase decision.	.819	.844		

<b>Purchase Intention</b> (Baker and Churchill, 1977)	I would like to try product X.	.878	.893	.843	.907
	I would buy product X, if I happened to see it in a store.	.844	.929		
	I would patronize product X.	.902	.932		
<b>Consumer's local ethnocentrism</b> (Fernández-Ferrín et al., 2018)	Products from outside my region should only be bought, when there are no equivalents available.	.784	.799	.863	.855
	One should always buy products made in the region.	.837	.828		
	Regional products come first and foremost.	.850	.826		
	One should not buy products from outside the region since it harms regional companies and causes unemployment.	.723	.705		
	It may be cost in the long-run but I prefer to support regional products.	.830	.820		

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