Sarah Hemmerling

# Sensory food preferences

## An analysis of consumer behaviour using organic food as an example

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# Sensory food preferences – An analysis of consumer behaviour using organic food as an example

# Sensory food preferences – An analysis of consumer behaviour using organic food as an example

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# Index

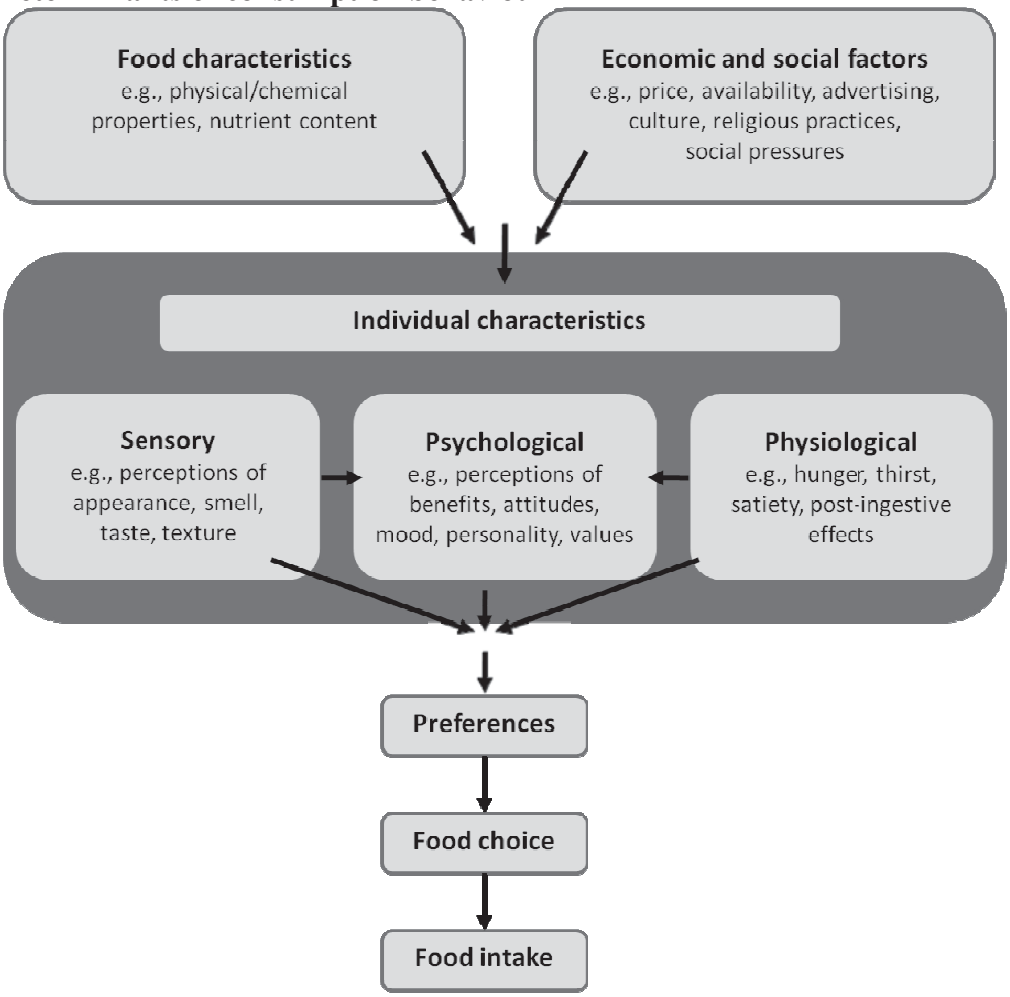
# Introduction

People's food choices have been the focus of many scientific disciplines, such as nutritional science, food technology, sociology, psychology, sensory research and marketing (Solomon et al., 2010). The understanding of food consumption behaviour is of paramount importance considering the availability of a great variety of products in a globalising and highly competitive food market and thus a central task of food marketing. Past research into this topic revealed food purchasing to be a complex process that is characterised by the interplay of several influencing factors (Conner, 1993; Rozin, 1996; Shepherd, 1990; Shepherd & Raats, 1996). Besides economic and social criteria (e.g., price, availability, labelling, culture, society), psychological aspects (e.g., attitudes, beliefs, values, personality, emotions), physiological factors (e.g., hunger, thirst, satiety) and particularly the sensory perception of, and preference for food properties such as smell, texture, appearance and taste are claimed to determine consumers' food preferences and subsequently food choices (ibid.). The model in Figure 1 displays these interrelated factors and shows how they affect consumption behaviour that is comprised of preferences, food choice and finally food intake.

In general, a preference is a choice of one subject over another. In the context of food, the term preference is commonly used for liking, although they are not synonymous (Rozin & Vollmecke, 1986). Liking refers to the palatability and contributes together with other aspects such as price, availability or attitudes, to the building of preferences for a food (Rozin, 1996). Meiselman (1996) suggests the following definition of the term preference: "a general predisposition for a particular food independent of the situation" (p. 253). The interpretation of the word preference in the sense of liking is used in this dissertation.

Empirical findings confirm the importance of taste for consumers' food choices in general (Anna, 2001; De Ferran & Grunert, 2007; Lusk & Briggeman, 2009; Max Rubner-Institut, 2008; Torjusen et al., 2001; Wandel & Bugge, 1997). Several authors underline the fundamentality of a pleasant taste. They conclude that food is unlikely tobe eaten if its sensory attributes are not perceived as positive (Furst et al., 1996; Hetherington & Rolls, 1996; Steptoe et al., 1995). Moreover, one of the recent consumer trends in the food sector reflects an increased interest in food consumption that is characterised by indulgence, pleasure and a strong quality orientation that finally can be attributed to sensory experiences (BLL, 2008; Hughes, 2009; Zühlsdorf & Spiller, 2012).

**Figure 1: Determinants of consumption behaviour**




Source: On the basis of Conner (1993) and Van Trijp and Schifferstein (1995)

Part of this trend is the rising demand for food whose quality is ascribed to certain production methods, such as organic food. The expansion of organic food markets can be observed throughout the world. In 2011, the European market for organic food increased by nine percent compared with 2010 and has almost doubled since 2004 (Schaack et al., 2013). The interest in ecologically produced food is not limited to "core" organic buyers, but rather it is spread among all types of consumers. The drivers of this development are manifold. Initially, food scandals like the BSE-crisis led to an increased awareness of food safety and health concern. Subsequently, the intensive promotion of organic standards (e.g., the implementation of the Bio-Siegel in Germany or the National Organic Program by the USDA (U.S. Department of Agriculture)) and the conventionalisation of market structures contributed to the improved availability and visibility of organic food (Aertsens et al., 2009; Codron et al., 2006; Naspetti & Zanoli, 2009). Not least, there is evidence that organic products also attract consumers primarily because of their good taste (Magnusson et al., 2001; McEachern & McClean, 2002; Schifferstein & Oude Ophuis, 1997; Stobbelaar et al., 2007). Besides apparent health promoting aspects and environmental friendliness, taste is a frequently

claimed purchasing motive for organic food products. Thus, sensory characteristics represent a promising method to position organic products in the food market and to differentiate them from competing products. The high relevance that consumers assign to taste suggets that emphasising the sensory quality represents a suitable communication strategy, especially for high-quality foods like organic products.

**Classification within the research field**

While there is a plethora of research with regard to the effects of socio-economic and psychological aspects on consumption behaviour; so far marketing literature has not accounted sufficiently for the high relevance of sensory perception for consumers' food choices. One reason for this is the traditionally weak linkage between sensory analysis and marketing research, both of which share the goal of selling a profitable product in the market, but which differ substantially in their approaches (Wilton & Greenhoff, 1988). The scope of sensory analysis is the development of new products and the improvement of existing ones in terms of physical, chemical and microbiological composition and finally in good taste (Van Trijp & Schifferstein, 1995). For this, it uses possibly objective measurement methods, i.e., experts or trained consumer panels that conduct sensory testing. Moreover, sensory analysis is characterised by operating product-specifically and in an experimental environment that guarantees the exclusion of interferences with other factors that affect food choices in real consumption situations (Lawrence et al., 2003; Wilton & Greenhoff, 1988). To the contrary, marketing research investigates the overall perception and acceptance of food products by the consumer and attempts to capture a possibly realistic consumption setting. It seeks to understand the various drivers of food consumption by using rather subjective methods for the measurement of preferences (ibid.). Keeping both approaches separated or insufficiently integrated may lead to a poor understanding of consumer needs, which, in the worst case, results in product failure (Lawrence et al., 2003), as prominent examples like the "New Coke" and "Burger King's new French fries" have shown (Armstrong & Kotler, 2000; Ordonez, 2001). In both cases taste tests failed to predict the market performance of those product innovations due to not having taken into consideration the consumer and the marketing context (Lawrence et al., 2003). Although approaches combining both disciplines exist, empirical studies including sensory variables are relatively few and moreover reveal differing results (Saba et al., 1997). Moreover, a scientific standard for such combined analytical procedures is missing. However, the plurality of factors influencing food preferences demands a closer integration of sensory analysis in marketing research. Also, the fact that the social and cultural environment set up the framework for food consumption, thus determining the exposure of food and thereby shaping food liking (Mela, 2001; Wright et al., 2001), requires the consideration of sensory preferences for the analysis of consumer behaviour.

This cumulative dissertation aims to build an interface between product-oriented sensory analysis and consumer-centric marketing research, contributing to the emergent discipline of sensory marketing. Following an integrative approach, the dissertation enables a more comprehensive analysis

of consumer behaviour by considering the role of sensory preferences in relation to other aspects that determine food choices.

## Objectives of the dissertation

This dissertation presents empirical methods that take into account the need for a more sensory-oriented consumer research. It aims at exploring different facets of consumer behaviour with particular emphasis on sensory preferences. For this purpose, sensory preferences are related to different aspects that affect consumer behaviour or are part of it, namely attitudes, organic food consumption frequency, culture and marginally socio-demographics. Next to these personal criteria, the effect of product-related factors, i.e., product information on the sensory perception is considered. In order to emphasise the potential of the analysis of sensory preferences for strategically marketing high-quality goods, the presented studies predominantly refer to the consumption of organic products as one example of premium-food. With respect to methodology, these objectives are mainly approached by statistical analyses of quantitative demoscopic market data from six European countries.

An excursus provides insights into an additional market segment of high-quality food, i.e., traditional food specialities. Similar to organic food, traditional specialties are characterised by specific production methods that, according to consumers, contribute to a unique sensory quality (Almli et al., 2011; Bower & Baxter, 2000; Vanhonacker et al., 2010). However, in the focus of the excursus is the relationship between perceived authenticity of food specialities and psychological dimensions of the consumer's mind and the effect of both constructs on consumer behaviour. Thus, addressing another perceptual dimension that is assumed to influence food choices, offers additional insights into the complex process of consumer behaviour.

## Structure and content of the dissertation

The dissertation comprises six articles that are divided into three chapters that examine the above mentioned research concerns. The reported articles, in similar versions, are either published in scientific journals, submitted or are intended for submission. Table 1 outlines the structure and content of the dissertation.

**Table 1: Structure of dissertation**

| | | |
|---|---|---|
| **Introduction** | | |
| **Organic food consumption behaviour** | | |
| Literature review regarding organic food consumption behaviour | *I* | *Consumption behaviour regarding organic food from a marketing perspective – A systematic literature review* |
| **Sensory preferences** | | |
| Consumer typology based on sensory preferences | *II.1* | *Cross-national sensory segments in the organic market based on stated preferences for the five basic tastes* |
| Framework of preferences for sensory attributes of organic food | *II.2* | *Core organic taste: Preferences for sensory attributes of organic food among European consumers* |
| Effect of the organic label on sensory perception | *II.3* | *Organic food labels as a signal of sensory quality –insightsfrom a cross-cultural consumer survey* |
| Relationship between attitude and sensory preferences with regard to naturalness | *II.4* | *Preference for naturalness of European organic consumers – First evidence of an attitude-liking-gap* |
| **Excursus** | | |
| Authenticity of food specialties | *III* | *Developing an authenticity model of traditional food specialties: does the self-concept of consumers matter?* |
| **Summary** | | |

In the following, each research article will be placed in the context of the objective of this dissertation. In addition, the scope and methodological procedure of every study will be briefly described. The outlined articles will then be reported in full length. Subsequently, a comprehensive summary will be presented including remarks about the main findings of the presented articles, a discussion of the results with respect to recommendations for marketers, practitioners and scientists and the consideration of research limitations. Finally, suggestions for future research will be made taking into consideration the limitations of the presented research approaches.

### Chapter I: Organic food consumption behaviour

The first chapter builds the basis for the following analyses. The article *"Consumption behaviour regarding organic food from a marketing perspective – A systematic literature review"* provides an extensive overview and structure of existing literature regarding organic food consumption. Using the 4 C's as a framework, it covers the main marketing elements from a consumer's perspective, i.e., consumer value and benefits, costs, communication and information and convenience. The article does not focus on sensory preferences. However, it contributes to this dissertation by identifying studies that deal with sensory aspects of organic food or with the perception of these by the consumer. The brief descriptions of the main outcomes give information about the status quo and the relevance of this research field, from which a possible need for further research can be derived. The

article reports the results of a systematic literature review that analyses secondary data of 279 studies that were published between 2000 and 2011 in English peer-reviewed scientific journals.

**Chapter II: Sensory preferences**

Against the background of the prevalent importance of sensory characteristics for the purchase of organic food, this chapter focuses on sensory preferences of organic consumers and thus builds the core of the dissertation. It intends to explore product-specific and product-unspecific sensory preferences and investigates their role in consumer behaviour. Thereby, it stresses the chances of integrating sensory product information into the marketing of organic food and provides recommendations for marketers and producers. All four studies use the same data base, which was obtained in the framework of an EU-funded research project between November 2010 and February 2011 in Italy, Germany, Switzerland, Poland, the Netherlands and France.

The first article presents an approach of building a consumer typology under consideration of product-unspecific sensory preferences. Article II.1, entitled *"Cross-national sensory segments in the organic market based on stated preferences for the five basic tastes"*, uses stated preferences for the five basic tastes sweet, salty, sour, bitter and umami for classifying organic consumers. By means of a hierarchical cluster analysis, the study illustrates the stepwise process of segmenting a market and thus proposes a flexible instrument that is applicable for different marketing needs. Revealed patterns of taste preferences are related to socio-demographics and cultural origin by using descriptive and bivariate statistical methods.

The second article (II.2), *"Core organic taste: Preferences for sensory attributes of organic food among European consumers"*, proposes a framework of sensory attributes for which organic consumers presumably have a preference, the so called "core organic taste". Deriving from the principles of a wholesome nutrition and the ideals of organic food consumption, and supported by empirical evidence, a theoretical framework is elaborated and explored in a cross-national context. Stated preferences for sensory properties of organic food are also examined in relation with consumers' organic food consumption frequency. This exploratory approach mainly uses correlations and ANOVA for data analysis.

Article II.3 and II.4 deal with actual sensory perceptions of a specific product, namely the liking of strawberry joghurt. The article *"Organic food labels as a signal of sensory quality-insights from a cross-cultural consumer survey"* (II.3) applies sensory testing in order to find out whether and how information about production methods, i.e., organic and conventional, influences the perception of taste. This is achieved by comparing means with a non-parametric Wilcoxon test. Correlations were calculated in order to check whether effects depend on the organic food consumption frequency.

The article *"Preference for naturalness of European organic consumers – First evidence of an attitude-liking-gap"*, provides insights into organic consumers' attitudes towards natural food and in their sensory preference for it. A principal axis factor analysis is used to explore whether there is

evidence for a latent dimension that represents consumers' attitude towards naturalness and which aspects are assigned to this dimension. However, the main scope is to investigate whether attitudes towards naturalness are able to predict the liking of natural food. This aim is achieved by combining sensory tests of strawberry yoghurt with consumer information obtained from the means of a standardised questionnaire. Findings are discussed against the background of cultural differences. Descriptive and bivariate statistical methods, such as ANOVA, contingency analsis and correlations, are used for further data analysis.

**Chapter III: Excursus**

The article III, *"Developing an authenticity model of traditional food specialties: does the self-concept of consumers matter?"*, provides an excursus into the topic of authenticity of traditional food specialties. Thereby, it also pursues the objective to gain a better understanding of consumer food choice behaviour. Due to many similarities between organic products and traditional specialties, which will be discussed in the following, findings from this study may also be applied in the context of organic food.

Traditional food specialties are defined as foods that are characterised by particular qualitative aspects and by a specific cultural identity (Jordana, 2000). As for organic products, producers of traditional food specialties have the possibility to have their products certified by the European Union if they produce them according to certain production standards, which in turn enables them to use one of the following labelling schemes: PGI (protected geographical indication), PDO (protected designation of origin) or TSG (traditional specialities guaranteed). Also, the consumers' perception of some quality aspects shows commonalities between both food categories. In general, both are associated with superior quality (Pieniak et al., 2009). Specifically, they are perceived as being more sustainable (Asebo et al., 2007; Risku-Norja et al., 2008) and also more natural (Pieniak et al., 2009). Finally, like the organic food market, the market for traditional specialties represents a niche, i.e., a market segment within the larger marketplace consisting of groups of consumers who have similar demographic, buying behaviour and/or lifestyle characteristics (Thilmany, 2008) (although in the organic food market the trend of mainstreaming and conventionalisation is becoming more and more apparent (Berlin et al., 2009; Eden et al., 2008; Pugliese et al., 2013)).

In addition to the similarities of the analysed product categories and markets, in the broader sense, the scope of article III fits in the research objective of this dissertation since it deals with the perception of a product attribute, namely authenticity, which is assumed to influence consumers' food choices. The study aims at developing a model that considers the antecedents (consumers' identification with the product) and consequences (purchase intention) of the perceived authenticity of a PDO-product. To this end, a structural equation model is proposed.

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# Chapter I: Organic food consumption behaviour

## I Consumption behaviour regarding organic food from a marketing perspective – A systematic literature review

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*This article was submitted in a similar version to: Organic Agriculture.*

## Abstract

There are many publications focusing on diverse aspects of marketing research for organic products. However, so far there have been very few attempts to provide an overall synthesis of current knowledge. The present study therefore gives an overview of marketing research for organic food consumption, enabling the identification of research strengths and deficits. The review analyses a total of 279 research studies published between January 2000 and December 2011. The structure of this review was derived from the concept of the consumer-oriented marketing mix (4C's), taking into account consumer value and benefits, cost to the consumer, convenience and communication. The studies were systematically evaluated according to sampling procedures, methods of data analysis as well as main outcomes. The results of this qualitative analysis reveal a high density of publications, especially for the period from 2008 to 2011. The most investigated topics are cost to consumer and consumer value and benefits. Nevertheless, there are still many aspects within these research areas that have not yet been addressed, such as ecological packaging, price knowledge and price processing. The research areas communication and convenience in terms of places of purchases are also less intensively researched.

**Keywords:**Organic food consumption, organic food marketing, consumer behaviour, systematic literature review, research gaps

## 1 Introduction

The organic food sector experienced massive growth since the end of the last century (Sahota 2011). Consumers increased interest in, and awareness of, food quality, and they assume safety to be the consequence of several interacting factors, such as various food scandals like the BSE-crisis, intensive promotion of organic standards (e.g., the implementation of the Bio-Siegel in Germany or the National Organic Program by the USDA (U.S. Department of Agriculture)) as well as the "conventionalisation" of the organic food industry (Aertsens et al. 2009a; Codron et al. 2006; Naspetti and Zanoli 2009). These developments in the organic food sector have also left their mark in the international scientific literature, with the publication of an increasing number of research articles dealing with the marketing and consumption of organic food. In spite of the large number of publications, researchers rarely conduct meta-analyses and reviews of the numerous results for this field. There are a few cases in which researchers attempt to give an overview of the state of the art. However, these mostly focus on single facets of organic food demand and/or sales. Aertsens et al. (2009b), for example, address a subdomain of consumer behaviour by describing the status quo of research on personal determinants of organic food consumption. Similarly, Hughner et al. (2007) focus on studies that deal with purchasing motives and aspects that deter the consumption of organic food products. Schleenbecker and Hamm (2013) report findings regarding consumers' perceptions of organic product characteristics, while Yiridoe et al. (2005) conducted a review of em-

pirical studies on consumer preferences for and attitudes towards organic vs. conventional food. Thøgersen (2010) took an approach to explore the various reasons for differences in sustainable and organic food consumption between countries. Pearson et al. (2010) review research on the distribution and marketing of organic food as well as on the consumer demanding it. A further review by Adams and Salois (2010) focuses on the literature that allows a comparison between organic and local food, in order to analyse how they affect each other. Other literature analyses focus on organic food consumption behaviour in specific countries such as Romania (Popa et al. 2011) or Ireland (Tobin et al. 2011).

Nevertheless, to the best knowledge of the authors, a review that comprehensively considers the four classic main areas of marketing with focus on the consumer (consumer value and benefits, cost to the consumer, convenience and communication) in the context of organic food does not exist. The vast number of publications has been poorly summarised in meta-analyses or reviews so far and thus makes it difficult for scientists and practitioners to get an overview of relevant results. Also, an extensive revision and quantification of publications with regard to content serves the science by identifying research fields that have not yet been covered and reporting disproportionately researched ones. In addition, it may reveal contradictory findings. Usually, studies are neither replicated nor critically reassessed. An attempt to clarify contradictions in the area of determinants of organic food consumption is made, for example, in the meta-analysis by Aertsens et al. (2009b).

Moreover, a comprehensive literature review could support marketers, producers and retailers of the organic food sector. Practitioners are often hindered by a lack of, or unclear and contradictory, recommendations for practical application, which requires them to make their own interpretation. Moreover, results are commonly published by a range of organs, e.g. in different journals, edited volumes and online-documents. Although practitioners can search the comprehensive international scientific database ‘Organic Eprints’ for relevant results and recommendations, it is questionable if such instruments are actually used in companies due to time pressure. Thus, the present study provides an opportune way for researchers as well as practitioners to get a comprehensive overview of the state of the art of organic food consumption behaviour and to find structured results regarding its diverse aspects.

Thus, the present qualitative literature study aims to fill the identified gap, by not only outlining the articles based on relevant quantitative and qualitative surveys and their findings, but also by identifying insufficiently investigated research areas and knowledge gaps in the field of organic food marketing. This is done by systematically reviewing and analysing the focal literature and reporting results in both a qualitative and quantitative manner. The review is based on English language studies from internationally publishing peer-reviewed journals from the time period between January 2000 and December 2011. After presenting the methodological procedure of this literature review, its results, in terms of applied methods and content, will be summarised for each of the four C’s, i.e., the elements of the consumer-oriented version of the marketing-mix. The subsequent discussion

will synthesise the findings and highlight existing research deficits. These findings will finally be evaluated regarding scientific and practical relevance.

## 2 Methods

McCarthy (1960) originally proposed operational marketing to be based on the four elements of the classical marketing mix – product, price, promotion and place. Our literature review focuses on consumers and their consumption behaviour regarding organic food. Thus, for the structure of this review, we use the revised concept suggested by Lauterborn (1990) that considers the above mentioned elements from a consumer perspective, namely consumer value and benefits, costs to the consumer, convenience and communication. For each marketing element we identified the subcategories, which were mostly derived from the marketing literature, as follows.

- **Consumer value and benefits:** The product represents a bundle of values and benefits demanded by the consumers (Dennis et al. 2005). They obtain values and benefits from different product-related elements that build the categories for this research field: *product characteristics*, *packaging*, *product labelling*, *product innovation*, *elimination and modification*, *product range* and *value added services* such as guarantee and customer service (Kotler and Keller 2012; Armstrong and Kotler 2013).
- **Costs:** The costs equal the sum of all values that a consumer pays for a product or a service (Armstrong and Kotler 2013). Since consumers perceive and evaluate price information differently (Belz and Peattie 2012), the main topics analysed here are *price cognition*, *perception*, *and processing of price information* as well as *willingness to pay*.
- **Communication and information needs:** Communication includes all the ways in which a company communicates with its customers (Dennis et al. 2005). The message, i.e., the set of words, pictures or symbols, and the communication instrument, i.e., the channel through which message is delivered (such as advertising, personal selling, sales promotion, public relations, online marketing and additionally, sponsoring and event marketing) form the major parts of the communication strategy (Armstrong and Kotler 2013; Belz and Peattie 2012; Kotler et al. 2005). We identify the categories *communication instruments*, *communication messages* and *general communication* in order to discuss the current literature concerning communication.
- **Convenience and distribution:** Convenience considers consumers' choices for purchase venues that are convenient to them (Dennis et al. 2005). Several trade outlets are relevant for the organic food sector (Coughlan et al. 2006) and serve as sub-topics of this research field: *conventional food retail*, *Internet*, *direct sale from farmers to consumers*, and *specialised food retail*. In addition to these, the categories *availability* and *store choice behaviour* consider all articles that do not concentrate on a specific purchase venue but broadly discuss sales channels for organic food with regard to availability and store choices.

Eight international electronic databases (AgEcon, Cab Abstracts, EBSCO, EconPapers, Emerald Insights, NAL Catalog, Science Direct, Web of Science) were screened using a structured list of search terms (Table 1), which were derived from the prevalent marketing literature. We combined search terms of type 1 with search terms of each topic from type 2 and selected articles if at least one of the search terms appeared in the abstract of the publications. For the screening we used British as well as American spellings, although Table 1 only reports keywords with British spellings. The period reviewed was spanned from January 2000 to December 2011.

**Table 1: Search terms**

| Type | Topics | Search terms |
|---|---|---|
| Type 1 | Organic | ((organic AND farming) OR (organic AND agriculture) OR (organic AND food)) AND ((consum*[1]) OR (private AND household*)) |
| Type 2 | Consumer value and benefits | ((product AND character) OR consistence OR (product AND styling) OR style OR (product AND quality) OR (product AND design) OR (product AND colour) OR (product AND packaging) OR package OR (package AND size) OR brand OR (product AND brand) OR label OR labelling OR (product AND innovation) OR elimination OR modification OR (product AND range) OR (product AND line) OR (product AND assortment) OR (product AND guaranty) OR warranty OR service) AND consum*) |
| | Costs | ((price AND perception) OR (price AND awareness) OR pricing OR (price AND adjustment) OR cost* OR (price AND policy) OR (willingness-to-pay) OR WTP OR (price AND behaviour*) OR purchase*) |
| | Communication and information needs | (advertising OR promotion OR marketing OR (sales AND promotion) OR (personal AND selling) OR (direct AND marketing) OR communication OR fairs OR (trade AND show*) OR (public AND relations) OR events OR (media AND work) OR relations OR (relationship AND management) OR CRM) |
| | Convenience and distribution | (distribution OR (sales AND channel) OR shop OR shopping OR purchase OR purchasing OR store OR retailer OR (retail AND market) OR grocery OR PoS OR (point AND of AND sale) OR (health AND food AND store) OR (wholefood AND shop) OR (organic AND supermarket) OR preference OR accessibility OR availability OR distance) |

Only English language articles published in peer-reviewed scientific journals were considered for further analysis. Theses, dissertations, project reports and conference contributions were excluded. Publications fulfilling these requirements were further checked for the following inclusion criteria regarding the content:

- **Organic food consumption:**Eligible articles had to focus on the consumption of organic food or refer to it as one of the primary research concerns. Articles predominantly focusing

[1]The asterisk (*) denotes a wildcard used as a substitute for any other character or characters. For example, consum* captures the words consume, consumption, consumer etc., all of which are relevant for the search.

on sustainable, natural, local, fair trade, ethical or green consumption, with which organic is commonly associated, were not considered as sufficiently addressing our research topic.

- **Consumer perspective:**The reviewed publications had to deal with the consumer and/or with aspects of their consumption behaviour. Articles exclusively dealing with the supply of organic food from the producer and/or retailer perspective were excluded.
- **Elements of the marketing mix:**• Elements of the marketing mix: Only articles addressing one or more of the four components of the marketing mix were included. Publications that did not fall into at least one of these categories were not considered.
- **Methodology:**The present review accepted quantitative as well as qualitative surveys and approaches that were theoretical. Literature reviews were not considered, therefore twelve articles were excluded. There was no exclusion of studies with low methodological quality in terms of data collection, sampling, sample size or analytical procedure or with an incomplete documentation of these.

Data from the collected publications was extracted using a pre-designed data sheet. First, publications were categorised into four research topics. Publication identification details (i.e., author, year, source and title), study design (i.e., quantitative, qualitative or theoretical) survey and sampling method as well as the sample size and type of participants were then recorded. Three reviewers, who each focused on one part of the selected literature, independently evaluated the eligibility of the articles in terms of content. According to the four-eyes principle, in cases of doubt, the reviewer would ask one of the other reviewers for her assessment in order to decide if an article should or should not be included. Studies that turned out to not fulfilling the inclusion criteria were not considered in the further steps of the review. For publications that were not accessible either online or in libraries (n=67), the authors were contacted via e-mail and asked to provide the article. Through this method, we received a further 21 articles that were considered for the relevance check. The remaining publications could not be included. Studies that were based on the same data set reporting consistent results and that were published twice, were included only once in the present review.

Subsequently, quantification was conducted for each of the four research topics and their subcategories. Frequencies of study countries were computed, by the years of publication as well as by applied methods. In total, 279 publications fulfilled the above mentioned requirements and were, therefore, assigned to one or more of the four thematic categories. Table 2 shows the number of analysed studies for all topics and their sub-topics. The sum of addressed sub-topics for a research field may be higher than the total number of identified studies in that research field, since some publications deal with more than one sub-topic. For the same reason, the sum of the numbers of studies per topic does not equal to the total number of reviewed publications (279).

Finally, the findings were evaluated. Quantifications of the reviewed articles, according to their research objects, serve to identify intensively researched areas and, consequently, poorly covered aspects for which more research is needed. The obtained findings turned out to be heterogeneous,

thus rendering a quantitative meta-analysis infeasible (Mondelaers et al. 2009). While for the most part a narrative type review of each study was possible due to the relatively small number of studies in the category, this was not feasible for the aspects product characteristics due to their quantity of publications (see Table 2). In this case the authors attempted to synthesise the literature as much as possible.

The aim of this literature review is to provide a comprehensive overview of the selected aspects of the marketing literature with regard to organic food consumption in terms of content and applied methodology. As proposed by several authors such as Fink (2005), Hagen-Zanker et al. (2012) and Okoli and Schabram (2010), we approach this task systematically by following a rigorous methodological procedure, which is described here in order to enable others to reproduce the analysis. Within the defined scope of this study, we included all relevant material in order to obtain a comprehensive review. However, we do not claim to consider the complete body of available literature, due to the exclusion of articles that only marginally addressed the focal topic. The presented approach can be viewed as a qualitative review including quantifications of research topics. In the following, for lack of space, we do not present all findings for each research area and sub-category that we obtained by means of our analysis, but only those that have received increased attention in research. We then discuss the outcomes of this review with regard to each marketing-mix instrument.

**Table 2: Number of identified studies for analysed topics and sub-topics**

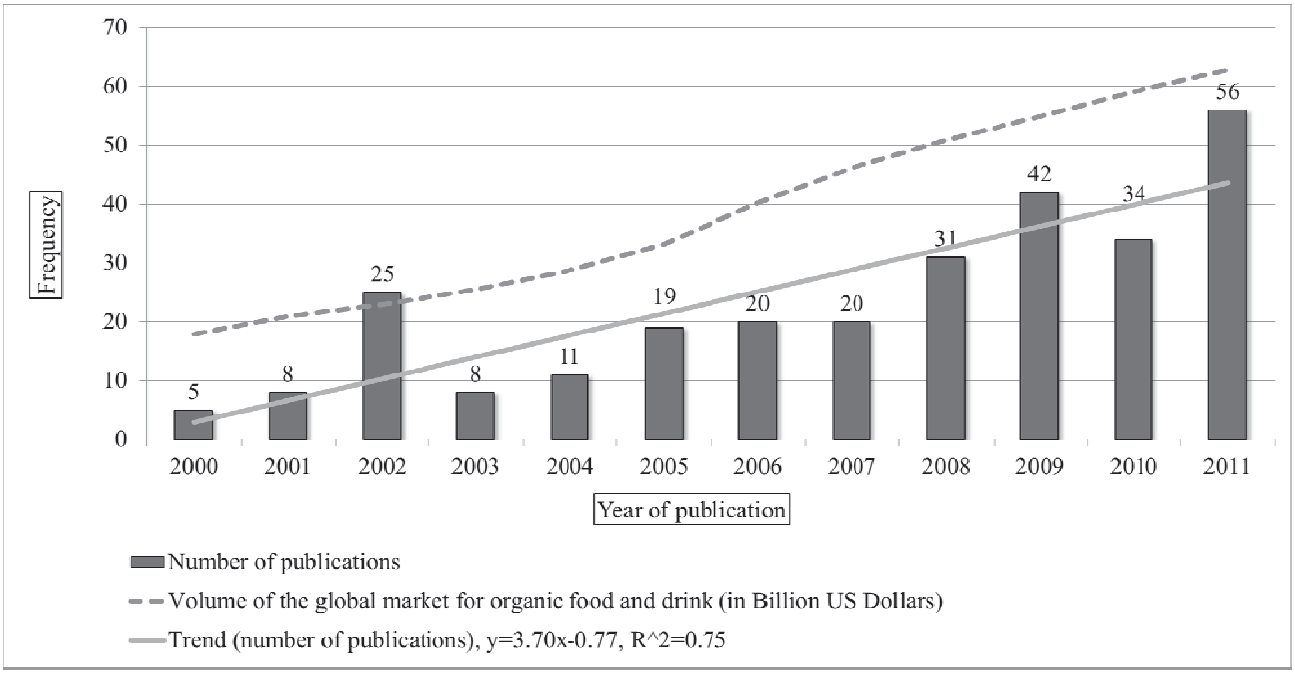
| Topic of consumer research | Number of studies | Sub-topic | Number of studies |
|---|---|---|---|
| **Consumer value and benefits** | 171 | Product characteristics | 133 |
| | | Packaging | 6 |
| | | Product labelling | 50 |
| | | Product innovation | 4 |
| | | Product range | 3 |
| | | Value added services | 0 |
| **Costs** | 144 | Price cognition, perception, and processing of price information | 25 |
| | | Willingness to pay | 119 |
| **Communication and information needs** | 32 | Communication and information in general | 6 |
| | | Communication and information instruments | 11 |
| | | Communication and information messages | 13 |
| **Convenience and distribution** | 67 | Availability | 22 |
| | | Store choice behaviour | 33 |
| | | Conventional food retail | 1 |
| | | Direct sales from farmer to consumer | 16 |
| | | Specialised food retail | 2 |
| | | Internet | 1 |

Source: Own data.

# 3 Results

Figure 1 clearly shows an increase in the number of articles over time, which parallels the increase in global market volume. After the first phase of publishing, the number of studies has risen since around 2003. This can be partly assumed to be a consequence of the BSE-crisis that was associated with increased promotion and demand of organic food (Aertsens et al. 2009b; Lüth et al. 2005). We estimated the linear model on the basis of the number of published articles between January 2000 and December 2011.

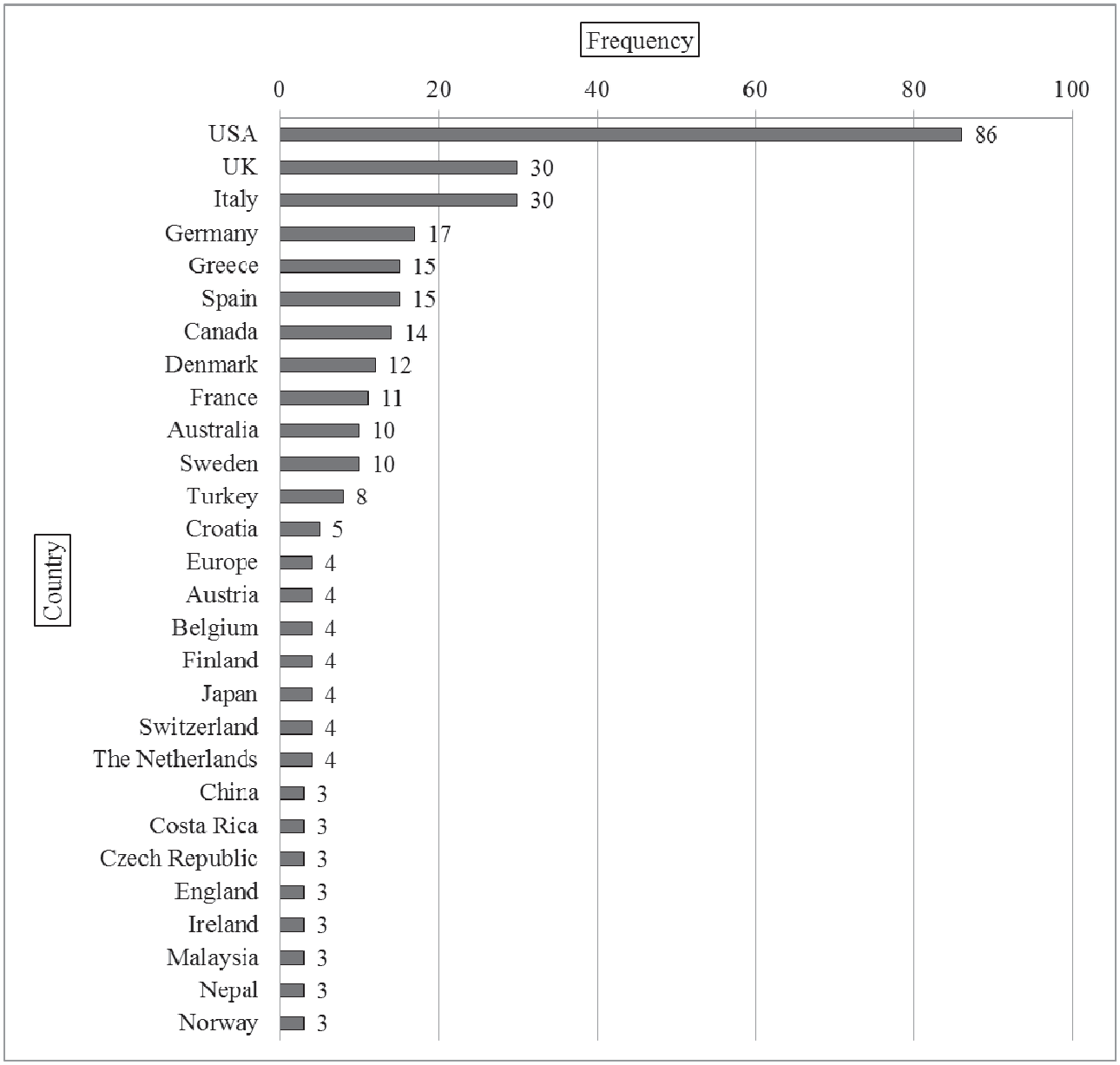
**Figure 1: Number of publications published between January 2000 and December 2011**




Sources: Own data; Sahota 2013; Sahota 2012; Sahota 2011; Sahota 2010; Sahota 2009; Sahota 2008

Figure 2 displays the frequencies of those countries that are the subject of at least three studies between January 2000 and December 2011. Since many intercultural studies consider more than one country, for each country we recorded how often it has been the focus of a study instead of listing only the country of the authors. Thus, the bars illustrate the publishing effort of one country only to a certain extent and can be understood as the extent of research attention a country has received. The US was the subject of 86 publications, which is by far the largest number in our sample dealing with the marketing of organic food, followed by the UK (United Kingdom) (30) and Italy (30). Due to the present literature being based on English articles, it is logical that English-speaking countries produce a larger number of research articles than other countries. Nevertheless, the scientific output in Europe is relatively large, with the UK, Italy, Germany, and Greece representing important research centres. Other non-European countries, besides the USA, are less frequently displayed, except for Canada with 14 publications and Australia with 10 publications.

**Figure 2: Frequencies of study countries for the time period from January 2000 to December 2011**




Source: Own data.

## 3.1 Consumer value and benefits

We assigned 171 publications to this category, which mostly do not focus on the issue of organic products' values and benefits, but deal with it as one aspect out of many. Studies that analyse the consumers' WTP for organic food and its attributes and thus offer implications for the relevance of these, are not considered here since they are extensively discussed in the following section about costs to the consumer.

### 3.1.1 Product characteristics

This section summarises the findings of 133 studies addressing products' attributes and benefits that consumers associate with organic food and look for when buying it. Besides a large part of publications referring to the most important organic product attributes that drive organic food preferences, selection and consumption, many studies take a closer look at how consumers perceive organic food products in general and with regard to taste.

Product attributes and purchasing motives

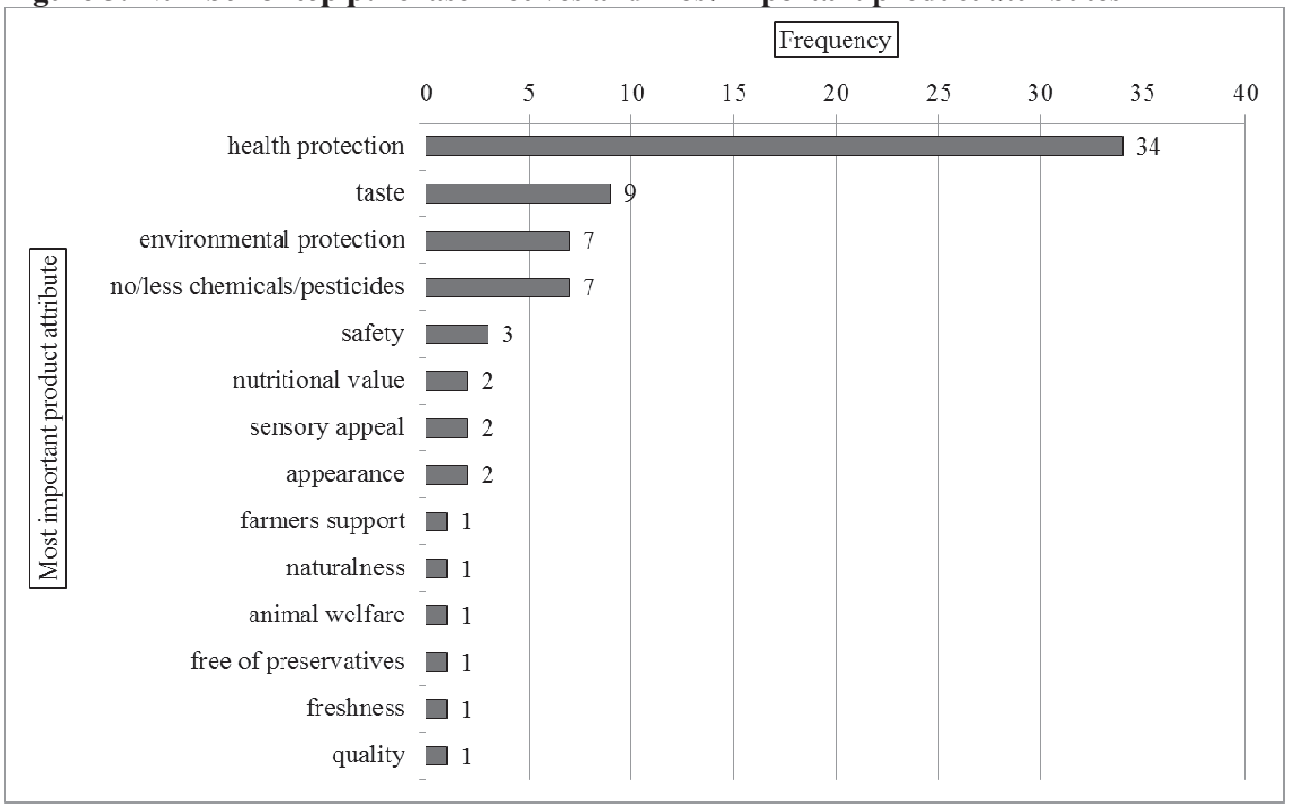
A large number of studies attempt to answer the question of which product attributes consumers value as important and what motivates them to purchase organic food. Many of these studies come to similar or even to same conclusions. In order to highlight the product characteristics that mainly motivate consumers to buy organic food, Figure 3 displays those purchasing motives that obtained the highest frequencies in each study (sometimes motives are ranked highest). Other aspects that are not of primary importance (and thus do not appear in Figure 3), but are also relevant for the organic food choice, are, for example, superior quality in general, a competitive price, support of local farmers, curiosity for new products and brands, origin, lifestyle, absence of GMO (genetically modified organism), a better feeling when consuming organic food, longer shelf life and enjoyment.

Pearson et al. (2007) go further and identify five groups of organic buyers based on their motivational structure regarding their organic food purchases composed of health, quality (taste, freshness), and environmental issues. The largest segment (60%) describes the passionate organic user, who values all three aspects to the same extent, while for the second biggest group (24%) health and taste aspects are most important. These findings suggest that particularly the individual benefits, i.e. health and taste, are of major importance to Australian organic consumers.

With regard to Germany, Klöckner and Ohms (2009) analyse if consumers with strong pro-environmental beliefs value different organic milk attributes than consumers with weak pro-environmental beliefs. For both groups the fat content is the most important criteria. After that, participants with a weak personal belief consider the expiration date, the recyclability of the container, the impact of the chosen milk on their own health and the kind of container. Participants with a strong personal belief consider, next to the fat content, recyclability and their own health, organic-production and the EU-label for organic products on the container among the five most important aspects (ibid.).

Wier et al. (2005) addresses the relation between individual and altruistic benefits. They claim that 2/3 of the total value of a product can be assigned to public good attributes (e.g. environment protection), and 1/3 to private good attributes (e.g. health and taste). However data from Denmark indicates that stated importance does not correspond to importance revealed by actual purchasing behaviour. They find that private good attributes have a significant effect on the organic budget share,

**Figure 3: Number of top purchase motives and most important product attributes**




Source: Data is taken from various studies[2].

whereas stated public good attributes do not significantly contribute, thus revealing an attitude-behaviour-gap (ibid.). The inferior role of the public good environmental protection becomes also evident in a study addressing the French consumers' perception of food miles. Sirieix et al. (2008) reveal that most respondents do not see major differences between locally grown and imported organic food as regard to health, quality or environment. They do not really take distance into account when choosing food and do not reject products coming from far away. The authors conclude that

[2] Aertsens et al. (2011), Aguirre (2007), Aguirre González (2009), Ahmad and Juhdi (2010), Akbari and Asadi (2008), Aryal et al. (2009), Ayaz et al. (2011), Barrena and Sanchez (2010), Bhatta et al. (2010), Botonaki et al. (2006), Cerjak et al. (2010), Chang and Zepeda (2005a), Chang and Zepeda (2005b), Chinnici et al. (2002), Cicia et al. (2009), Costanigro et al. (2011), Crandall et al. (2011), Dahm et al. (2009), Deleuran (2011), Disegna et al. (2009), Ergin and Ozsacmaci (2011), First and Brozina (2009), Fotopoulos and Krystallis (2002a), Fotopoulos and Krystallis (2002b), Hamzaoui Essoussi and Zahaf (2008a), Hamzaoui Essoussi and Zahaf (2008b), Hamzaoui Essoussi and Zahaf (2009), Harper and Makatouni (2002), Hill and Lynchehaun (2002), Katundu et al. (2010), Krystallis et al. (2006a), Krystallis et al. (2006b), Lobley et al. (2009), Lockie et al. (2002), Lockie et al. (2004), Magnusson et al. (2001), Maguire et al. (2006), Managi et al. (2008), McEachern and McClean (2002), McEachern and Schroder (2002), O'Donovan and McCarthy (2002), Padel and Foster (2005), Padilla-Bernal and Pérez-Veyna (2008), Pearson (2001), Pellegrini and Farinello (2009), Peršurić and Tezak (2009), Piyasiri and Ariyawardana (2002), Rainey et al. (2011), Roitner-Schoesberger et al. (2008), Sirieix et al. (2011), Van Loo et al. (2010), Vidal et al. (2011), Wang et al. (2010), Westerlund Lind (2007), Wier et al. (2005), Wier et al. (2008), Wolf et al. (2009), Yin et al. (2010), Yue and Tong (2009)

emphasising exclusively the environmental dimension of food miles can be insufficient to promote local supply (ibid.).

Organic plus products

Four studies explicitly deal with organic plus products, i.e. products with an additional special benefit. Howard and Allen (2006) conclude that the most important "plus" attributes for organic consumers in the USA are humane animal treatment, local origin of the products and living wages for the workers. Zander and Hamm (2010) support these findings by revealing animal welfare and fair prices to farmers as the most important attributes along with product price for consumers in Austria, Germany, Italy, Switzerland and the UK. Larue et al. (2004) analyse Canadians' acceptance of functional health properties in conventional, organic and GM-food. Only some consumers show preferences for functional GM-food and organic food over conventional food, assumingly due to their health consciousness. Whereby, they prefer organic food over GM-food. West et al. (2002) concludes that functional food properties are valued more than organic or GM-food. However, adding functional benefits to organic and GM-food makes it more attractive to Canadian consumers (ibid.).

Importance of organic in relation to other product attributes

Some studies analyse the importance of the attribute "organically produced" in relation to other product attributes. For example, Verdurme et al. (2002) compares organic versus GM-food, examining whether Belgium organic consumers are automatically opposed to GM-food. They find that this is not the case, since only about 40% of the organic consumers reject the use of genetic modification in organic food production, suggesting that the ban of GM-technology from organic food production is not consistent with the views of a lot of organic consumers and should therefore be reconsidered (ibid.).

Some studies imply a low importance of organic quality. Bellows et al. (2010) reveal that the general relevance of the organic attribute for food choice was quite low in comparison to the US-origin of food, to the absence of GMO, and to local production. Wirth et al. (2011) come to the same conclusion when quantifying the relative importance of apple search, experience (quality, appearance, size, flavour, price), and credence attributes (conventional vs. organic, local vs. national vs. import). Organic production appears to be not important for apple consumers from Pennsylvania (ibid.). Also, Wolf et al. (2002) find that the attributes organically grown and certified are only somewhat desirable to the average Californian lettuce consumer. Whereas, consumers rate the aspect environmental friendly somewhat to very desirable, indicating that they do not understand the characteristics of organically grown produce. Bernabeu et al. (2010) reveals even a negative influence of the fact that a product is organically produced on the consumers' preference for cheese, suggesting that the attribute organic does not contribute additional utility to the Spanish consumer and is an inadequate differentiation strategy for cheese producers. Also, McIntyre and Schwanke (2010) reveal a

negative effect by the organic labelling of high premium biscuits, since British consumers did not prefer organic biscuits.

Associations and perceptions

In addition, in many studies consumers are asked how they perceive organic food products and what they associate with them. About 40 quantitative and qualitative studies analyse consumers' stated and sensory perceptions of, beliefs about, associations with and expectations from organic products.

Summarising the reviewed publications, we find that consumers most frequently relate health promoting aspects to organic food. Eight studies report the highest frequencies for the perception of organic food being produced without or with fewer chemicals. Consumers in six studies reveal that they mainly relate organic food to high prices. Respondents in five studies make association with a good or better taste prior to other attributes. In three articles each, organic food is most strongly perceived to represent an environmental friendly production, an increased food safety as well as a generally good/better quality and appearance. Also, the surveys mention attributes like homegrown, animal welfare, non-industrialised production, no artificial additives, being less processed, serving a good purpose, non-toxic, and no hormones. Moreover, many consumers share the negative perception of organic food being more expensive and few think that organic food has a worse sensory appeal than conventional food.

Effects of perception on organic food consumption

Some studies attempt to analyse the effects that consumers' perception of organic food has on their consumption behaviour. Rimal et al. (2006) examine consumers' perceived risks and benefits of agro-biotechnology and their influences on purchasing organic food. They conclude that consumers in the USA prefer organic food over conventional and GM-food (genetically modified-food) because they perceive it as healthier, more environmental friendly and more ethical/fair. Results of De Magistris and Gracia (2008) indicate that those Italian consumers who highly believe that organic food products are healthier and of higher quality than conventional ones will have a higher intention to purchase organic food products. In addition to that, De Gracia and de Magistris (2008) reveal that the Italian consumers' perception of the health benefit has a higher impact on the probability of buying organic food than the environmental one. On the other hand, the environmental benefit also influences the intensity of organic food consumption, whereas the health benefit does not (ibid.). Along the same line of thought, according to Magnusson et al. (2003) and Shepherd et al. (2005), egoistic motives of Swedish consumers, such as perceived health benefits, are better predictors of the purchase of organic food than altruistic motives, such as perceived environmental benefits. Zepeda and Li (2007) quantify the effect of beliefs about organic food on the probability to purchase organic food. The belief that organic food is less convenient lowers the probability to purchase it by 26%; whereas the belief that organic food is more nutritious increases the probability by 12% (ibid.).

Barnes et al. (2009) find that survey participants perceive organic production as beneficial to the environment, but favour conventional farming due to its apparently more positive impacts on the farmer and family. Organic farming is perceived as being even riskier than conventional farming already is (ibid.).

Sensory perception

While most of the above mentioned studies deal with the perceptions of organic food in general, 14 publications specifically attend to the issue of sensory perception by means of consumer testing. For example, Di Monaco et al. (2007), Poelman et al. (2008) and Tagbata and Sirieix (2008) investigate the effect of different kinds of information on the sensory perception of consumers and obtain ambiguous results. Di Monaco et al. (2007) examine Italian consumers' liking of vegetable soups and find it to be positively affected by information on organic ingredients. Overall, consumers prefer a soup made with organic ingredients to a soup made with ingredients from conventional farming systems (ibid.). Poelman et al. (2008) test whether information about organic production and fair trade affects the sensory preference for and perception of sensory attributes of pineapples among British and Dutch consumers and conclude that organic and fair trade information do not have much influence on liking or on perception of single attributes. Although they seem to positively affect liking to a small extent when presented alone, in combination, they do not. However, subjects with a positive attitude towards organic or fair trade information perceive the products to have an overall stronger sensory impact in the presence of such information than in its absence. The opposite is true for subjects with a negative attitude towards organic or fair trade information. In France, Tagbata and Sirieix (2008) also explore if interactions exist between the taste of chocolate and the organic and/or fair trade labels of chocolate, revealing a gap between the expected quality and the perceived quality measured by the hedonic ratings, with the latter being lower.

Some studies conduct blind sensory tests in order to prove the taste superiority of organic food. This way, Napolitano et al. (2010b) find that Italian consumers prefer organic beef over conventional beef and Annett et al. (2008) reveal that Canadian consumers like organic bread more than conventional bread. Also testing the sensory liking for bread, Kihlberg and Risvik (2007) identify different consumer segments in Sweden characterised by varying preferences for bread. Among the most liked breads are both organic and conventional breads. In contradiction to Napolitano et al. (2010b), Markus et al. (2011) find conventional beef to have an overall better sensory quality in reference to organic and natural beef, when investigating the liking of Canadian consumers. Testing physico-chemical characteristics and consumer acceptance of suckling lambs, Revilla et al. (2008) reveal that organic suckling lamb meat is not only healthier (as shown by the lower saturated fatty acid levels and the higher polyunsaturated fatty acid contents), but that Spanish consumers also prefer its sensory properties. For the product categories wine and Pecorino cheese, no differences in taste preferences between organic and conventional quality are found (Martin and Rasmussen 2011; Napolitano et al. 2010a). Fillion and Arazi (2002) focus on the product categories orange juice and

milk and compare different brands within these. British consumers perceive organic orange juice tastes better than the conventional counterpart. However, they do not find a difference between organic and conventional milk. This leads to the global finding that the claim of organic food's better taste cannot be generalised, but that it depends on the product type.

### 3.1.2 Packaging

Six studies address the packaging of organic food products. In a satisfaction analysis with a focus on organic olive oil, Sandalidou et al. (2002) find that Greek consumers are in general satisfied with the packaging of organic oil. 63% of consumers from Sri Lanka believe that organic food packaging is an unnecessary feature, since it adds extra costs and it prevents people selecting the exact amount of the product desired (Piyasiri and Ariyawardana 2002). Australian consumers emphasise another disadvantage of packaging, namely the lack of environment-friendliness (Lyons et al. 2001), which contradicts the ideals of organic food. Soares et al. (2008), who find that Brazilian consumers consider polyvinyl chloride films harmful to the environment but also to the appearance and freshness of organic food, confirms this. This kind of packaging seems to be a relevant issue to them when buying fruit and vegetables, since they declare to prefer biodegradable packaging. Hamzaoui Essoussi and Zahaf (2008b) reveal that Canadian consumers use the packaging of food as a means to distinguish organic (e.g., non-packaged food) from conventional food (e.g., canned or wrapped food). Hill and Lynchehaun (2002) are the only ones who analyse the perception of packaging of organic food, i.e. of organic milk, in the UK. Survey respondents find most of organic milk packaging unattractive. The authors reveal differences in perception between organic consumers and non-consumers. While the latter claim that mainstream packaging and price would encourage them more to purchase organic milk, the former seems to understand the differentiation by package design and the messages communicated by it.

### 3.1.3 Product labelling

This section summarises the findings of 50 studies that deal with the labelling of organic food, in particular with the consumers' knowledge about labels and certification standards, with their usage of other recognition cues, with their trust in certification as well as the plurality of different organic brands and other official labels. Moreover, it covers findings regarding the effects of organic labelling.

Knowledge about labels and certification standards

Eighteen studies reveal that consumers' knowledge about certification and the standards they guarantee is low and that the meaning of organic food labelling often is not clear. In this context, Janssen and Hamm (2011) analyse the perception of different organic labels in Denmark, Germany, Italy, the Czech Republic and the UK. Their findings indicate that many consumers do not know that a monitoring system controls organic production, and how various types of label differ from

each other. Likewise, Australian consumers are generally unfamiliar with the term organic certification and have difficulties understanding different organic brands and labels due to the lack of a unified logo (Chang and Zepeda 2005a). Gifford and Bernard (2011) and Abrams et al. (2010) find much confusion and concern surrounding the differences between the organic and the natural claim among US consumers, leading to an overestimation of the labelling standards for the natural claim. Conner and Christy (2002; 2004) do not only report a lack of understanding of the USDA's organic label meanings but also a disconnect between the label's actual function and consumers' stated motivations for buying organic food, such as sustainability, local support, and opposition to the "corporate" food system. Hoogland et al. (2007) test how Dutch consumers understand and value on-package information about organic production and animal-welfare, concluding that many consumers do not realise that the organic logo already covers all the standards, resulting in an underestimation of the organic label's value. Roitner-Schoesberger et al. (2008) come to a similar conclusion when investigating Thai consumers' knowledge of different quality-labels (hygienic, pesticide-safe, food quality and safety, organic). They determine that the main barrier to organic food consumption is the lack of understanding that the organic label already covers the standards of pesticide-free labels (ibid.). Gifford and Bernard (2008) find that US consumers' knowledge of organic tends to be limited to the three traits: pesticide-free, no antibiotics used and not irradiated. Consumers are less aware of the rule that organic must be non-genetically-modified and that sewage-sludge fertilizers must not be used (ibid.).

Eden (2011) focuses on practical aspects of certification processes and reveals that British consumers think products are scientifically tested, instead of production processes being checked. Although Padel and Foster (2005) and Eden et al. (2008) claim that consumers' knowledge about organic certification and labelling is poor in the UK, Wier et al. (2008) conclude that the complexity of having five approved national inspection bodies with individual labels does not appear to be a problem for British consumers. Similarly to Chang and Zepeda (2005b), Hamzaoui Essoussi and Zahaf (2008a; 2009) differentiate between British and Canadian organic food consumers and non-consumers, concluding that there are different levels of awareness and understanding of the concepts of organic and organic certification. Regular consumers are more knowledgeable about it and have more trust in organic brands and organic food stores. For Danish consumers, Wier et al. (2005; 2008) document a generally good understanding of the organic farming regulations. So do Fotopoulos et al. (2011), when examining whether Greek consumers' self-reported awareness of the organic scheme actually holds true.

Recognition cues apart from the label

Even though labels are supposed to distinguish organically produced food from conventional food, Eden et al. (2008) find that many UK consumers use other proxies to identify organic product quality, such as taste, texture and perishability, since they do not always trust labels. Despite the good knowledge attested to Canadian consumers, also Hamzaoui Essoussi and Zahaf (2008b) reveal that

regular and non-regular organic consumers have difficulties identifying organic food. Magnusson et al. (2001) report the same finding, i.e. Swedish consumers find it particularly difficult to know if meat, bread and potatoes are of organic quality. Aguirre (2007) analyses how consumers from Costa Rica know that products being sold at organic farmers' markets were organic and receives answers such as: knowing the farmer, confidence in the vendor, better taste and being friends with a certifier. Similarly, Moore (2006) discovers that consumers at participatory farmers' markets value the trusting relationships built up through repeated personal contact at these markets over organic certification. Stefanic et al. (2001), on the other hand, reveal that in Croatia signs of quality and origin and labels are the most trusted sources of information, followed by brand names and information from sales persons.

Trust in certification

As already indicated above, a lack of knowledge and understanding may result in mistrust. Lockie et al. (2002) reveal skepticism regarding the honesty and reliability of organic labels among Australian consumers, which is explained by the lack of understanding about existing certification schemes for organic growers and processors, but also by the increasing availability of processed organic food. Raab and Grobe (2005) measure how much trust US consumers have in the – at that time – newly introduced USDA labeling. They reveal that only about 20% of all consumers have high levels of trust, whereas almost 75% have some or little trust and 7% none. Sonderskov and Daugbjerg (2011) analyse the trustworthiness of eco-labels in the UK, the USA, Denmark and Sweden, and find that trust in different organic labelling schemes is greatest where there is substantial state involvement. In contrast to the findings for the UK, Aarset et al. (2004) detect a lack of trust in organic labelling and the underlying governmental regulations in the UK, Germany and Norway, with the exceptions being France and Spain. Also, Italian consumers do not trust certification institutes equally, since they show a preference for most popular certification program, the AIAB (Associazione Italiana per l'Agricoltura Biologica) (Cicia et al. 2002). Panico et al. (2011) find that there is demand among Italian consumers for a clearer certification system with greater guarantee for organic strawberries, concluding that the visibility and communication of organic products have to improve. We can also report findings from countries in which the certification of organic food is not mandatory. In Nepal, for example, 60% of consumers do not trust products to be pure and organic due to the lack of a mechanism that differentiates organic from inorganic food (Aryal et al. 2009). In Sri Lanka, 65% of consumers indicate that at least a local institute should certify organic food products. The other respondents considered certification as too cost intensive and supermarkets to be sufficient to certify products as organic (Piyasiri and Ariyawardana 2002). McCluskey (2000) and Giannakas (2002) address the potential of asymmetric information to incentivise fraud and mislabelling. The former study underlines the need for third-party monitoring, whereas the latter considers possible market failure due to a decrease of consumer trust in labelling and consequently of acceptance in organic products (ibid.).

Private organic brands and the plurality of labels

Further studies address competing organic brands. Pivato et al. (2008) and Perrini et al. (2010) investigate consumers' perception of organic products marketed by mainstream retailers under a private label, taking into account the retailer's social responsibility. Both studies suggest that Italian consumers are more likely to trust organic products marketed by a retailer under its private label, when consumers believe that this retailer is considered socially responsible, i.e. committed to respecting their rights and the environment (ibid.). Truninger (2008) reveals that consumers perceive that different retailer outlets give different meanings to organic quality. While retailers such as supermarkets and specialised health food shops represent the definition of organic food according to the EU regulations, i.e. the official meaning that stresses commerce, industry and branding/labelling, small businesses, such as food-coops, represent a definition beyond the regulations, i.e., a non-official meaning that highlights environmental aspects, ethics and locality with face-to-face relationships (ibid.). According to Ngobo (2011), French consumers are more likely to buy organic store brands than organic national brands, perhaps due to lower prices, mainstreaming or higher offer and acceptance of organic store brands. Bartels and Hoogendam (2011) also provide information regarding the preference for national and private brands in relation to the consumers' social identification. Besides the result that, in general, German consumers have positive attitudes towards all investigated types of labels, they find that people who identify themselves with the organic consumer also seem to have positive associations with single organic brands rather than only with organic food consumption in general (ibid.). Koos (2011) addresses the plurality of labels and finds that it neither undermines nor fosters the consumption of labelled goods. The author proposes that a multitude of labels is a sign of a differentiated market with different consumer groups showing different convictions regarding public and private standards (ibid.). This contradicts the findings of Eden et al. (2008), who emphasise that due to a logo overload, British consumers have difficulties thinking about trade-offs between different product characteristics. Janssen and Hamm (2011) deal with consumers' choices when different brands are available, as is the case in various countries. They explain that some consumers prefer certain labelling schemes because they perceive them as having stricter standards than the EU label, for example in the case of the standards of some farmer associations in Germany and the governmental label in Denmark.

Organic standards

Some studies take a closer look at the formulation of standards for organic labelling. Cranfield et al. (2009) evaluate Canadian consumers' preferences for different organic standards pertaining to, inter alia, pesticide-residue testing and product origin specifications. Key results suggest that consumers place a high value on a pesticide standard that involves regular testing of the end product and that they prefer an organic food standard to include a rule that limits where the food is produced (ibid.). Klintman (2006) critically reflects on product labelling in the context of political consumerism. The author claims that criteria for labelling tend to be simplified and that definition of organic is not

fixed and constantly needs to be modified (ibid.). Sawyer et al. (2007; 2008a; 2008b) introduce the aspect of international harmonisation of standards, suggesting that consumers in the USA, in the EU and in Canada do not have a strong attachment to the – at that time – current national organic standards and that international harmonisation may be a legitimate food policy goal, in order to remove technical barriers that reduce the welfare gains available from international trade.

Kretzschmar and Schmid (2011) focus on European consumers' expectations with regard to organic food processing and compare them to the present rules and regulations at that time. They indicate a demand for clear principles and definition of concepts like “carefully processed”, “fresh” and “true nature/authenticity”. They also stress the possibly problematic gap between consumer expectations and the regulations for organic processing at the time of the survey.

Effects of organic labelling

Moreover, four studies attempt to quantify the effectiveness of organic labelling. Naspetti and Zanoli (2011) test how the liking of different mock labels of additional ethical attributes for organic eggs influences the purchase intention of European consumers. Animal welfare is by far the most preferred, followed by regional/local production. Fair price concepts are rejected in all of the countries, suggesting that consumers do not mind supporting organic farmers. However, the overall acceptance of these labels is quite low, implying that the selected labels, with their symbolism (words and images), are not a promising labelling strategy in most of the countries (except for Italy and to some extent Austria).

Linder et al. (2010) use functional magnetic resonance imaging in order to test whether organically labeled food is evaluated more positively than conventional food. They discover that organic food labelling leads to a higher preference portrayed by an increased activation in the ventral striatum, which is assumed to be caused by health related aspects. Thus, the organic logo shows a similar effect than that exhibited by cultural goods and brands indicating wealth and status (ibid.). Zepeda and Li (2007) as well as Li et al. (2007) assert that familiarity with, and awareness of the USDA organic label increase the probability of purchasing organic foods by about 17%.

### 3.1.4 Product innovation

Four studies explicitly refer to the innovative character of organic food. Bäckström et al. (2004) investigates the structure and predictive ability of social representation (which combines consumers’ values, ideas and practices such as *suspicion of novelties*, *adherence to technology*, *adherence to natural food*, *eating for enjoyment* and *eating as a necessity*) of innovative product characteristics such as organic, functional, fat-free, genetically modified and ethnic with regard to the willingness to try these. They find *adherence to natural food* and *eating for enjoyment* to be strong predictors of the willingness to try organic food among Finish consumers (ibid.). Bartels and Reinders (2010) confirm this finding. They compare the effects of domain-specific innovativeness, social representa-

tion of new foods and social identification in the context of the acceptance of new food products (with regard to organic food) in the US, the UK and Germany. Moreover, both innovativeness and social identification seem to have a relatively large influence on organic buying behaviour in all three countries. This implies that social identification plays an important role in the acceptance of new food products (here organic food) that have an identity-signalling function. Their findings also indicate that culturally shared values and ideas play an important role in consumers' perceptions of new food products. Chryssochoidis (2000) approaches innovativeness in a different way, namely by explaining the problem of the late introduction of differentiated products causing confusion among Greek consumers. He reveals that many differentiated products introduced late to the market are suffering from consumer confusion regarding differentiation, since consumers might be unaware of the actual differences between the late introduced differentiated organic products and existing conventional products, and that they are unwilling to learn about these differences. Grosglik (2011) stresses the innovativeness of organic hummus in an ethnic discourse. He reflects on the changes taking place in the symbolic and materialistic production processes of hummus, being an icon of Israeli culture and nationality. Global trends of ethical and reflexive food consumption influence the perception of recently introduced organic hummus, which differentiates significantly from the original hummus that represents rootedness, earthiness, and local simplicity. In its organic version, it bears an economic and symbolic image of global values used by the Israeli westernising elite to demonstrate a widespread environmental cosmopolitan identity.

### 3.1.5 Product range

Three studies broach the issue of product range with reference to organic food. A UK retailer representative stresses the importance of range and availability to customers, who need to be given a choice of both organic and conventional, instead of one completely replacing the other (Hill and Lynchehaun 2002). Govindasamy et al. (2006) refer to this aspect by investigating US consumers' perception of the variety of organic food. They reveal that almost half of the respondents feel that there is a smaller range of organically grown produce than that of conventionally grown produce in supermarkets and other retail facilities. While, 17% feel that the two are the same in variety. Ngobo (2011) statistically confirms that French consumers are less likely to buy organic products in concentrated categories, i.e. in categories where there are only few suppliers, in which they are rather loyal to well-known conventional brands.

### 3.1.6 Value added service

We did not find any study addressing the topic value added service in the framework of our literature review. Although, in practice, there are some examples of value added service for organic food products, such as recipes or packaging that can be used on other modes. The service of traceability with regard to organic food consumption is also a feature that has not gained attention in research so far. Thus, the issue of value added service clearly builds a research gap.

## 3.2 Costs

In total, we identified 144 studies dealing with the topic costs to consumers. Although price cognition and price perception and processing are theoretically two separated concepts, a clear distinction for empirical studies is almost impossible. Thus, we consider these two concepts as one sub-topic that is covered by 25 studies. However, a substantially larger part, namely 119 studies, refers to the willingness to pay for organic products.

### 3.2.1 Price cognition, perception and processing of price information

Twenty-five studies deal with consumers' perception of the prices of organic food products. In general, consumers perceive organic food to be more expensive than comparable conventional food (Abrams et al. 2010; Aryal et al. 2009; Chinnici et al. 2002; Hamzaoui Essoussi and Zahaf 2009; Hill and Lynchehaun 2002; Sirieix et al. 2011; Yin et al. 2010; Zepeda et al. 2006; Živìlová and Jánský 2007). While Chinnici et al. (2002) find that the majority of consumers perceive a price difference of 20% to 30% in comparison to conventional food prices; Chang and Zepeda (2005a) reveal that most consumers cannot quantify the difference. However, several surveys agree that the high price of organic food is the main barrier to organic food consumption (Chang and Zepeda 2005b; Frydlova and Vostra 2011; Hill and Lynchehaun 2002; Hjelmar 2011; Lea and Worsley 2005; Lyons et al. 2001; Magnusson et al. 2001; Padel and Foster (2005); Van Loo et al. 2010; Zepeda et al. 2006; Živìlová and Jánský 2007). In spite of this, there is empirical evidence that not only organic but also some non-organic consumers think that higher price premiums for organic products are justified because organic production causes higher costs per unit and they believe that organic products are of better quality as well as more ethical and environmentally friendly (Aryal et al. 2009; Chang and Zepeda 2005a; Chang and Zepeda 2005b; Chinnici et al. 2002; Hjelmar 2011).

While the above cited articles treat the issue of price perception of organic food only as an additional aspect, Zielke (2010) refers to it in detail by evaluating the impact of five price-image dimensions (price-level perception, value for money, price perceptibility, price processibility, evaluation certainty) on shopping intention in organic food stores (among other distribution channels). He indicates that perceived value is the most important driver of shopping intentions, followed by price processibility and evaluation certainty. He suggests that retailers should improve price communication by actively communicating and justifying price differences to conventional brands and by emphasising the added value (ibid.).

Chang and Zepeda (2005a) conclude that Australian organic consumers tend to accept the higher price, whereas occasional or non-organic consumers are very price-sensitive. Regarding price-sensitivity, Hjelmar (2011) establish another relationship by claiming that pragmatic Danish consumers are very price-sensitive, whereas value-oriented consumers express an understanding and acceptance for the higher price.

### 3.2.2 Willingness to pay

The consumers' WTP is explored in 119 studies. Due to the large number of publications, we attempt to further systemise the analysis of the identified articles by classifying them based on their survey methods. Approaches that are used to elicit the consumers' WTP belong either to stated preferences methods or to revealed preferences methods (Bateman et al. 2002; Coulibaly et al. 2011). Stated preferences are based on directly or indirectly asking test subjects how much they are willing to pay for a certain good, by applying, e.g., contingent valuation or choice-based experiments and conjoint analyses (ibid.). Revealed preference methods, however, measure actual purchase behaviour on the basis of market data or market simulation experiments such as experimental auctions. Following this classification framework, we review 82 articles based on stated preference methods, of which 49 studies use direct inquiries and 32 indirect queries. Of the 34 surveys belonging to revealed preference methods, nine approaches use different kinds of auctions and in 25 cases authors observe actual purchase behaviour. Five studies combine two methods in order to reveal if these lead to different outcomes.

#### *3.2.2.1 Direct price queries*

Fifty-two publications explore the willingness to pay for organic food mainly with reference to conventional food products by using direct price queries. Most of these studies treat the consumers' WTP as one out of several research issues. More than twenty studies address organic food in general. The remaining articles deal with one or more specific product categories. The findings reported here vary remarkably from no WTP price premiums for organic peaches among Mexican consumers (Padilla-Bernal and Pérez-Veyna 2008) to WTP a premium of over 100% for different kinds of meat by Greeks (Krystallis et al. 2006a). However, differences do not only exist between product categories but also within the same and between countries, in some cases even between different studies in the same country.

Some authors estimate particularly high premiums. Nevertheless, a greater part of direct-survey based studies place consumers' WTP inbetween 5% and 30%, for both organic food in general and specific product categories. Table 3 gives an overview of the findings. In the higher section, Table 3 reports the results of those studies that calculated the average WTP as a percentage of the conventional price. In the lower section, it lists those studies that provide information about the modal class, i.e. the range of premiums that the highest share of consumers stated to be willing to pay.

In a longitudinal section study, Aguirre González (2009) reveals an increase of the mean WTP from 5.9% to 25.1% between 1999/2000 and 2007/2008 in Costa Rica. Corsi and Novelli (2011) analyse the WTP for organic beef in Italy, considering the BSE crisis and its short- and long-term consequences regarding eating habits. One of the key findings is that at low prices, consumers were less willing to buy organic beef in 2003 than they were in 2001, indicating in some cases an atypical price function.

The following articles also examine the WTP for organic food, but neither report results in percentages nor a reference price, rendering it impossible to compute comparable figures. However, they additionally identify factors influencing the WTP, such as socio-demographic variables and attitudes, and come to rather heterogeneous results. Common findings are the positive impact of a higher income and education as well as being married (Botonaki et al. 2006; Budak et al. 2005; Charatsari and Tzimitra-Kalogianni 2007; Coulibaly et al. 2011; Disegna et al. 2009; Gunduz and Bayramoglu 2011; Haghiri et al. 2009; Joo-Nyung and Myung-Hwan 2003; Loureiro and Hine 2002; Loureiro and Lotade 2005; Wong et al. 2010). Product-specific attributes, such as a better taste, appearance and perceived quality, register a positive impact on the WTP for organic food (Coulibaly et al. 2011; Ghorbani and Hamraz 2009; Loureiro and Hine 2002; Padilla-Bernal and Pérez-Veyna 2008; Shuzzler et al 2003; Tsakiridou et al. 2009). A large group of reports confirm the positive influence of attitudes towards health aspects and environment (Boccaletti and Nardella 2000; Botonaki et al. 2006; Canavari et al. 2002; Coulibaly et al. 2011; Gunduz and Bayramoglu 2011; Haghiri et al. 2009; Loureiro and Lotade 2005). The WTP more for organic food appears to depend also on the organic food consumption frequency (Botonaki et al. 2006; Canavari et al. 2002; Disegna et al. 2009; Gunduz and Bayramoglu 2011; Haghiri et al. 2009). In regards to deterrents, some studies find family size and a higher age as negative influences for WTP for organic food (Budak et al. 2005; Canavari et al. 2002; Charatsari and Tzimitra-Kalogianni 2007; Ghorbani and Hamraz 2009; Loureiro and Hine 2002; Loureiro and Lotade 2005).

Aldanondo-Ochoa and Almansa-Saez (2009) makes an attempt to quantify the value of health improvement and environmentally friendly technology in organic food production and come to the conclusion that Spanish consumers are willing to pay more for health gains (premium of 31.4%) than for environmental improvements (premium of 22%).

With regard to the relationship between organic and locally produced food, Bean and Sharp (2011) segment consumers from Ohio according to their attitudes towards organic and local production. They confirm that those favourable toward the organic attribute are more willing to pay extra for organic and are less price-conscious in comparison to those that are not inclined towards organic food.

**Table 3: WTP values elicited by direct queries**

| Average WTP | Product category | Country | Author (year) |
|---|---|---|---|
| -10.3% | cheese | Croatia | Stefanic et al. (2001) |
| 4.0% | beef | Croatia | Stefanic et al. (2001) |
| 7.6% | bellpepers | Croatia | Stefanic et al. (2001) |
| 11.2% | tomatoes | Croatia | Stefanic et al. (2001) |
| 13.1% | milk | Croatia | Stefanic et al. (2001) |
| 13.2% | eggs | Croatia | Stefanic et al. (2001) |
| 14.1% | apples | Croatia | Stefanic et al. (2001) |
| 16.1% | cucumbers | Croatia | Stefanic et al. (2001) |
| 16.3% | wine | Spain | Brugarolas et al. (2005) |
| 18.8% | food in general | Costa Rica | Aguirre (2007) |
| 19.1% | raisins | Greece | Krystallis et al. (2006b) |
| 22.6% | oranges | Greece | Krystallis et al. (2006b) |
| 22.8% | olive oil | Greece | Krystallis et al. (2006b) |
| 23% | cucumber | Nigeria | Phillip and Dipeolou (2010) |
| 26% | food in general | Iran | Akbari and Asadi (2008) |
| 27.5% | vegetables | Greece | Charatsari and Tzimitra-Kalogianni (2007) |
| 29.3% | bread | Greece | Krystallis et al. (2006b) |
| ca. 30% | food in general | Nepal | Aryal et al. (2009) |
| 35.3% | food in general | China | Yin et al. (2010) |
| ca. 50% | tomatoes | Ghana | Coulibaly et al. (2011) |
| ca. 51.6% | fish | Turkey | Dagistan et al. (2009) |
| ca. 56% | tomatoes | Benin | Coulibaly et al. (2011) |
| ca. 57% | cabbage | Ghana | Coulibaly et al. (2011) |
| 63.7% | wine | Greece | Krystallis et al. (2006b) |
| ca. 66% | cabbage | Benin | Coulibaly et al. (2011) |
| 73% | fluted pumpkins | Nigeria | Phillip and Dipeolou (2010) |

| Modal class of WTP | Share of sample | Product category | Country | Author (year) |
|---|---|---|---|---|
| >9% | 52.6% | food in general | Greece | Fotopoulos et al. (2011) |
| 1-5% | 44% | meat | Ireland | O'Donovan and McCarthy (2002) |
| 6-10% | 29% | chicken | Turkey | Gunduz and Bayramoglu (2011) |
| 6-10% | 34% | produce | Italy | Boccaletti and Nardella (2000) |
| 10-20% | >50% | food in general | Sth. Africa | Du Toit and Crafford (2003) |
| 10-20% | 32.9% | vegetables | Sri Lanka | Piyasiri and Ariyawardana (2002) |
| 11-20% | 45.7% | food in general | Croatia | Radman (2005) |
| 11-20% | 34.4% | seabass | Turkey | Budak et al. (2005) |
| >20% | 78% | food in general | Italy | Cicia et al. (2002) |
| up to 30% | >50% | food in general | Brazil | Soares et al. (2008) |
| 30% | 37.2% | different foods | Greece | Krystallis and Chryssohoidis (2005) |
| ca. 46% | 43.3% | fish | Italy | Disegna et al. (2009) |
| >50% | 46.3% | food in general | Malaysia | Ahmad and Juhdi (2010) |
| 85-130% | 54.7% | chicken | Greece | Krystallis et al. (2006a) |
| 103-125% | 53.3% | pork | Greece | Krystallis et al. (2006a) |
| >105% | 52% | lamb-goat | Greece | Krystallis et al. (2006a) |
| >115% | 40% | beef | Greece | Krystallis et al. (2006a) |

#### *3.2.2.2 Indirect price queries*

In indirect queries, which 32 studies apply, the willingness to pay is derived from preference and behaviour data measured by means of choice experiments or conjoint analyses. As for direct price queries, the WTP for organic food elicited indirectly varies considerably between product categories.

WTP for organic food with reference to conventional food

Pellegrini and Farinello (2009) estimate price premiums for organic eggs and biscuits that Italian consumers are willing to pay ranging from 20% to 40% with reference to prices paid for corresponding conventional products. This indicates the tendency for consumers to invest substantially in purchasing organic food. Likewise, Tsakiridou et al. (2006) assess an average WTP of 35% extra for different organic foods in Greece. Hearne and Volcan (2005) determine a premium for organic vegetables of around 39% among consumers from Costa Rica. Mondelaers et al. (2009) discover an even higher premium for organic carrots of 50% among Belgians. Kim et al. (2008) reveals the price premiums of approximately 10% for organic food, which is much lower compared to the other findings.

WTP for organic in comparison with sustainability aspects

Predominantly due to the method used for eliciting the WTP, there are many attempts to compare organic with other sustainability aspects, e.g., local production, animal welfare, fair trade and naturalness.

Eight studies pick up on the topic of the additional or alternative attribute “locally grown”. Curtis and Cowee (2011) reveal that the share of North Americans willing to pay a premium for one or more of five tested organic vegetables is slightly smaller (40%) than the share of those willing to pay a premium for one or more locally grown products (47%). Yue and Tong (2009) find the same price premiums for organic and local tomatoes (each 56%) and a premium of 90% for both attributes combined compared to conventional tomatoes for consumers in the USA. In contrast to that, Costanigro et al. (2011) estimate a price premium for local apples from Colorado that is almost six times higher than the premium for organic apples. Also James et al. (2009), Hu et al. (2009), Onozaka and McFadden (2011), and Wang et al. (2010) conclude that consumers value locally grown food (apple sauce, blueberries, tomatoes/apples or apples) more than certified organic products. Only Campbell et al. (2010) elicit a higher WTP for organic produce (12.6%) than for locally grown fruits and vegetables (6%) among Canadian women, whereas men are not willing to pay extra.

Three other articles address animal-welfare aspects. Olesen et al. (2010) find that the average Norwegian consumer prefers organic and Freedom Food salmon to the otherwise identical salmon from conventional salmon farms, as long as the colour is comparable to that of conventional salmon (price premium of about 15%). They suggest that the small difference between the premiums for

organic and Freedom Food salmon is due to consumers perceiving these products as close substitutes (ibid.). Liljenstolpe (2011) explores the WTP and thus the preferences for twelve different animal welfare attributes of organic pork in Sweden. Interviewed consumers commonly prefer only two attributes, namely farm feed (i.e., at least half of the feed has to be produced at the farm) and stock limit of 100 pigs. All other attributes are appreciated by one part of the sample and refused by another (ibid.). Dransfield et al. (2005) find that consumers in France, Denmark, Sweden and in the UK are willing to pay 5% more for organic meat when they obtain the information that it stems from livestock that is raised outside and in the home country.

Six surveys explore the monetary value of fair trade products compared to organic food, leading to different conclusions. While fairness is worth almost twice as much as organic quality for coffee among German consumers (Langen 2011), it is slightly more important than organic quality for apples and less important for tomatoes among North Americans (Onozaka et al. 2011; Onozaka and McFadden 2011). Chang and Lusk (2009) and Briggemann and Lusk (2011) examine fairness concerning the distribution of benefits to the actors in the supply chain of bread and reveal premiums for organic over conventional bread ranging from 39.7% to 48.8%, indicating that consumers in the USA primarily care about the benefits to small farmers. Likewise, Zander and Hamm (2010) find that European consumers are willing to pay a premium of at least 20% for additional ethical attributes of organic food such as fair prices to farmers besides animal welfare and regional production. In contrast, with regard to organic baby food, Peterson and Li (2011) find the WTP is higher for products from large-scale companies than for smaller counterparts or private-label products. Nevertheless, in general consumers in the USA are willing to pay a premium for organic baby food, even though they value two primary features of organic food (no chemicals and GMO-free) on its own higher than the comprehensive organic attribute (ibid.).

In one study, the attributes natural and organic are compared with respect to strawberries, indicating that consumers in the USA are willing to pay more for natural than for organic quality (Onken et al. 2011).

WTP for different organic certification schemes

The following studies compare the WTP for different organic certification schemes with each other. Sakagami et al. (2006) and by Kim et al. (2008) analyse the influence of different types of certification for Japan. While the latter find that consumers trust governmental quality assurance more than consumer organisation-led (voluntary) certification, independent inspection agencies and certification by the retailer; the former reveal slightly higher importance attributed to third-party NOP certification (13% to 22%) than to the governmental JAS certification (10-17%). In consensus with Kim et al. (2008), Van Loo et al. (2011) find that consumers trust the USDA certification more than general organic labels (average premium of 103.5% for the USDA label and 34.8% for the general label compared to conventional food). Bhatta et al. (2010) deal with the difference in WTP between unlabelled and labelled organic tomatoes. They find that only 7.8% of the respondents surveyed in

Nepal would pay a premium of 40% to 60% for unlabelled tomatoes, whereas 44.4% of consumers would pay a premium of 40% to 60% for labelled tomatoes.

Interactions

Bond et al. (2008) estimate the WTP among North American consumers for different health, nutrition, non-profit organisation logos and production process attributes for lettuce, revealing that the organic label alone elicits the smallest WTP among all health claims and nutrition labels, which increases by 66% when the organic label is combined with a claim of vitamin C content.

#### *3.2.2.3 Experimental auctions*

Thirteen studies elicit the WTP by means of experimental auctions. Linder et al. (2010) elicit the WTP for 40 different foods, estimating an average price premium of about 31% across all product types. Other papers approach the issue in quite diverse ways by not only considering different product categories but by also shedding light on manifold aspects that is partly due to the used method, such as comparisons with sustainability attributes apart from organic, interactions with diverse quality aspects and specific effects regarding information or sensory properties.

WTP for organic in comparison with sustainability aspects

With regard to sustainability attributes other than organic, Bernard et al. (2006) as well as He and Bernard (2011) examine the North Americans' WTP for fresh and processed foods in organic, conventional and non-GM quality and come to contradictory findings: While the former reveal that bids for organic are not significantly higher than for GMO-free food, the latter find that the mean percent premium of organic over conventional (24.0% on average over all product categories) is larger for both fresh and processed food products than those for non-GM-food. However, the average premiums, especially for organic, are smaller than in the marketplace, where organic products often are priced at as much as twice their conventional counterparts (ibid.).

Conner and Christy (2002; 2004) relate the organic standards of the USDA's National Organic Program to consumers' WTP for organic food, concluding that consumers are willing to pay more to avoid the Big 3 (GMO, biosolids, and irradiation) in organic foods.

Interactions

Tagbata and Sirieix (2008) find that the joint application of environmental and social labels on the same product induces a sub-additivity to the WTP compared with the WTP for the two dimensions considered separately. Researchers draw the same conclusion with regard to claims about the absence of pesticides and GMO (Bernard and Bernard 2009) and the absence of rBST and antibiotics in milk production (Bernard and Bernard 2010) in the USA. Moreover, Bernard and Bernard (2009)

find own-price elasticity of organic milk to be lower than of rBST-free and no-antibiotics milk, indicating a high WTP for organic milk.

Specific effects

Napolitano et al. (2010b) focus on the taste of beef. They estimate a premium of about 67% for organic beef compared to conventional beef and reveal a relationship between WTP and expected liking (stated liking after provision of information) for organic beef, whereas actual liking (liking before provision of information) is not significantly correlated with it. From this, they conclude that the Italians' WTP seems more dependent on information than on product sensory properties (ibid.). Napolitano et al. (2010a) obtain the same result, studying the effect of information about organic production on Pecorino cheese liking and consumers' WTP. Tagbata and Sirieix (2008) confirm this for French consumers by showing that the WTP for organic and fair trade chocolates in conjunction with tasting is lower than the WTP they stated on the sole basis of the labels. This reveals a gap between the expected quality and the "experienced quality".

Gifford and Bernard (2011), Soler et al. (2002) and Gil and Soler (2006) also investigate the effect of information. Gifford and Bernard (2011) examine how information about organic and natural production standards affects the WTP for chicken in Delaware. On average, clear definitions of the natural and organic concept make no appreciable change in premiums. However, 46.4% of participants increased their premium after information, 23.6% kept their premium the same and almost 30% decreased their premium. Soler et al. (2002) and Gil and Soler (2006) analyse the effect of different information channel strategies (information effect) as well as of price references of conventional products (reference price effect) on WTP for organic olive oil in Spain. Reference prices of conventional products increase the perceived value of the organic olive oil and thus increase the WTP for it. Considering the information effect, they discover that not the information itself but the way this information is provided increases the WTP. Leaflets appear ineffective, but oral explanation by a specialist has a positive effect on the WTP (ibid.).

Yue et al. (2009) observe consumers' WTP for organic and conventional apples with different levels of blemish in the USA. They obtain the contradictory results that consumers want environmentally friendly production methods, but that they do not want the natural consequences of them, i.e., the blemished appearance of products.

#### *3.2.2.4 Market data observation*

Market data observation builds the basis for 21 studies. A relative high number of these observation-based approaches (n=9) analyse the consumers' milk purchasing behaviour by using household scanner data (Alviola and Capps 2010; Chang et al. 2011; Dhar and Foltz 2005; Jonas and Roosen 2008; Kiesel and Villas-Boas 2007; Lusk 2011; Monier et al. 2009) as well as retail sales data (Anstine 2007; Lopez and Lopez 2009).

Several studies calculate price elasticities for milk in the USA and in Germany. They are consistent in the finding that the demand for organic milk decreases if its price increases (Alviola and Capps 2010; Jonas and Roosen 2008 (Germany); Lopez and Lopez 2009; Lusk 2011). Alviola and Capps (2010) quantify this relationship and reveal that a 1% price increase would lead to a 2% decline of demand. They also calculate the cross-price elasticity and predict an increase of organic milk sales by 0.7% if the price of conventional milk increases by 1% (ibid).

Lopez and Lopez (2009) investigate price elasticities for different milk types (conventional: private label and manufacturer brand; specialty milks: organic, lactose-free; 1% fat content, whole milk) and find a more price-elastic demand for organic milk (own-price elasticity of -4.09 for 1% fat content and -3.80 for whole milk) than Alviola and Capps (2010) do. With cross-price elasticities, Lopez and Lopez (2009) conclude that in the face of a price increase, consumers tend to substitute within types of products that retain most of the original features of the sort of milk they regularly purchased. However, cross-price elasticity for organic milk is found to be close to zero, indicating that organic consumers rarely substitute types of milk when prices increase (ibid.). For the beef product category, Anders and Moeser (2008) suggest that Canadian consumers are responsive to price decreases of organic beef and that they do not always substitute organic beef cuts with conventional beef cuts in the face of price increases.Referring to the USA, Zhang et al. (2011) find that – with the exception of potatoes – tomatoes, onions and lettuce have inelastic own-price and cross-price effects between organic and conventional vegetables, suggesting that a decrease in the organic price does not necessarily lead to an increase in the demand for organic vegetables. Lin et al. (2009) reveal organic fruit demand to be highly elastic and conventional fruit demand is price inelastic. From cross-price elasticities they conclude that consumers are more likely to substitute organic fruits for conventional fruits than the other way around (ibid.).

Two studies analyse the price-sensitivity of different consumer groups. By comparing purchase patterns of suburban and inner-city residents in Ohio for both conventional and organic milk, Chang et al. (2011) find that conventional and organic milk shoppers are generally price insensitive, which is in contrast to the outcomes stated above. They also reveal that suburban shoppers are less price sensitive compared to inner-city shoppers and that in general shoppers do not switch to conventional milk when organic milk prices increase (ibid.). Moreover, Greenway et al. (2011) find organic potato consumers in the USA to be more sensitive to price changes than conventional potato consumers.

Stevens-Garmon et al. (2007) compare price premiums for organic produce before and after the implementation of the USDA's National Organic Program labelling standard and find them to have increased by roughly 35%. Kiesel and Villas-Boas (2007) conduct the same analysis for organic milk and reveal a much smaller increase from 39.4% to 45.8%.

Some studies report price premiums for organic food with reference to conventional food that were actually paid by the consumer. Lin et al. (2008) obtain premiums for organic fruit varying from less than 20% (grapes and oranges) to over 42% (strawberries). For vegetables, premiums range from

15% (tomatoes, carrots, onion) to 60% (potatoes). Also referring to the USA, Zhang et al. (2011), confirm these large differences in premiums between various fresh vegetables, with the highest relative organic premium (potatoes) over five times higher than that for the lowest (tomatoes). US consumers surveyed by Zhang et al. (2009) pay on average 22% more for organic tomatoes and 24% more for organic apples, thus quite similar to those values estimated by Lin et al. (2009). Moreover, premiums are found to depend on seasons (Zhang et al. 2009).

WTP for organic in comparison with sustainability aspects

The outcomes of Dhar and Foltz (2005) suggest that consumers in the USA on average derive more benefit from organic than from rBST-free milk. Anstine (2007) confirms the positive effect of labelling by showing that consumers in New Jersey pay more for milk and yoghurt labelled "all natural" and "organic" compared to products without labels. However, there is no statistically significant difference between "organic" and "all natural", indicating that consumers might not know the difference between both labels.

Andersen (2011) examines the purchase behaviour for three types of eggs (organic, free-range, barn) in Denmark. About one third of the total sample pays price premiums for all three types of eggs, with the highest premium for organic eggs. Besides, Andersen (2011) concludes that although a significant share of the population pays more in order to increase animal welfare, the effect of animal welfare on predicted purchase shares is relatively small, which indicates an attitude-behaviour-gap. Chang et al. (2010) also investigate eggs and find that, in a population of shoppers in the USA, the mean premium paid for organic or cage-free eggs is substantially less than the estimated implicit price premium for the attributes organic or cage-free.

Specific effects

Lusk (2011) analyses how personal values as well as socio-demographic variables affect price-elasticities and therefore purchase behaviour. For both milk and eggs, environment-related values have the largest positive effect on the purchases of organic milk and eggs, accompanied by naturalness-related values and tradition orientation. Negative impacts for both product categories derive from convenience constraints, blemished appearance, safety and fairness concerns (ibid.).

Based on observed purchase behaviour and socio-demographic information, Smith et al. (2009) generate a profile of organic consumers in the USA and derive from it that organic food demand is positively influenced by income and negatively influenced by price-consciousness, by living in a household with children under six years, by higher education, by age and by being married. This is partly consistent with the findings of Zhang et al. (2009).

#### *3.2.2.5 Combinations*

We review five surveys that use a mixed approach for the measurement of consumers' WTP for organic food. By applying a combination of the above presented methods, authors attempt to overcome a possible over- or underestimation of consumers' self-reported WTP. Krystallis et al. (2006b) reveal a substantial difference between the WTP for organic food elicited by contingent validation (average WTP: 73.6%) and the price premium revealed by conjoint analysis (31.5%) among Greek consumers. This suggests that directly inquired preference methods for measuring the WTP should only be used for indicating consumers' tendencies. Likewise, but with the opposite result, Canavari et al. (2005) combine discrete choice experiments with preceding or following open-end questions in order to explore the Italians' WTP for pesticides-free organic apples and peaches. They confirm that open-end questions produce smaller values for the WTP than discrete choice approaches. Gifford and Bernard (2008) also report varying results. They test the reliability of directly inquired WTP by means of an experimental auction and find that the auction reveals higher premiums for fresh organic food with reference to processed organic food.

Brooks and Lusk (2010) test whether stated preference choices for selected milk attributes (among others the hypothetical introduction of milk from cloned cows) are congruent with US consumers' revealed preferences given by scanner data. They conclude that pooling stated and revealed preferences data makes better predictions than considering only stated or revealed preference data.

## 3.3 Communication and information

We review 32 publications that predominantly focus on the communication and information of organic food products or that address this topic as an additional aspect. The identified articles are assigned to the sub-topics *communication and information in general*, *communication and information instruments*, and *communication and information messages*. The labelling of products is a communication instrument that is not considered in this section due to having already been extensively covered in the section on product labelling. However, we assign studies that analyse the provision of more extensive information about organic products, their production methods or organic agriculture going beyond a logo or a short claim to communication, since their usage appears to be more detached from the physical product than product-specific labels and claims are. Studies that give recommendations about communication strategies as part of their final conclusions are not included here.

### 3.3.1 Communication and information in general

We find six publications discussing general aspects of communication of organic products. Lyons et al. (2001) find that limited information about organic food is one perceived disadvantage of its consumption. Hill and Lynchehaun (2002) stress the education of consumers and emphasise that in-

stead of communicating only the key benefits of organic food, which does not always influence purchase behaviour, retailers in the UK should create concerning knowledge, e.g., about organic farming methods. Sandalidou et al. (2002) analyse Greek consumers' satisfaction with – among other things – the promotional effort for organic olive oil. They reveal consumers are unsatisfied with its promotion, even though they consider it the least important compared to other marketing aspects. The authors consider a significant improvement in promotional activities a very efficient means of increasing the sales of organic olive oil. The study by Young (2001) treats the communication and promotion of organic aquatic food and its limitations in Norway, France, Spain, Germany and the UK. The findings indicate that the promotion of the organic quality of fish is necessary in order to differentiate from conventional quality, taking into consideration that this product category is traditionally not intensively promoted.

### 3.3.2 Communication and information instruments

Eleven articles address the various instruments of communication. Six surveys address the usage of different communication channels for the promotion of organic food as one aspect out of many (Akbari and Asadi 2008; Ayaz et al. 2011; Chinnici et al. 2002; Fotopoulos et al. 2003; Fotopoulos and Krystallis 2002b; Živìlová and Jánský 2007). Akbari and Asadi (2008) conclude that consumers in Iran mainly use TV and radio for gathering information about organic food. For Italian consumers, television is also one of the most frequent used information sources followed by specialised magazines and specialised sales outlets (Chinnici et al. 2002). Turkish consumers gather information about organic food predominantly from newspapers, the TV, the Internet and scientific publications (Ayaz et al. 2011). However, Czech consumers, reveal that they predominantly receive information directly from the shops where they purchase organic food, from friends or from the media (Živìlová and Jánský 2007). Fotopoulos et al. (2003), Fotopoulos and Krystallis (2002b) and Krystallis et al. (2006b) report that Greek buyers predominantly obtain information on organic food from friends and their family as well as from electronic and printed media. Pellegrini and Farinello (2009) analyse the credibility of information sources for organic products finding that Italian organic consumers rely on the information reported on product labels or that has been directly received in the place of purchase or from friends and acquaintances. 70% of organic consumers think that the information collected via these channels is reliable. Public institutions have less credibility, so have radio, television and magazines. The Internet occupies the lowest position. Soler et al. (2002) discover that not the information but the way this information is provided increases the WTP for organic olive oil among Spanish consumers. Leaflets are ineffective, whereas oral explanation by a specialist has a positive effect on the WTP. Baourakis et al. (2002) focus on the Internet as an information source for Greek consumers, among whom 63% state they are willing to search for information about agro-food-products online. They list searching for varieties, low availability of a certain product, and comparisons of prices and of qualities as reasons to use the Internet. With respect to sales promotion of retailers in France, Ngobo (2011) analyses if brands with frequent pro-

motions attract more buyers and finds that consumers on average are less disposed to buy organic products in categories where products are often promoted via store flyers.

### 3.3.3 Communication and information messages

We find 13 articles that deal with communication messages. Six studies address the framing of organic food and agriculture. Gifford and Bernard (2004a; 2006; 2011) dedicate three studies to this issue by testing the effect of positive and negative framing on the self-reported changes in purchase likelihood of organic food in the USA. In their studies from 2004a and 2006, they conclude that positive framing, i.e., mentioning the benefits of organic agriculture, has a positive influence. While in their 2004 study they find no influence of negative framing, in 2006 they reveal that emphasising possible negative effects of conventional agricultural techniques leads to a lower purchase likelihood from those organic consumers with high trust in food safety. In addition, they examine the effect of definitions of organic and natural on the WTP a premium for the corresponding products. Before information is provided, two thirds of all respondents confuse requirements for both concepts. After information, the WTP for organic food increases, whereas it decreases for natural food (Gifford and Bernard 2011).

Gifford and Bernard (2004b) also explore package texts of 37 products from three different categories (milk, pasta and soup) and the usage of positive or negative framing. Only one of four organic pasta brands provided information about organic methods. For soup, only positive framing was used. Among the organic-food packages observed, there were only two examples of negative framing, such as the statement “no dangerous pesticides or chemicals are ever used” (ibid.). Lockie (2006) discusses various ways in which organic agriculture, alongside sustainability, genetic engineering, GM-foods and food safety, is framed in its own terms and in relation to the others. DuPuis (2000) examines the communication on milk cartons of three organic milk companies in the USA and finds three categories of delivered messages: consumer-as-authority, agrarian (support of farmers), neighbourly (stressing community and localness, e.g., by announcing local events). According to the author, these claims represent the different enrolment practices of actors (e.g., the reflexive consumer) in different positions within the market and within the contested discourse on food.

Napolitano et al. (2010b) combine taste tests of organic and conventional beef with the provision of information concerning production methods in order to test if the provided information influences the preference for beef. They reveal that information about organic farming practices influences Italian consumers’ expectations positively. They find no effects for conventional beef. Likewise, in another study, Napolitano et al. (2010a) find that information about organic production methods leads to better liking scores for organic cheese among Italian consumers. Annett et al. (2008) come to the same result, testing the influence of information provided about health and environmental aspects of organic production methods on the sensory liking of organic bread of Canadians.

Cook et al. (2009) approach the South African consumers' perception of communication messages from a linguistic perspective in the context of organic food. They reveal that promotional language is often not as effective as marketers believe it to be.

Abrams et al. (2010) investigate the consumers' perception of the terms all-natural and organic, and they record the reactions to the USDA organic standards for livestock production and policy for all-natural claims. As in Gifford and Bernard (2011), respondents express their confusion about the meaning of both terms due to both claims being viewed similarly. Also Lockie (2006) find that Australian consumers view organic and naturalness as more-or-less synonymous. One possible explanation for this is given by Eden (2011). She defines product labels as tools for communication between producers and consumers and concentrates on the "active-meaning-making". According to the author, this does not simply consist of transferring information but rather of actively constructing and re-interpreting it, since consumers bring in their own ideas. The author concludes that definitions of regulators and producers do not match the definitions of consumers (ibid.).

## 3.4 Convenience and distribution

Sixty-seven publications address the topic of convenience with regard to where consumers buy organic food. To begin with, we present outcomes concerning the availability of organic food and store choice. Subsequently, we review research articles that address specific places of purchases. However, we only found studies dealing with the purchase of organic food at conventional food retailers, at specialised food shops, in direct sales channels and in the Internet, whereas other places of purchases are not analysed in the relevant literature.

### 3.4.1 Availability

In regards to the availability of organic food products, experts from two different surveys agree that limited availability in India and Europe is one of the major constraining factors for a more regular use and consequently for an increasing demand of organic food (Chakrabarti 2010; Padel and Midmore 2005). Many consumers confirm this throughout various countries, reporting that they are not satisfied with the number of purchase points for organic food (Aryal et al. 2009; Cerjak et al. 2010; Chang and Zepeda 2005a; Govindasamy et al. 2006; Hamzaoui Essoussi and Zahaf 2008a; Hill and Lynchehaun 2002; Hjelmar 2011; Kuhar and Juvancic 2010; Lea and Worsley 2005; Lockie et al. 2002; Lyons et al. (2001); O'Donovan and McCarthy 2002; Zakowska-Biemans 2011; Živìlová and Jánský 2007). They would welcome a widening of the net of purchase places, and they state that a lack of availability deters them from purchasing organic products. They are willing to buy more organic food if the availability increases (ibid.). Ergin and Ozsacmaci (2011), Quah and Tan (2010) and Van Loo et al. (2010) provide statistical evidence for this statement, showing that the availability has a significant positive effect on organic consumption behaviour in Turkey, Malaysia and the

USA. However, there are also findings revealing the contrary: Tarkiainen and Sundqvist (2005) cannot confirm statistically that the perceived availability of organic food in Finnish hypermarkets influences the intention to buy it. Verhoef (2005) finds only a weak positive influence on organic meat choice and no effect on purchase frequency in the Netherlands. Swedish consumers rate the availability of organic milk to be good and state that additionally, limited availability does not seem to be an obstacle for other product categories (Magnusson et al. 2001). Moreover, Ngobo (2011) claims that the French are less disposed to buy widely distributed organic brands, perhaps due to the idea that organic products should not be as popular as conventional ones. Chang and Zepeda (2005b) point out that the availability of organic food in rural Australia is a limiting factor in demand, but that organic food consumers are more tolerant of inaccessibility than non-organic consumers.

### 3.4.2 Store choice behaviour

With respect to the choice of purchase places, the outcomes are heterogeneous. Ahmad and Juhdi (2010), Padel and Foster (2005), Ergin and Ozsacmaci (2011), Lobley et al. (2009), Pellegrini and Farinello (2009), Lockie et al. (2002), Wier et al. (2005; 2008) provide empirical evidence for the increased relevance of conventional retailers for the supply of organic food in Malysia, Turkey, the UK, Italy, Australia and Denmark. The latter five find that supermarkets are used more frequently than farmers' markets and specialty shops. Other studies disagree, revealing that in Iran, Italy, Arkansas and Greece chain supermarkets are of lower priority, whereas well-known specialty markets and farmers' markets constitute the main places where consumers purchase organic food (Akbari and Asadi 2008; Cicia et al. 2002; Crandall et al. 2010; Fotopoulos et al. 2003; Fotopoulos and Krystallis 2002b). Wang et al. (2010) find that supermarkets (ca. 67%), farmers' markets (ca. 52%), natural food stores (ca. 50%), and food co-ops (ca. 45%) are the major places where consumers purchase organic in Vermont. In a survey of consumers from Croatia, Radman (2005) finds that most respondents that report to buy organic fruit and vegetables claimed to buy these products in city markets (46.3%) or directly from producers (19.1%). However, at the time of the study, there are almost no products in city markets in Zagreb with organic labels. Thus, the author assumes that consumers are poorly informed and make their own assessment that purchased products were organically grown.

Hamzaoui Essoussi and Zahaf (2008a) furthermore relate organic food consumption to the choice of the PoS (point of sale), also considering consumers' trust, and find that the PoS used mostly by Canadian organic consumers are supermarkets (31.2%), organic food stores (27.2%) and local markets (27.2%). These do not correspond to the most trusted ones, i.e., organic food stores, followed by health food stores and direct sales channels (ibid.). In a similar study, Hamzaoui Essoussi and Zahaf (2009) conclude that Canadian consumers do not tend to trust large producers, distributors or organic companies importing their products, mainly due to health- and environment-related concerns.

Two studies model store format choice in order to identify influencing factors. Hsieh and Stiegert (2011) reveal that organic shoppers in the US have stronger quality perceptions than conventional shoppers, which affect their store format choice. Henryks and Pearson (2011) determine variables (e.g., habit, budget, convenience of the shopping trip, range of products) affecting consumer choice of retail outlets and use them to explain purchase behaviour in the Australian organic food market. The store choice is also used to explain organic consumption behaviour, e.g., Zepeda and Li (2007) find that the choice of purchase venue is the most important and significant factor influencing the probability of buying organic food among Australians. Similar results are found by Li et al. (2007) and Yue and Tong (2009) for the USA and by Panico et al. (2011) for Italy. Eden et al. (2008) analyse cues used by British consumers to judge the quality of organic food and food in general. They see one of these cues, a specific retail outlet (e.g., farm shops, farmers' markets, and local butchers), in a positive way. To the contrary, they see food-miles, implicitly in supermarkets, in a negative way. Concluding, Onozaka et al. (2011) successfully segment US consumers on the basis of their primary and secondary store choices for fresh produce shopping and emphasise that such an approach provides useful insights into consumer behaviour and implications for marketing strategies.

### 3.4.3 Conventional food retail

One publication briefly touches on the topic of selling organic food in conventional food retail. Ngobo (2011) provides insights into how French households choose organic food products during a visit to the grocery store. He considers different potentially influencing variables and attempts to give recommendations with respect to the sale of organic food in conventional retail.

### 3.4.4 Direct sales from farmer to consumer

With 16 publications, this is the most researched distribution channel, by far. Besides the classic direct sales of own produce at a farmers' market or in farm shops, other channels such as box schemes and collective purchasing groups have emerged as alternatives to the highly industrialised food markets. They are increasingly receiving attention from consumers as well as from researchers.

#### *3.4.4.1 Farmers' markets*

In order to gain a deeper understanding of the customers of farmers' markets, seven studies attempt to profile consumers by analysing their socio-demographics, their attitudes and values, their motivations to shop at a farmer's market and their organic food consumption habits (Aguirre 2007; Crandall et al. 2010; Curtis and Cowee 2011; La Trobe 2001; Hamzaoui Essoussi and Zahaf 2008b; Moore 2006; Rainey et al. 2011). According to Moore (2006), by choosing to shop at participatory farmers' markets, Irish consumers reveal to be reflexive in terms of being opposed to capital and scale. These consumers perceive personal reassurance to be more important than technical organic

certification and value the connection between local producers and consumers (ibid.). Rainey et al. (2011) reveal support of local farmers, freshness of produce, better quality than at retail stores and food safety to be the major reason for consumers in Arkansas to shop at farmers' markets. La Trobe (2001) discovers that only few consumers state the purchase of organic food to be a motive for attending farmers' markets in the UK.

Three articles deal with purchasing behaviour at farmers' markets' regarding organic food and other product attributes, such as locally grown and natural items (Aguirre 2007; Curtis and Cowee 2011; Onken et al. 2011). The findings of Curtis and Cowee (2011) indicate that those US farmers' markets' consumers concerned with food safety, environmental impacts of food production and environmental issues, in general are more likely to purchase organic produce and to spend more for it. Whereas, those consumers concerned about local origin and supporting local farmers are more likely to pay premiums for and are more likely to purchase locally grown produce at farmers' markets. As mentioned above, Onken et al. (2011) show that US consumers would pay more for organic products – among other product characteristics – at farmers' markets than at grocery stores. Aguirre (2007) discovers that farmers' markets customers in Costa Rica are willing to pay a maximum of 20% extra for organic food with reference to conventional food.

#### *3.4.4.2 Box schemes*

Another, less frequently discussed, topic is the distribution of organic food via the delivery of food boxes. Brown et al. (2009) conduct both socio-demographic profiles of English and French users of box schemes and additionally, an analysis of the barriers and motivations to use them. The English consumers report access to local produce with fewer food-miles to be the most important motive, followed by ecological commitment. The French users state product quality to be most important, also followed by ecological commitment (ibid.). Vidal et al. (2011) confirm the relationship between Spanish consumer knowledge about box schemes and the consumption of organic food. Freidberg and Goldstein (2011) present the unsuccessful attempt to implement an alternative direct marketing initiative (box scheme) in Kenya. In the course of the project, the box scheme boost incomes of more than 30 farm households, indicating that demand in Nairobi exists. However, failure is almost unavoidable, mostly due to country-inherent ideology and practice regarding development.

#### *3.4.4.3 Alternative Food Networks (AFN)*

Five publications are dedicated to the topic of AFN. Little et al. (2010) investigate collective purchasing groups in Europe, Japan and the USA as an important form of agri-food networks, their history and development and their drivers. They state that important driving forces of community-led buying groups are taking back control over the food-supply system and the ability to make creative interventions by forming new mechanisms to access more variety of local and organic food at low costs (ibid.).

Stagl (2002) reflects on CSA (community supported agriculture, i.e. direct marketing between producers and consumers operating on a principle of share rewards and risks (Thompson and Coskuner-Balli 2007)) as an example of emerging local and sustainable alternatives to global food markets. The publication illustrates potentials and limitations and how consumers can benefit from it (e.g., response to consumers' needs, learning about sustainability, generation of trust, variety of products, extending to new consumer groups, possible lower prices). It also addresses barriers to sustainable consumer behaviour, such as not meeting certain consumer demands like convenience, high organisational effort and reduced predictability (ibid.). From a more ideological perspective, Thompson and Coskuner-Balli (2007) discuss the development of CSA in the USA, which emerged in response to the conventionalisation of the organic food movement. They analyse the ideology that circulates in CSA communities among farmers and consumers, which is oriented around reconstituting rooted connections to nature (countervailing the disconnectedness and disempowerment of the consumer), engaging in practices of decommodification and working towards an artisan food culture.

Schifani and Migliore (2011) present an approach of profiling the members of solidarity purchase groups in Italy, a country-specific form of CSA, according to their socio-demography and their motivations. The average consumers belonging to these groups are relatively young (between 40 and 49 years old) with a high level of education and a middle to upper-middle high income. They are mostly motivated by solidarity with the farmers and the environment and aspects relating to responsible consumption (ibid.).

Seyfang (2006) contributes to this research field by examining local organic food networks in the UK with respect to sustainable consumption and ecological citizenship and discusses how ecological citizenship motivates sustainable consumption behaviour in form of consuming local organic food.

### 3.4.5 Specialised food retail

Zielke (2010) addresses specialised organic food stores in Europe. As mentioned above (see p. 24), he analyses shopping intentions in different store formats, among others organic food stores, namely specialty stores and supermarkets, considering the influence of five price image dimensions (price-level perception, value for money, price perceptibility, price processibility, evaluation certainty) He recommends that retailers should consider that the perceived value is the most important driver of shopping intentions in this distribution channel.

Additionally, Grebitus et al. (2011) briefly touch on the issue of product service when analysing the impact of quality characteristics of organic and conventional pork on consumption behaviour. They reveal that service and advice concerning organic pork at the point of sale, as it is the case in specialty shops, have a positive effect on the purchase of organic pork.

### 3.4.6 Internet

One study deals with the distribution of organic food through the Internet. Baourakis et al. (2002) analyse the status quo and the perspectives for Internet usage for the agricultural food sector in mainland Greece and the island of Crete. In regards to consumption behaviour, the authors reveal that only 11% of the interviewed respondents would buy online, which indicates a strong prevalence of insecurity. Consumers believe that physical contact is needed for agro-food-products. However, they consider the Internet to be more promising for organic food than for conventional food, due to a higher demand for information about organic products.

## 4 Discussion

Interest in organic food on the part of consumers as well as researchers has grown since the year 2000, which is reflected not only by a steady market growth (Sahota 2011) but also by intensified scientific research. Screening the literature regarding organic food consumption and quantifying the publications for each topic and the corresponding sub-topics (see Table 2) gave an overview of the status quo of research and enabled the identification of well and poorly researched areas. Due to the large number of analysed studies and the great variety of treated issues, results of the literature review are quite numerous and heterogeneous. In the following, we first discuss the research intensity relative to market size of the most significant organic markets before we then make reference to the main results and the predominant topics that became evident in the course of the performed literature analysis.

**Research intensity relative to market size:** Since the year 2000, the number of published articles regarding organic food marketing has risen (see Figure 1), which indicates a growing relevance of the subject. Considering the relatively low market share of organic food in 2010 in several countries (see Table 4), the great research interest in organic food appears disproportional. The provision of special research funds for the organic market by some European countries (e.g., Bundesprogramm Ökologischer Landbau in Germany (BÖLN 2012)) and Europe-wide funds like CORE organic is one explanation for the concentration of research on the organic food sector, which can be observed in many countries. Nevertheless, one might expect that a large volume of organic food sales leads to a higher research intensity – expressed by the number of publications of that country – resulting in a higher ratio of number of papers/total organic food market volume. However, the present study shows that the relevance of organic food consumption does not necessarily correlate with the research intensity in most countries. Table 4 displays the size of the organic food market as well as the consumption and research intensity for the countries with the nine highest organic market shares in 2010. In addition, Greece, the UK, Italy and Spain are included in the table due to their high number of identified publications. It is notable that Germany and France have the highest volume of the organic food market in 2010 – behind the USA – yet provide only a relatively small number of

articles published in English in international journals. With Switzerland, they show the lowest paper-per-sales-ratio of the countries analysed here (Germany 2.8, France 3.1, Switzerland 3.4). In contrast, Greece's market volume of 60 Mio € in 2010 is the lowest of all. Nevertheless, Greece provides the third highest number of publications and therefore shows the highest paper-per-Bn€-sales-ratio, namely 250.0. One reason for this outcome can be seen in the strength of the organic export sector in countries like Greece or also Italy. However, it should be considered that the total volume of the organic food market reflects the absolute amount of money spent for organic food, which also depends on the food prices in specific countries. Moreover, in this study research intensity only refers to English publications and does not consider articles published in country-specific languages.

**Table 4: Country-specific research and consumption intensity**

| | Market share of organic food in 2010 (%) | Size of population in 2010 (Bn) | Per-capita and year expenditures for organic food in 2010 (€) | Total volume of organic market in 2010 (Bn €) | Number of publications (January 2000 to June 2011) | Number of papers/ total market volume (Bn €) |
|---|---|---|---|---|---|---|
| **Denmark** | 7.2 | 5.5 | 142 | 791 | 12 | 15.2 |
| **Austria** | 6.0 | 8.4 | 118 | 986 | 4 | 4.1 |
| **Switzerland** | 5.7 | 7.8 | 153 | 1,180 | 4 | 3.4 |
| **Sweden** | 4.1 | 9.4 | 86 | 804 | 10 | 12.4 |
| **USA** | 4.0 | 309.6 | 65 | 20,155 | 86 | 4.3 |
| **Germany** | 3.5 | 81.6 | 74 | 6,020 | 17 | 2.8 |
| **Netherlands** | 2.7 | 16.6 | 40 | 657 | 4 | 6.1 |
| **Canada** | 2.5 | 34.1 | 57 | 1,904 | 14 | 7.4 |
| **France** | 2.2 | 63.0 | 52 | 3,385 | 11 | 3.1 |
| **Spain** | <1 | 47.1 | 20 | 920 | 15 | 4.4 |
| **Greece** | 0.3 | 11.3 | 5.3 | 60 | 15 | 250.0 |
| **UK** | n. a. | 62.2 | 32 | 2,000 | 30 | 15.0 |
| **Italy** | 1.4 | 60.5 | 30 | 1,550 | 30 | 19.4 |

Sources: Own data; FiBL 2012; Meredith and Willer 2013; PRB 2010; Willer 2012; Willer and Kilcher (2012).

**Consumer value and benefits:** Of those research areas that are analysed in the present literature review, *product characteristics* received by far the most attention. Some of the more dominant topics in the large number of publications examining product characteristics will be discussed in the following. With regard to purchasing motives in the reviewed literature, it comes down to the relation between public and private goods. Although consumers often claim that they purchase organic food out of altruistic motives that have a public utility, such as environmental protection, in practice, attributes that represent an individual utility (e.g., health, taste and quality) are the stronger driving forces for organic food consumption. In fact, health is the primary purchasing motive for organic food, followed by taste and environmental protection. However, there is some empirical evidence for differences between committed organic consumers and those that only occasionally or never consume organic food. Whereas the former value attributes with an individual and altruistic

benefit, the latter tend to value predominantly individual benefits. In addition, functional aspects, such as expiration date and packaging, are important features for occasional organic consumers or non-users, suggesting that they are more convenience-oriented than the committed organic consumers.

The finding that consumers predominantly associate health benefits with organic products is interesting, since there is hardly any scientific proof for organic products having positive health effects (Dangour et al. 2009; Forman and Silverstein 2012; Kouba 2003; Williams 2002). The predominant meaning that consumers give to organic food seems to diverge from the aims organic production originally had. This positive health image turns out to be strong, since its influence on organic food consumption behaviour is stronger than the influence of the environmental aspects.

However, some studies also report that consumers do not assign high importance to the attribute "organically produced" or even repel products that are certified with organic, as it was revealed in the case of biscuits for British consumers and in the case of cheese for Spanish consumers. This suggests that for certain products and in certain countries, other product properties, such as tradition or origin, might function better as quality signs than organic certification does. Also, the image of organic products in different markets has to be considered when interpreting such findings (Hemmerling et al. 2013).

Another claim that circulates in the consumers' mind is that organic products have a better taste. Considering that a better taste is the second most important purchasing motive, there are relatively few studies analysing consumers' taste perceptions. Moreover, these studies do not come to a clear conclusion. Approaches that analyse the influence that organic labels or information about organic production have on the perceived taste report mixed results that at first glance seem to depend on the tested product. However, as mentioned above, the image of organic products, but also cultural aspects, habits and experiences, have to be considered when interpreting such findings. Also, blind testing leads to ambiguous results. For some product categories consumers show a preference for organic quality over the conventional counterpart, whereas for others no difference in taste preferences is found. Findings also differ between countries. For example, while Italian consumers show a preference for organic beef, Canadians prefer conventional beef. These results suggest that the question of whether organic food tastes better cannot be answered in general. Different aspects such as cultural background, country-specific food traditions, sensory skills and experiences with the tested product are important factors to consider when evaluating taste perceptions. However, this conclusion also has its limitation since it is based on studies that are not comparable due to their differing databases.

Although there are relatively few publications addressing *packaging* of organic food, all together they express that this topic is not a negligible matter to the consumer. While most of the studies focus on the utility and environmental friendliness of organic food packaging, only one study takes a look at packaging design and reveals the importance of differentiating between organic consumers and non-consumers, with the latter appreciating mainstream packaging of organic milk. Thus, more

research is needed into the effectiveness of packaging design considering the demands of both groups. In addition, since sustainable food packaging could be a competitive advantage for organic products and might strengthen their ability to compete against conventional products, research should also be carried out on the consumers' interest in this.

*Product labelling* is a disproportionately well-analysed topic in organic food marketing. Studies dealing with organic labels mostly agree on the fact that the majority of consumers have a low knowledge about organic labelling and certification standards. They reveal that many consumers do not know what "organic" means and that organic production is monitored. The large variety of labels that can be found in many countries seems to mostly confuse the consumer, since the differences between various labelling schemes are not clear. It is especially unclear what differentiates organic products from natural ones, so that consumers often tend to overestimate naturalness claims. As a consequence of low knowledge, but also because of numerous food scandals, trust in organic certification is another topic that gained attention in the scientific literature. In general, the level of trust on part of the consumer seems to be low. State involvement in certification does not guarantee to be a reassuring factor in every country. Moreover, relatively little literature is focused on organic standards. However, from these studies we can conclude that standards for organic production need to be clarified and simplified for the consumer. Many concepts that are often used to describe organic food (e.g., "natural", "authentic" and "fresh") are vague to the consumer and leave room for misuse by the producer. In addition, the issue of international harmonisation is brought forward, which gains importance considering the ongoing globalisation.

With regard to *innovation*, the reviewed studies stress the symbolic and value-oriented notion of innovation in the context of organic food. Organic products are approached as a social innovation rather than a technological one. Thus, they represent copies or imitations of conventional food with an added social value. Studies that discuss technologically innovative procedures used for the production of organic food were not found, thus pointing to a research gap.

The reported studies only marginally address the topic of *product range* design. On the basis of our literature review, questions concerning how to design the assortment of goods from the retailer's point of view remain unanswered. For instance, a conventional retailer ought to decide how many organic products to offer and whether to substitute parts of the conventional assortment or to supplement it. Therefore, research into the effective design of product ranges is needed. The topic of *value added service* clearly represents a research gap, since we did not find any publication addressing this issue.

**Costs:** At first glance, costs to the consumer seem to be a well-treated topic in organic marketing research. On closer inspection, we found that publications dealing with the WTP for organic food or for organic food attributes constitute a disproportionally large share of articles in this section. Research on the issue of how prices are processed in the consumer's mind or on price differentiation are still missing.

However, the cited studies referring to *price cognition and perception* agree that organic food is perceived as more expensive than its conventional counterpart, and that the higher price represents a barrier to organic food consumption. Some articles dedicate more attention to the differentiated perception of frequent organic consumers and occasional or non-organic consumers. Interestingly, even some non-organic consumers express understanding for the price premiums of organic food and think that they are justified. Nevertheless, they appear to be sensitive to these higher prices. One study finds out that price-sensitivity comes along with pragmatism, whereas the acceptance of higher prices might be related to stronger value-orientation. It will be challenging for marketers to convince these price-sensitive, non-organic consumers of the mostly value-based benefits of organic food.

The reviewed publications analysing the *WTP* reveal a high heterogeneity in results, so that a clear answer to the question whether consumers would pay premiums for organic food and if so how much, cannot be given in general. Values for the WTP for organic food with reference to conventional food range from no WTP up to more than 100%. Particularly for direct price queries, results differ substantially. Considering also the other methods, the majority of studies estimate WTP-values located between 10% and 40%. However, due to studies examining a great variety of food categories being conducted in different countries with presumably varying degrees of awareness for organic food, in different years and using diverse methods, results are hardly comparable. Studies that evaluate the applied procedures by combining two methods with each other in order to find out whether they tend to over- or underestimate the WTP are rather rare and also contradictory. Thus, based on the available literature it is not clear which method generates the most reliable results. However, one study comes to the conclusion that pooling the findings of different methods leads to better predictions.

Nevertheless, using homescan-data, some authors reveal the actual price premiums that consumers paid for organic food, which could be a possible procedure to evaluate the reliability of methods that use stated preferences or experimental auctions. However, due to the incomparability of studies reviewed for the present literature analysis, such an evaluation was not possible.

When comparing organic food to products with other sustainable attributes, findings are mixed. Only one out of eight studies reveals a higher WTP for organic food compared to locally grown products. Moreover, for the attributes naturalness, fair trade and animal welfare findings are not congruent. This suggests that the meaning of organic and its standards is not clear to all consumers. This may lead to problems for organic food producers who have higher production costs in order to fulfill the various standards of organic food (e.g., feed in organic quality, no usage of antibiotics, hormones, pesticides) than producers of merely local or animal welfare products, but who are not able to cover these costs due to low WTP. Thus, a stronger communication of the additional value of organic food is needed.

**Communication and information needs:** Even though communication is traditionally seen as the most important marketing tool, only 32 out of 279 publications were found dealing with this topic.

The articles assigned to *communication and information in general* stress the importance of communication of organic food products and partly reveal that around the year 2000 their promotion was limited. Communicating the benefits of organic food is necessary in order to differentiate from conventional products. This is especially true for food categories that are traditionally less intensely promoted, such as fish, so that the benefits of organic might be even more obscure to consumers. However, one study importantly points out that promoting the key benefits of organic food is not enough. Producers and retailers should rather go beyond that by trying to create knowledge about organic production methods.

The reported results with regard to *communication and information instruments* are highly diverse. Thus, there is no clear tendency of what communication channel is the most used and what is the most effective. Conclusions for the industry can hardly be drawn on the basis of these relatively few and heterogeneous findings. However, it becomes evident that the perception of credibility of different media varies substantially between countries. Whereas in some parts of the world, for example, TV and radio are the most frequently used information sources, in others these media are seen as lacking credibility. Moreover, findings suggest that the media has the main function when it comes to the promotion of organic food, whereas other information sources such as scientific publications or word of mouth seem to be less important. It is striking that the potential of the Internet as communication channel remains completely unaddressed.

Two main questions are addressed by the articles dealing with *communication and information messages*: On the one hand, some studies approach the topic of communication design and framing, whereas other studies are dedicated to the issue of how to distinguish organic products by means of communication in order to lower the risk of confusion, as it is the case for natural products. With regard to the former, the reported findings are in accordance with positive framing being more effective to communicate organic food than negative framing. There is evidence that positive framing does not only increase the purchase likelihood but also sensory product liking. As to the second main research question, results point out the high risk of confusing organic food with natural products. In this regard, more research is needed in order to understand how far consumers' definition and understanding of organic diverge from those of regulators and producers. Research is also needed in order to find ways to make them match.

**Convenience and distribution:** Next to higher prices in relation to conventional products, the low *availability* of organic food is one of the major obstacles to the consumption of organic food in most of the analysed countries. However, the reported findings allow for the conclusion that this problem depends on the development of the organic market in a specific country. Especially in new markets, the lack of accessibility represents a barrier, whereas in mature markets consumers tend to be satisfied with the supply of organic food. Thus, increasing the availability of organic food, which stands in direct relation to conventionalising the organic food sector, may lower the barriers for its consumption, particularly for those consumers who are less committed. Nonetheless, it may have

the negative effect of nurturing scepticism among consumers regarding the reliability of organic labels and the quality of the products.

Examining the question of the *store choice*, i.e., "which purchase venues are mainly used for organic food shopping?", we can conclude that the findings are diverse and not comparable due to different databases considering various countries with different organic food market structures and with different types of consumers and consumption habits. Whereas in some countries the conventionalisation of the organic food sector appears to be advanced, in others the classic distribution structure of organic food tends to be conserved to some extent. Some studies point at the downside of the ongoing mainstreaming of organic food by stressing the signalling function of certain retail outlets with regard to trust, quality and sustainability.

With regard to single distribution channels, the scientific literature does not mirror the current situation: We found only one study analysing consumption behaviour in a *conventional retail*, which is rather surprising considering the growing offer of organic food in conventional retail outlets. Also *specialised food retail* had hardly been dealt with. The low attention that the *Internet* as a distribution channel has received so far in the scientific literature corresponds to its significance in the food sector. Due to insecurity on part of the consumer, but also because of perishability of goods and delivery costs, buying food via the Internet is still rather unattractive. In spite of – or maybe because of – the ongoing conventionalisation, which is mainly reflected in distribution and less in other marketing-mix instruments, the only distribution channel that has been researched more frequently compared to the others is *direct sales from the farmer to the consumer*. Next to the rather traditional farmers' market, particularly the usage of alternative sales channels such as box schemes, community-supported agriculture and collective/solidarity purchasing groups is strongly related to ideological beliefs and offer the possibility to counter the ongoing conventionalisation and globalisation.

Nevertheless, research is especially needed for the supply of organic food in large retail formats like discounters or hypermarkets. Additionally, the perceived unique selling proposition of organic food shops is still unclear.

**Choice of method:** The scope of the presented literature analysis is to provide a comprehensive overview of the status quo of the research with regard to organic food consumption behaviour and marketing. We chose a qualitative approach, namely a narrative-like literature review, combined with the quantification of research areas. The conclusions that can be drawn from such an approach are limited and sometimes not free from subjective evaluations, since most findings are not comparable. However, due to the large amount of studies and the extensive and consequently heterogeneous research field, the conduction of a meta-analysis in the classical sense was not feasible.

Finally, it can be concluded that organic food consumption behaviour has received a lot of scientific attention in general. Although the present article reports findings only in an exemplified way, it reflects the high heterogeneity of this research area.

Nevertheless, this literature review reveals a need for further research for many facets of organic food consumption and marketing. With regard to the four marketing-mix instruments, product-related topics and costs, particularly the WTP, are all well researched areas. On the contrary, for the communication and the distribution of organic food relatively few studies were found. Also, the findings in the two well-researched areas are heterogeneous to a certain extent and sometimes even contradictory. Since contradictory results are difficult to assess for practitioners, more emphasis should be placed on these in general. The prevalent reason for these contradictions is the lack of comparability of the reviewed publications, which are based on different studies using different databases and different methods. Due to this, the role that cultural differences presumably play cannot be evaluated in the framework of this literature review. Further research should be dedicated to this aspect.

Like many other research articles, the present one also has some limitations. Although the authors attempted to proceed as systematically and objectively as possible, a clear classification of some articles was not always feasible due to the fact that the topic of organic food consumption and marketing is often also marginally addressed by bordering issues. Therefore, the decision about whether an article should be included or not was in some cases ambiguous. We therefore do not claim this review to consider the complete body of available literature. Also, the classification of single articles in the identified categories was not always distinct. Moreover, especially with regard to the above discussed issue of country-specific relevance of organic food sales, conclusions should be considered carefully, since we did not account for the literature published in a country's own language. Also, we did not critically take into consideration possible methodological weaknesses of the reviewed studies.

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# Chapter II: Sensory preferences

## II.1 Cross-national sensory segments in the organic market based on stated preferences for the five basic tastes

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*For submission.*

## Abstract

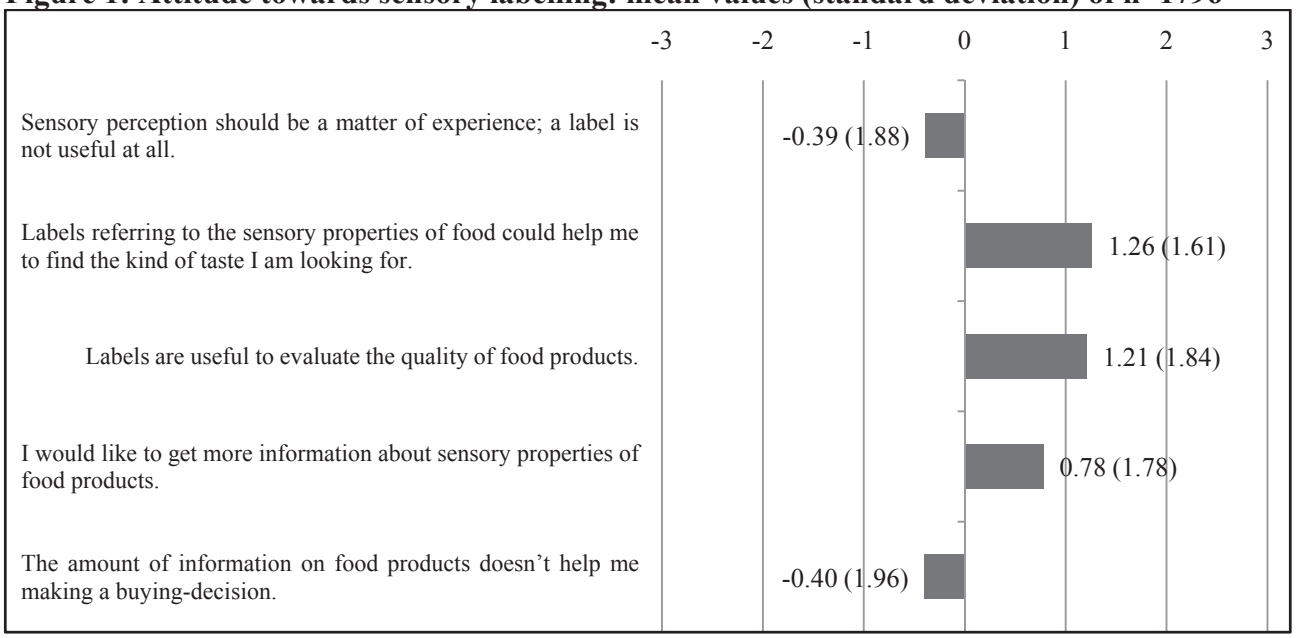
In a highly competitive food market, innovative marketing strategies are necessary to differentiate a product from its competitors. Among consumers, taste is one of the most important motivations for purchasing food. Studies regarding sensory preferences for specific product categories prove that consumers differ in their liking of sensory attributes. However, little is known about general consumers' taste preferences that are not related to a certain product. Therefore, this study analyses if patterns of general taste preferences exist, and how they can be characterised. To this end, 1796 organic consumers from six different European countries, interviewed as part of an EU-funded research project between October 2010 and February 2011, were segmented based on their stated preferences for the five basic tastes: sweet, salty, sour, bitter, and umami. Seven consumer segments were identified. They differed in their size as well as in their distributions of age and organic consumption frequency. All seven taste patterns can be found in each of the six study countries. As a first approach towards stronger marketing-oriented sensory research, this study shows that a consumer segmentation based on general taste preferences as a fundament for sensory marketing is meaningful and promising.

## 1 Introduction

Intensive competition among food producers makes innovative differentiation strategies increasingly important. Sensory properties of food products are relevant for the consumer's buying decision, especially in premium segments such as the organic food market (Chryssohoidis and Krystallis, 2005; Magnusson et al., 2001; McEachern and McClean, 2002; Schifferstein and Oude Ophuis, 1997; Stobbelaar et al., 2007). Organic consumers on average affirm the usefulness of the labelling of sensory attributes, as Figure 1 illustrates (see the Method section for information about study design). Hence, the marketing of sensory characteristics helps consumers in guiding their purchase decision. Moreover, it represents a promising way to differentiate a product from competing ones and to perform target-specific communication.

In order to target consumers with sensory marketing strategies, an extensive knowledge about their preferences is necessary. In the past, the segmentation of consumers was found to be a good method to gain knowledge by dividing consumers into homogenous groups, comprised of individuals that show similar characteristics, habits or preferences (Funk and Hudon, 1988; Larson, 2004; Lawrence et al., 2003; Moskowitz and Bernstein, 2000). Besides psychographic and behavioural aspects, sensory and taste preferences have been used for segmenting consumers as well (Mehinagic et al., 2012; Moskowitz and Bernstein, 2000; Moskowitz and Rabino, 1994; Séménou et al., 2007; Sinesio et al., 2010; Tomlins et al., 2005).

**Figure 1: Attitude towards sensory labelling: mean values (standard deviation) of n=1796**




Source: Own data.

However, sensory research studies show the problems of applying a product-specific approach. Analyzing taste preferences for a single product or product category impedes the generalisation of results and requires analyses for every product of interest. Information about preferences that do not depend on a certain product reveals a consumer's general disposition towards taste and can reduce the effort of analyzing consumers' preferences for every single product. Therefore, in this paper, product-unspecific preferences are operationalised by the five basic tastes – sweet, salty, sour, bitter, and umami – and are used to reveal general taste preference patterns. This way, food producers can target market segments more efficiently. For example, consumers who express a general aversion towards bitterness are unlikely to buy a chocolate bar that is labelled with a bitter tasting high percentage of cacao.

Especially for players in the international market, gaining insights about the target group's preferences is indispensible, since many factors such as dietary experiences or the familiarity with certain foods and tastes (Prescott, 1998; Rozin and Hormes, 2010) may depend on the cultural background and influence food habits, perception and preferences (Birch et al., 1996; Lwin and Wijaya, 2010; Rozin, 1996). Thus, analysing taste preferences cross-nationally may provide valuable data about the target segment, which can assist food producers, product developers and marketers when internationalising their product portfolio. A dataset comprising preference information of consumers from Italy, France, Poland, the Netherlands, Switzerland and Germany was complied for this study. It originates from a quantitative consumer survey with a total of 1796 participants, carried out within the framework of an EU-funded research project between October 2010 and February 2011. The treated countries are of interest, since they show differences in their culinary culture: Italy and France are worldwide known for their cuisine rich in tradition that constitutes a considerable part of

their cultural property as the number of products with protected designation of origin (PDO) and protected geographical indication (PGI) listed in Table 1 suggests (Parrott et al., 2002; Pieniak et al., 2009; Renting et al., 2003). To the contrary, Germany, Poland, Switzerland and the Netherlands have relatively few registered products. The number and the diversity of listed products for each nation reveal differences in food cultures that justify the analysis of taste perception and preferences in these countries.

**Table 1: Products with PDO and PGI in study countries in 2013**

| | Italy | France | Netherland | Switzerland | Poland | Germany |
|---|---|---|---|---|---|---|
| **Registered** | 256 | 203 | 10 | 29 | 35 | 95 |
| **Published** | 20 | 22 | 0 | n. a. | 0 | 7 |
| **Applied** | 26 | 29 | 1 | n. a. | 2 | 17 |
| **Total** | **302** | **254** | **11** | **29** | **37** | **119** |

Sources: European Commission (2013), Schweizerische Vereinigung der AOP – IGP (2013)

Therefore, the aim of this explorative study is to present a cross-national consumer segmentation based on stated preferences for the five basic tastes – sweet, salty, sour, bitter, and umami – in order to reveal the existence of general sensory consumer types. This study is to be viewed as a first methodological approach of identifying general preference patterns instead of product-specific ones. Due to the origin of the data, the study focuses on taste preferences of organic consumers and serves as an example of differentiated food marketing.

## 2 Taste preferences

A variety of factors that have enjoyed much attention in consumer behaviour research influence food consumption behaviour. Besides the socio-economic environment of the consumer and their beliefs, values and attitudes, taste in particular plays an important role for food choice and consumption behaviour (Rozin, 1996; Shepherd and Raats, 1996), which several empirical studies confirm (Anna, 2001; De Ferran and Grunert, 2007; Lusk and Briggeman, 2009; Magnusson et al., 2001; Max Rubner-Institut, 2008; Torjusen et al., 2001; Wandel and Bugge, 1997). Also with regard to the consumption of organic food, taste is repeatedly identified to be among the most important buying motives (Chryssohoidis and Krystallis, 2005; Magnusson et al., 2001; McEachern and McClean, 2002; Schifferstein and Oude Ophuis, 1997; Stobbelaar et al., 2007).

However, it is widely known, that there is no accounting for taste. Rozin (1988) argues that the origin for differences in food preferences among humans is threefold, depending on genetics, on individual experience and on culture. Whereby, the latter, culture, has the most predicting power (Rozin, 1996). The social and cultural environment can be understood as setting up the contexts for food consumption and hence for certain sensory experiences (Mela, 2001). Society and culture de-

termine which foods are consumed and in what frequency, therefore strongly shape food liking. This leads to differences not only between cultures but also between individuals of the same culture (Mela, 2001; Wright et al., 2001). Within a given cultural and social frame, genetics and individual aspects further determine food liking. Among other factors, it depends on the sensory perception, mainly on the taste (gustation and olfaction) but also on the appearance (vision) and texture (audition and haptics) (Cardello, 1996; Eertmans et al., 2001). Within the sense of gustation, humans can distinguish between the five basic qualities sweet, salty, sour, bitter and umami (Cardello, 1996; Krishna, 2012). Whereas the first four taste qualities are generally known, umami was discovered by the Japanese researcher Ikeda in 1908 and was belatedly accepted as a basic taste (Kurihara, 2009; Sano, 2009; Yamaguchi and Ninomiya, 2000). The term can be approximately translated into deliciousness, savoury, meaty and broth-like. It mainly characterises glutamate-rich foods, e.g., meat, poultry, seafood, cheese, vegetables and mushrooms (ibid.). Due to its origin and name, umami is commonly associated with Asian food, even though it has always been part of Western cuisine as well (ibid.). Humans have genetic preferences for some of these taste qualities, others they naturally reject so that processes of learning and experiences are required in order to adapt (Birch, 1999; Eertmans et al., 2001). The characteristics of preferences for the basic taste qualities alter during the course of a lifetime and vary among individuals, due to dietary experiences and exposure (Eertmans et al., 2001; Mela, 2001).

There are a number of different approaches to the measurement of taste preferences. First, we should distinguish between sensory analysis and marketing research. These have traditionally been two separate research disciplines, or even scientific communities, with different scopes and research cultures, although they share a common goal, i.e., to sell a product that is successful and profitable in the market (Wilton and Greenhoff, 1988). The former concentrates on product development and product-specific quality evaluation by applying objective evaluation methods and sensory tests conducted by experts in a controllable experimental environment. The latter deals with the overall perception and acceptance of food products by the consumer and attempts to capture a possibly realistic consumption setting, hence using a subjective approach of sensory preference testing (ibid.; Lawrence et al., 2003). Though there are overlaps between both disciplines, these are rather weak. For marketing, which usually does not operate product-specifically, sensory preferences have not played an important role so far.

When analysing consumer preferences, a further distinction can be made between actual taste preferences and stated taste preferences. While analysing actual taste preferences requires the tasting of a real product, stated taste preferences can be evaluated on basis of experience without the exposure of a real stimulus (Saba et al., 1998). Findings with regard to the performance of both approaches are diverse. Tuorila-Ollikainen et al. (1986) and Shepherd et al. (1991/2) reveal improved prediction of consumption behaviour when evaluating the actual liking of low-salt bread and milk instead of stated preferences. To the contrary, Tuorila (1987) finds that stated preferences predict the consumption of milk with different fat contents better than actual sensory liking. There is also evidence

showing that stated preferences do not always correspond with actual preferences. Mehinagic et al. (2012), for example, segment consumers based on their sensory preferences for 31 apple varieties. One out of four emerging clusters representing 26% of the total sample stand out for its discrepancy between the actual liking of sensory properties and stated sensory preferences. Although they declare that odour and crispness are not important to them, preceding sensory tests reveal the opposite (ibid.). This suggests that humans' ability to distinguish and verbalise taste perceptions is poor, as found by Wilton and Greenhoff (1988). When they test the perception of four of the basic tastes (umami was not included) for 3,000 British consumers, they find that only 18% of consumers are able to correctly describe all four (ibid.). Poorer results are expected for more complex sensory properties, such as combined taste qualities or texture (ibid.).

However, several studies reveal that sensory perceptions can be influenced by extrinsic cues such as product information, brands or the product's image (Hemmerling et al., 2013; Kähkönen et al., 1995; Paasovaara et al., 2012; Shankar et al., 2009; Veale and Quester, 2009; Wansink and Park, 2002; Wansink et al., 2005). Taking this into account, Veale and Quester (2009) conclude that marketers cannot assume that intrinsic product attributes, such as taste, will be weighted and interpreted accurately when evaluated by consumers. Information on sensory as well as non-sensory properties forms expectations that influence consumers not only when making a purchase decision but even when tasting the product (Cardello et al., 1985; Deliza and MacFie, 1996; Grunert, 2005; Grunert et al., 2000; Lawrence et al., 2003; Wansink et al., 2005). For example, in a well-known experiment, Hall (1958) analyses the effect of the colour of different sherbets on consumers' perception of their flavours. He reveals that consumers cannot correctly identify different flavours, e.g., lemon, orange and grape, when the sherbets are mismatched in colour or left white. Only when the sherbets are coloured according to the participants expectations, they identify the flavours with more accuracy (ibid.) Although taste is considered to be an experience dimension that cannot be ascertained prior consumption (Grunert, 2005; Grunert et al., 2000), influences on the already poor taste perception cannot be excluded either when experiencing the product after purchase (Deliza and MacFie, 1996). Accordingly, consumers' taste perception is rarely unaffected. Buying decisions are hardly ever based solely on actual sensory preferences, but additionally on what consumers believe to like. The evaluation of both actual and stated preferences is therefore relevant.

Nevertheless, to the best of our knowledge, studies analysing stated preferences for the five basic taste qualities do not exist. Therefore, the present article addresses this issue and attempts to group consumers on the basis of their general taste preferences, with the objective to build a consumer typology that provides information about preference patterns, which in turn can support the development of target-specific products and communication strategies.

## 3 Sensory consumer segmentation

In order to create target-group specific sensory marketing strategies, it is essential to gather knowledge regarding consumer taste preferences. Consumer segmentation is a widely used method for this, which acquires information by building groups of consumers that are similar in their preferences (Funk and Hudon, 1988; Larson, 2004; Lawrence et al., 2003; Moskowitz and Bernstein, 2000). There are a variety of consumer segmentation approaches, supporting the idea that classifying consumers according to their sensory food preferences is meaningful and reveals significant differences between groups of consumers (Mehinagic et al., 2012; Moskowitz and Bernstein, 2000; Moskowitz and Rabino, 1994; Séménou et al., 2007; Sinesio et al., 2010; Tomlins et al., 2005). These studies all have in common that they analyse food preferences in a product-specific manner. They include analyses on sensory preferences for unprocessed food, such as apples (Mehinagic et al., 2012) and tomatoes (Sinesio et al., 2010), as well as on sensory evaluations of processed food, i.e., cooked rice (Tomlins et al., 2005), smoked salmon (Séménou et al., 2007), fruit flavoured sodas (Moskowitz and Rabino, 1994), juice, coffee and soup (Moskowitz and Bernstein, 2000).

Mehinagic et al. (2012), Sinesio et al. (2010), Tomlins et al. (2005) and Séménou et al. (2007) apply external preference mapping by identifying consumer groups based on overall liking scores for different varieties of a specific product and subsequently relate them to sensory product characteristics that were analysed beforehand by trained sensory panels (Greenhoff and MacFie, 1994). This way, in order to identify sensory key-drivers for liking of apples among French consumers, Mehinagic et al. (2012) find four segments with differing preferences for 31 apple varieties. While some consumer groups are primarily sensitive to the texture and/or fruitiness of tasted apple varieties, other segments especially appreciate the taste and aroma. Sinesio et al. (2010) reveal four segments of Italian consumers based on preferences for a variety of tomato varieties with different sensory profiles. The authors indentify texture and flavour as the most discriminating attributes and conclude that a diversification of the tomato market is necessary to satisfy preferences of Italian consumers (ibid.). When analysing the liking for cooked rice among consumers from different regions in Ghana, Tomlins et al. (2005) find four segments with different preferences for six rice varieties, characterised by the sensory attributes appearance, odour, texture and taste. Séménou et al. (2007) categorise consumers from five European countries into six segments based on overall liking of smoked salmon. They report that all five countries are represented in each cluster, although to varying proportions. Thus, they conclude that European consumers, in general, vary in their preferences for smoked salmon and base their product choices regarding salmon primarily on different intensities of smoking and salting and the product's appearance. The authors suggest using more product information about sensory properties that can help consumers with their product choice (ibid.). Moskowitz and Rabino (1994) and Moskowitz and Bernstein (2000) identify other cross-cultural sensory segments. When categorising consumers based on their preferences for sensory properties of fruit flavoured soda, fruit juice, coffee and soup, they find three (in the case of fruit juice two) segments that are present in each study country in various proportions (ibid.). Moskowitz and

Rabino (1994) conclude that consumer segmentation based on sensory preferences is more accurate than segmentation approaches based on behavioural, psychological, socio-demographical or geographical aspects such as by country. Moskowitz and Bernstein (2000) add that their segmentation algorithm produces the most polarising results when used with products that differ from each other primarily on the basis of taste, rather than on appearance or texture.

In general, the reported studies show that preferences for sensory properties differentiate consumers and that taste plays an important role. Different countries reveal the same sensory preference types, but to varying proportions. This indicates that consumer preferences are not homogenous in either a single market or across cultures, and that product differentiation is necessary in order to satisfy consumer needs. Results also suggest that information about sensory properties is useful to support the consumer's buying decision. Comparing the studies with each other, it can be concluded that identified segments highly depend on the analysed product category, which impedes the generalisation of results. Each approach produces a different number of segments, which can be characterised by different sensory preferences. In a food market with thousands of product categories, the utility of such approaches is limited to only few products, though.

However, we have not found consumer segmentations based on product-unrelated taste preferences in the literature. The present paper aims at filling this research gap by proposing a consumer segmentation based on stated preferences for the five basic taste qualities. This approach does not consider actual sensory preferences, but stated general taste preferences. Stated taste preferences may support a buying decision, when previous experiences with a certain product do not exist or sensory testing of a product is not possible. In these situations, consumers rely on food labelling that informs about products' sensory properties as well as their beliefs about what they like and what they dislike. For producers, describing taste characteristics on product packages is a common way of food marketing.

# 4 Method

## 4.1 Data

Data was collected in the framework of an EU funded research project dealing with taste of organic food via computer-assisted interviews between October 2010 and February 2011. By means of a standardised questionnaire, participants were asked to state their preferences for the five basic tastes sweet, salty, sour, bitter and umami on a verbally anchored seven-category-liking scale. For example, test subjects rated their degree of liking of sweetness on the scale displayed in Figure 2.

**Figure 2: Rating scale for liking of sweetness**

| Regarding sweetness, I like it… | | | | | | |
|---|---|---|---|---|---|---|
| Very sweet | | | | | | Not sweet at all |
| □ | □ | □ | □ | □ | □ | □ |

Bitter was exemplified by the taste of grapefruit and sour by the taste of lemon. Since umami is a relatively recently discovered taste quality with a foreign name, it was assumed that western consumers would not be familiar with the concept. Therefore in the questionnaire, umami was described by the term "intensive aromas" and exemplified by mature cheese. Beyond that, questions concerning socio-demographic aspects and organic food consumption frequency were asked.

Respondents received the questionnaire in their mother language and with country-specific adaptions. Translation from English into the corresponding languages and back again into English ensured a high standardisation of the questionnaire throughout the study countries.

## 4.2 Sampling method and sample

This study is based on data that was primarily collected for a project dealing with a different research question. An organic quota sample of about 300 consumers in each country was conducted. Recruitment was mostly carried out via household panels, and additionally, in two cases, via e-mail, an announcement on a homepage or via announcements in organic food stores. Due to the nature of the project, which aimed at analysing sensory characteristics of organic food products, participants were required to be organic consumers and to be at least partly responsible for household food purchases. Although the existence of sensory segments does not depend on the consumption of organic food, the organic market offers growing potential for differentiated food marketing strategies and therefore serves as a suitable example. In order to ensure comparable subsamples, the recruitment of test subjects was carried out according to the following quota for the characteristics gender (66.7% women, 33.3% men), age (50% 18-45 years, 50% >45 years) and organic consumption frequency[1] (60% light users, 40% heavy users). These requirements were, apart from some small deviations, achieved in all study countries. The main socio-demographic characteristics of the total sample as well as the country-specific partial samples are displayed in Table 2.

[1]An index based on the consumption frequency of organic products from eight different categories (i.e. fruit, vegetables, meat/sausage, eggs, milk/milk products, bread/bakery products, beverages, oil) was used to determine the organic consumption frequency according to the calculations in the National Nutritional Survey II (Max Rubner-Institut, 2008).

**Table 2: Socio-demographics**

| | Pooled sample | Italy | Germany | Switzerl. | Poland | Netherl. | France |
|---|---|---|---|---|---|---|---|
| **Sample size** | 1796 | 299 | 294 | 296 | 319 | 290 | 298 |
| **Gender (%)** | | | | | | | |
| Female | 66.8 | 65.4 | 71.1 | 67.2 | 65.5 | 67.5 | 64.1 |
| Male | 33.2 | 34.6 | 28.9 | 32.8 | 34.5 | 32.5 | 35.9 |
| **Age** | | | | | | | |
| 18-45 years (%) | 49.5 | 49.8 | 50.3 | 53.0 | 50.2 | 48.1 | 45.6 |
| >45 years (%) | 50.5 | 50.2 | 49.7 | 47.0 | 49.8 | 51.9 | 54.4 |
| Average (years) | 45.4 | 43.3 | 45.4 | 44.6 | 44.3 | 47.4 | 47.4 |
| **Organic consumption frequency (%)** | | | | | | | |
| Light user | 53.6 | 58.9 | 44.2 | 43.4 | 56.1 | 55.4 | 63.1 |
| Heavy user | 46.4 | 41.4 | 55.8 | 56.6 | 43.9 | 44.6 | 36.9 |
| **Education (%)** | | | | | | | |
| Without formal qualification | 0.4 | 0.3 | 0.0 | 0.3 | 1.3 | 0.0 | 6.7 |
| Secondary education (about 10 years of schooling) | 18.9 | 1.0 | 46.9 | 42.2 | 4.4 | 0.3 | 29.3 |
| Further education (12 or 13 years of schooling) | 27.7 | 12.5 | 28.6 | 22.0 | 53.3 | 20.1 | 25.3 |
| College or university degree (BSc, BA, MSc, MA, PhD) | 43.4 | 56.6 | 23.8 | 29.7 | 40.0 | 67.4 | 33.3 |
| Others | 9.7 | 29.7 | 0.7 | 5.7 | 1.0 | 12.2 | 5.3 |
| **Household situation (%)** | | | | | | | |
| Single | 17.1 | 14.6 | 23.5 | 17.9 | 18.2 | 11.1 | 22.0 |
| With partner | 37.0 | 28.9 | 40.1 | 47.0 | 34.8 | 34.7 | 43.3 |
| Single parent | 3.7 | 1.0 | 3.7 | 3.4 | 6.0 | 4.5 | 6.3 |
| Couple with children | 26.8 | 21.9 | 25.2 | 20.6 | 23.8 | 43.4 | 25.0 |
| Apartment-share | 4.9 | 8.3 | 3.7 | 7.8 | 4.4 | 0.3 | 0.7 |
| Household with people of more than two generations | 5.5 | 15.0 | 2.7 | 1.7 | 7.2 | 0.3 | 1.3 |
| Student accommodation | 2.9 | 8.3 | 0.0 | 0.7 | 2.5 | 2.8 | 0.0 |
| Others | 2.0 | 1.0 | 1.0 | 3.1 | 2.8 | 2.0 | 1.3 |

## 4.3 Analysis

The analysis of the data was carried out using quantitative analytical methods with the statistics software IBM SPSS 20. A cluster analysis based on the stated liking of the five basic tastes as active variables was conducted in multiple steps. In spite of the higher goodness of the k-means procedure, we used hierarchical cluster analyses enabling the visualisation of the step-wise clustering process.

Beforehand, a correlation analysis proved that there were not high correlations between the clustering variables. In the next step, the single-linkage method was used for the identification of outliers. Accordingly, two cases were deleted from the database. The Ward-method was then used to determine the optimal number of clusters. Although the scree plot pointed at a two-cluster solution, based on the dendrogram and due to interpretative considerations a seven-cluster solution was chosen as the optimal number. Different cluster solutions (2-cluster to 7-cluster) and cluster means were calculated. Validation of the cluster solution showed that the obtained clusters were homogeneous, since the F-Values were smaller than 1 for all clustering variables in each cluster (in only one case there was an F-value of 1.03). Moreover, the averaged Eta-value of 0.65 indicated not only low within-cluster variance, but also that active variables differ substantially. An $Eta^2$-value of 0.44 implied that on average 44% of the variance among the cluster building variables can be attributed to differences between clusters. The stability of the cluster solution was confirmed by a discriminant analysis, which showed that 76.6% of the cases are classified congruently by the Ward-method and the discriminant analysis (Wilks Lambda=0.067).

For cluster description, analyses of variances were conducted. They showed that the means of the cluster building variables differ significantly between clusters. Due to disparate variances within the groups and to differing cluster sizes, the Games-Howell method was used for post-hoc tests, in order to find out which clusters differ (Field, 2009). The pairwise comparisons of group means of the cluster building variables showed significant differences in most cases. Finally, for each cluster split multinomial logistic regressions were conducted, in order to identify those variables that contribute the most to the separation of clusters and consequently have a greater explanatory power. For this purpose the Wald-test value, its significance, the effect size and the regression coefficient were consulted for evaluation (see Appendix for results). For further descriptions of the clusters, contingency analyses were performed, which confirmed significant differences between clusters regarding age, nationality and organic food consumption frequency.

## 5 Results

The segmentation tree displayed in Figure 3 illustrates the segmentation process of taste types in the six study countries. The starting point is the total sample, which is successively partitioned in smaller segments. Underneath the junctions – i.e., where one cluster splits into two – is indicated in bold letters which cluster building variables are dominant in separating cluster members. Moreover, the ratios next to each taste characteristic specify the probability of belonging to one cluster. This is, in the following example, described by means of the first segmentation step: The total sample is divided into cluster A and B, predominantly on the basis of its like or dislike of sourness, bitterness and intense aromas. An odd ratio of 0.29:1 for umami means that with an increase in the x-value by 1 unit, the chance to belong to cluster A declines by 0.29-times, i.e., the higher the preference for umami the lower the probability to be assigned to cluster A. The opposite occurs for the preference

for sweetness: with an increase of the x-value by 1 unit the chance to belong to cluster C increases by 1.20-times. Information about the successive clustering steps can be taken from Figure 3 and Table 4. Subsequently, only the total sample as well as the final seven-cluster-solution, labelled using roman numbers, is described in more detail with regard to segmenting variables and socio-demographics.

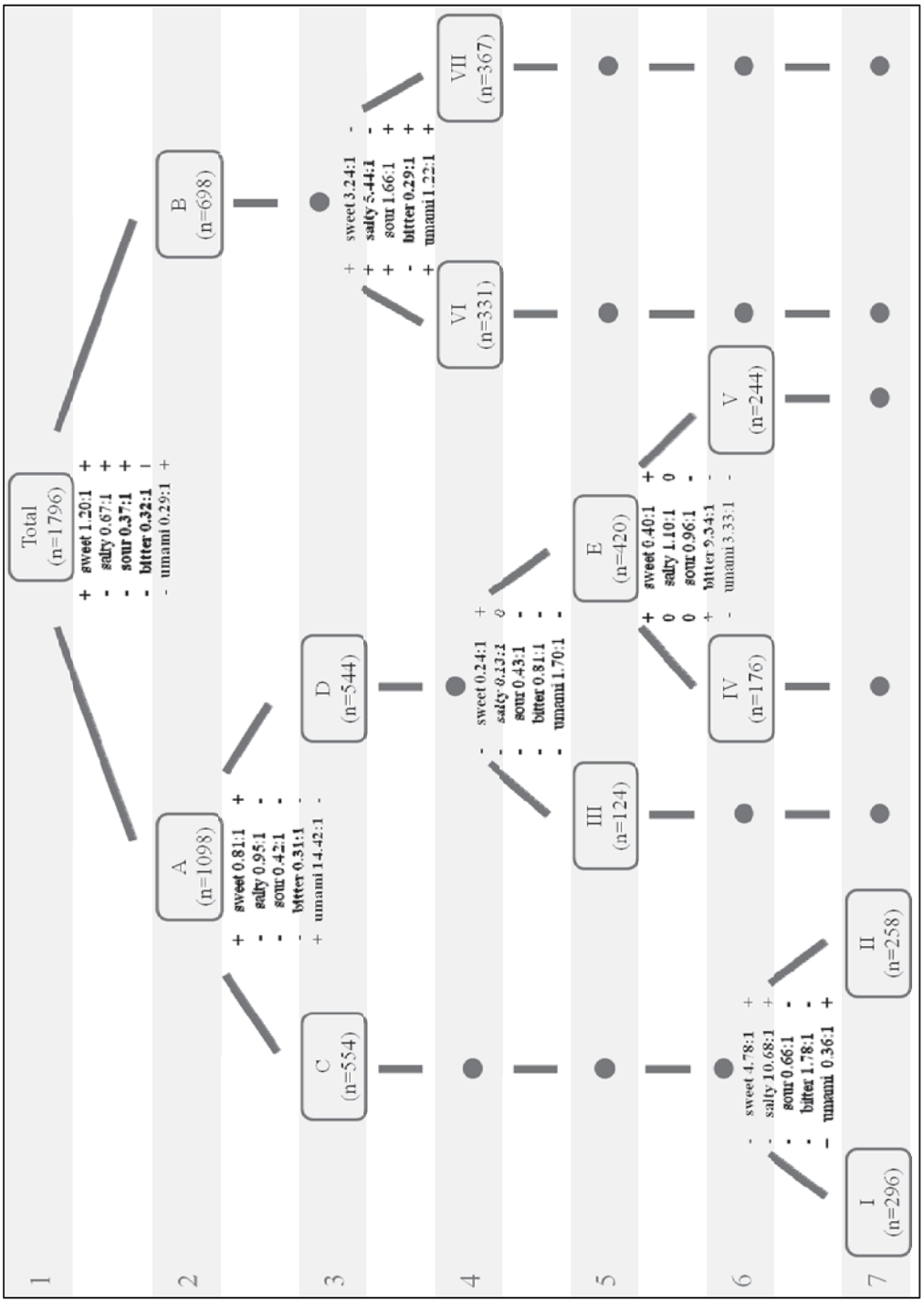
**Total sample:** The total sample is characterised by weak preferences for sweetness (mean=0.30, standard deviation=1.43) and for umami (0.47, 1.75). The average consumer neither likes nor dislikes salty food (-0.09, 1.42). He slightly dislikes sourness (-0.35, 1.48) and clearly rejects bitterness (-0.93, 1.61). The distribution of men and women corresponds to the quota set for the recruiting of test subjects, i.e., 66.8% of participants are female and 33.2% are male. The mean age is 45.3 years. The share of consumers with a low organic consumption frequency is 53.6%, consequently the proportion of heavy users is 46.6%.

**Cluster I:** This consumer group represents nearly 17% of the total sample. The main characteristic of this cluster is a strong aversion to sour (-1.55, 0.92) and bitter food (-1.98, 0.88). On average, they state that they like sweetness (1.00, 1.21), saltiness (0.60, 0.94) and intensive aromas (0.94, 1.16). The distribution of women and men corresponds to the distributions of the total sample. The share of light users is 5% higher than in the total sample (58.5%). On average, a member of cluster I is 47 years old, which is close to the mean age of the total sample. Almost one third of this consumer group is Italian (27%). The other five countries are represented in nearly equal proportions. A spider net in Figure 4 shows the taste pattern of this and the other clusters.

**Cluster II:** The only taste characteristic favoured by this cluster is umami (1.36, 1.22). Bitterness (-2.16. 0.80), saltiness (-1.16, 1.12) and sourness (-1.00, 1.37) are clearly disliked. Sweet food is only slightly rejected (-0.36, 1.45). About 14% of the total sample show this taste pattern. With a mean age of 42 years, cluster II is, on average, one of the youngest. The share of men and women corresponds to the quota for the survey. 57.1% of cluster members can be identified as light users, and 42.9% as frequent organic food consumers. The biggest share of this cluster, namely 22.1%, can be found in Poland, closely followed by the Netherlands with 19%. Swiss people only represent 9.7% of cluster II, the other half belongs in nearly equal parts to the remaining three countries.

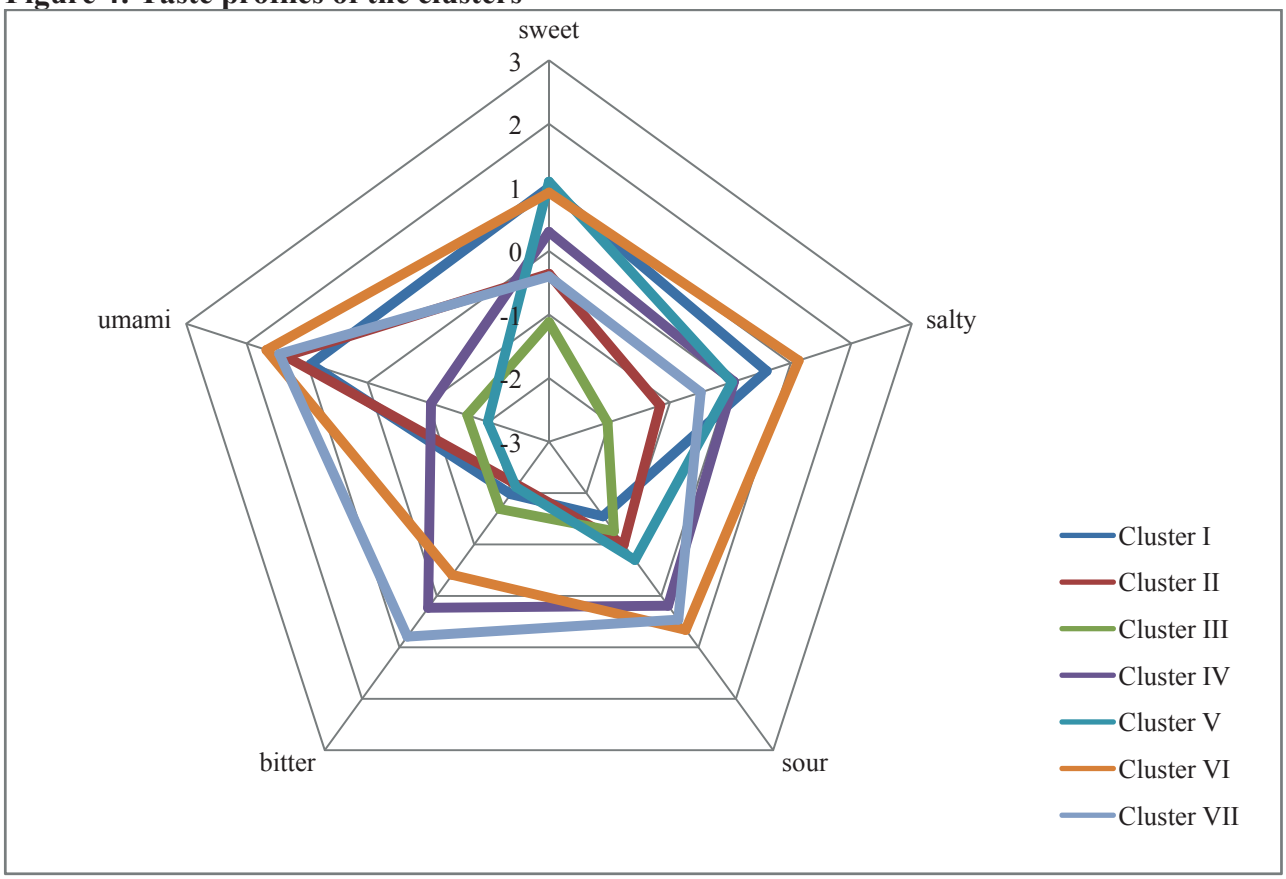
**Cluster III:** Consumers belonging to this cluster build the smallest group with a share of about 7% and stand out for their strong dislike towards all taste qualities. Moreover, it has the smallest proportion of men (19.4%) and consequently the biggest share of women (80.6%) among all clusters. Also, the mean age is the highest, 49.5 years. The distribution of organic food consumption frequency is similar to that of the total sample. About one third of this consumer group is Polish (30.6%). Together with the Dutch (21.8%), they represent one half of the cluster. In contrast, the small proportion of French and Swiss people, namely 8.1% each, is striking. Germans account for 16.1% of cluster III , 15.3% is Italian.

**Figure 3: Segmentation tree**




Notes: + = preference; - = aversion; 0 = indifference.

**Figure 4: Taste profiles of the clusters**




Notes: Semantic scales ranging from –3 (e.g., "I don't like it salty at all") to +3 (e.g., "I like it very salty").

**Cluster IV:** This segment shows the tendency towards preferences for food with weakly pronounced tastes, since it is characterised by positive values close to zero for almost all taste preferences. Also, the rather strong dislike of umami (-1.05, 0.99) goes in line with that tendency. It is one of the few segments that express slight preferences for sourness and bitterness. Members of cluster IV represent 10% of the total sample. Women are slightly overrepresented in this consumer group (72.2%). Light and heavy organic food consumers are distributed similarly as in the total sample. With a mean age of 47.2 years, members of cluster IV are, on average, two years older than the total sample. Consumers from Poland (22.7%) also represent the largest part of this cluster. Nearly equal shares of consumers with this taste pattern can be found in Switzerland, France, Germany and Italy. The Netherlands have the smallest percentage of all countries (11.9%).

**Cluster V:** About 14% of the total sample shows a preference for only one taste quality, namely sweetness (1.09, 1.12). This cluster neither particularly likes nor dislikes salty food (0.03, 1.28). Moreover, they are averse to sourness (-0.70, 1.56) and they strongly dislike bitterness (-2.12, 0.90) and intensive aromas (-1.99, 0.97). Women are slightly overrepresented (70.5%). The share of consumers with a lower organic food consumption frequency is the highest among all clusters (61.1%). With an average age of 43.4 years old, cluster V is classified as relatively young. Consumers as-

signed to cluster V are primarily found in Germany (21.7%), France (21.3%) and Poland (18.4%). In Switzerland (11.5%), Italy (14.8%) and Holland (13.9%), this taste type is less frequent.

**Cluster VI:** 18.4% of the total sample is characterised by a relatively open-minded preference pattern with fairly strong likings for almost all taste qualities. They state preferences for intensive aromas (1.67, 0.97), saltiness (1.13, 1.04), sweetness (0.92, 1.16) and sourness (0.66, 0.99). Additionally, the aversion to bitterness (-0.41, 1.47) is relatively low compared to other bitter-repelling clusters. Men are clearly overrepresented in this cluster (42.3%). Moreover, this consumer group comprises the second largest share of heavy users (51.5%). With an average age of 42.3 years, this segment is one of the youngest. Consumers characterised by this taste pattern can predominantly be found in Switzerland (29.3%). Their occurrence in the remaining five countries is about equal.

**Cluster VII:** Members of this cluster slightly dislike sweet (-0.40, 1.28) and salty (-0.49, 1.30) food but appreciate a note of bitterness (0.79, 1.09) and sourness (0.46, 1.33), which is rather peculiar. This cluster also states a high preference for intensive aromas (1.46, 1.02). With a share of 20.4%, it represents the biggest cluster. The distribution of men and women almost corresponds to the survey quota. Among all taste types, cluster VII shows the largest share of consumers that frequently buy organic food (52.9%) as well as the second highest mean age (48.7 years). This taste pattern occurs in all countries almost to the same extent. Only Poland (13.1%) and Italy (14.2%) show negligibly smaller shares.

**Table 3: Distribution of gender, age, organic consumption frequency and nationality by cluster**

| Cluster | Total | I | II | III | IV | V | VI | VII |
|---|---|---|---|---|---|---|---|---|
| **Sample size** | | | | | | | | |
| N | 1796 | 296 | 258 | 124 | 176 | 244 | 331 | 367 |
| % | 100.0 | 16.5 | 14.4 | 6.9 | 9.8 | 13.6 | 18.4 | 20.4 |
| **Gender[1] (%)** | | | | | | | | |
| Female | 66.8 | 67.4 | 66.6 | 80.6 | 72.2 | 70.5 | 57.7 | 65.1 |
| Male | 33.2 | 32.6 | 33.4 | 19.4 | 27.8 | 29.5 | 42.3 | 34.9 |
| **Mean age[2] (years)** | 45.3 | 46.8 | 42.1 | 49.5 | 47.2 | 43.4 | 42.3 | 48.7 |
| **Organic consumption frequency index[3]** | | | | | | | | |
| Light user (%) | 53.6 | 58.5 | 57.1 | 52.4 | 53.7 | 61.1 | 48.5 | 47.1 |
| Heavy user (%) | 46.4 | 41.5 | 42.9 | 47.6 | 46.3 | 38.9 | 51.5 | 52.9 |
| Average | 2.41 | 2.37 | 2.37 | 2.47 | 2.39 | 2.33 | 2.44 | 2.49 |
| **Country[4] (%)** | | | | | | | | |
| Italy | 16.7 | 27.0 | 15.5 | 15.3 | 15.3 | 13.1 | 14.8 | 14.2 |
| Germany | 16.4 | 14.5 | 16.7 | 16.1 | 16.5 | 21.7 | 12.7 | 17.4 |
| Switzerl. | 16.4 | 13.2 | 9.7 | 8.1 | 17.0 | 11.5 | 29.3 | 18.3 |
| Poland | 17.8 | 13.5 | 22.1 | 30.6 | 22.7 | 18.4 | 15.4 | 13.1 |
| Netherl. | 16.2 | 14.9 | 19.0 | 21.8 | 11.9 | 13.9 | 13.9 | 18.8 |
| France | 16.6 | 16.9 | 17.1 | 8.1 | 16.5 | 21.3 | 13.9 | 18.3 |

Notes: 1: according to Chi-square test, gender and cluster membership are not significantly related; 2: according to Kruskal Wallis' test, age significantly differs between clusters (Chi-square=70.72; $p<0.000$); 3: according to Kruskal Wallis' test, organic consumption frequency significantly differs between clusters (Chi-square=19.15; $p<0.01$); 4: according to Chi-square test, country and cluster membership are significantly related (Cramer's V=0.12; $p<0.000$).

**Table 4: Means (standard deviation) of clustering variables**

| Cluster | n/% | Sweet | Salty | Sour | Bitter | Umami |
|---|---|---|---|---|---|---|
| **Pooled sample** | 1796/ 100.0 | 0.30 (1.43) | -0.09 (1.42) | -0.35 (1.48) | -0.93 (1.61) | 0.47 (1.75) |
| **A** | 1098/ 61.1 | 0.35 (1.45) | -0.33 (1.37) | -0.92 (1.36) | -1.67 (1.26) | -0.22 (1.78) |
| **B** | 698/ 38.9 | 0.22 (1.39) | 0.28 (1.43) | 0.55 (1.19) | 0.22 (1.42) | 1.56 (1.00) |
| **C** | 554/ 30.8 | 0.37 (1.49) | -0.22 (1.35) | -1.29 (1.19) | -2.06 (0.85) | 1.13 (1.21) |
| **D** | 544/ 30.3 | 0.33 (1.41) | -0.43 (1.38) | -0.54 (1.42) | -1.26 (1.47) | -1.60 (1.06) |
| **E** | 420/ 23.4 | 0.76 (1.23) | 0.04 (1.15) | -0.33 (1.45) | -1.14 (1.50) | -1.59 (1.08) |
| **I** | 296/ 16.5 | 1.00 $^{bcdg}$ (1.21) | 0.60 $^{bcdefg}$ (0.94) | -1.55 $^{bdefg}$ (0.92) | -1.98 $^{dfg}$ (0.88) | 0.94 $^{bcdefg}$ (1.16) |
| **II** | 258/ 14.4 | -0.36 $^{acdef}$ (1.45) | -1.16$^{acdefg}$ (1.12) | -1.00 $^{adfg}$ (1.37) | -2.16 $^{cdfg}$ (0.80) | 1.36 $^{acdef}$ (1.22) |
| **III** | 124/6.9 | -1.12$^{abdefg}$ (0.93) | -2.03$^{abdefg}$ (0.72) | -1.26 $^{defg}$ (1.06) | -1.69 $^{bdefg}$ (1.28) | -1.65 $^{abdfg}$ (1.01) |
| **IV** | 176/9.8 | 0.30 $^{abcefg}$ (1.23) | 0.06 $^{abcfg}$ (0.95) | 0.19 $^{abcef}$ (1.08) | 0.23 $^{abcefg}$ (1.03) | -1.05$^{abcefg}$ (0.99) |
| **V** | 244/ 13.6 | 1.09 $^{bcdg}$ (1.12) | 0.03 $^{abcfg}$ (1.28) | -0.70 $^{bcdfg}$ (1.56) | -2.12 $^{cdfg}$ (0.90) | -1.99 $^{abdfg}$ (0.97) |
| **VI** | 331/ 18.4 | 0.92 $^{bcdg}$ (1.16) | 1.13 $^{abcdeg}$ (1.04) | 0.66 $^{abcde}$ (0.99) | -0.41$^{abcdeg}$ (1.47) | 1.67 $^{abcde}$ (0.97) |
| **VII** | 367/ 20.4 | -0.40 $^{bcdef}$ (1.28) | -0.49$^{abcdef}$ (1.30) | 0.46 $^{df}$ (1.33) | 0.79 $^{abcdef}$ (1.09) | 1.46 $^{acde}$ (1.02) |
| **F-value**[1] | - | 107.93*** | 200.80*** | 146.25*** | 357.87*** | 528.38*** |

Notes: 1: ANOVA; ***significant on a level of 0.001; a: according to Tukey post-hoc test, this item differs significantly from cluster I ($p<0.05$); b: according to Tukey post-hoc test, this item differs significantly from cluster II ($p<0.05$); c: according to Tukey post-hoc test, this item differs significantly from cluster III ($p<0.05$); d: according to Tukey post-hoc test, this item differs significantly from cluster IV ($p<0.05$); e: according to Tukey post-hoc test, this item differs significantly from cluster V ($p<0.05$); f: according to Tukey post-hoc test, this item differs significantly from cluster VI ($p<0.05$); g: according to Tukey post-hoc test, this item differs significantly from cluster VII ($p<0.05$).

## 6 Conclusions

The segmentation approach presented here is the first that used product-unspecific taste preferences for consumer segmentation. It showed significant results for identifying taste patterns based on stated general taste preferences. A segmentation tree illustrated the hierarchical clustering process from one to seven segments. The seven-cluster solution is described in detail based on shares of nationalities, age, gender and organic food consumption frequency.

The segmentation tree may serve as a tool for various companies with different scopes concerning market coverage. A broad segmentation reveals general tendencies concerning taste preferences and is suitable for addressing large parts of the market. Companies that seek detailed consumer information in order to develop niche marketing strategies should use a more refined cluster solution. The decision about the number and size of the clusters to be considered depends also on the costs and benefits entailed by segmentation. The smaller a segment is, the less probable it is that sales volume justifies segmentation costs. These are caused not only by obtaining and analysing information about that target group, but especially by creating target-oriented communication and price strategies and by designing and producing the segment-specific product itself (Bonoma and Shapiro, 1984). Moreover, for small segments, economies of scale are less likely to be obtained (ibid.). Larger segments, however, implicate greater heterogeneity within a segment, which impedes the comprehensive satisfaction of consumer needs.

The outcomes prove that general taste preferences are suitable criteria for segmenting consumers cross-nationally. In spite of the ongoing "standardisation of taste" due to globalisation, i.e., the convergence of food cultures and the increased availability of foods from all over the world (Marchese et al., 2013), different preference patterns of organic consumers are found. These taste patterns occur in all six study-countries. This indicates on the one hand that consumers from different countries have similar taste preferences. On the other hand, it also suggests that the sensory preferences of one country cannot be lumped together but that differentiation is necessary to satisfy various consumer preferences and to serve different market segments. The obtained findings reveal the potential of international segmentation and marketing and support practitioners in their decision between standardisation and adaption strategies with regard to all elements of the marketing mix. Considering global or regional segments, products and marketing programs can be standardised across countries leading to economies of scales (Steenkamp and Hofstede, 2002). Simultaneously, the same consumer segments in different countries can be targeted so that specific consumer needs and preferences can be addressed and complied (Verhage et al., 1989). This renders an international marketing strategy targeting transnational segments highly efficient and effective (Steenkamp and Hofstede, 2002).

Additionally, the results of a cross-national consumer segmentation based on sensory preferences provide references about which countries seem promising for selling products with specific sensory properties and which do not. Apart from product positioning strategies, a consumer typology based on taste preferences can also support decisions regarding product formulation and the composition of ingredients. For example, more than one fourth of cluster I, characterised by one of the strongest aversion to sour and bitter food, are Italian consumers. On the other hand, Swiss consumers account for the largest share of cluster VI, which stands out for its open-minded preferences with strong likings for almost all taste qualities.

Moreover, the proposed segmentation approach enables the observation of rather peculiar taste patterns. For example, cluster VII shows a preference for bitter tastes, which, nowadays, are being re-

moved from plant foods by the food industry as a response to the mainstream taste-driven consumer demand (Drewnowski and Gomez-Carneros, 2000). Being the largest cluster of all and additionally being almost equally distributed in all countries, it suggests that there is a potential market segment for bitter tasting foods that the food industry should consider.

Finally, this approach also contributes to the understanding of taste preferences among organic consumers. The largest shares of consumers who frequently buy organic food products are observed in the two biggest clusters, namely VI and VII. From this it can be concluded that the open-minded preference pattern revealed in cluster VI is attributed to a substantial part of organic consumers, particularly to the heavy users. Also, the peculiar preference pattern of cluster VII, composed of dislikes for sweetness and saltiness and likes of sourness, bitterness and intensive aromas, tends to be shared especially by frequent organic consumers. To the contrary, cluster V shows the smallest share of heavy users, indicating that a preference for sweetness is rather shared among light organic consumers and that it is not characteristic for heavy users.

The findings may be especially relevant for the development of new target-specific marketing strategies. Primarily communication strategies can be derived from a consumer segmentation based on stated taste preferences, e.g., food labelling with a focus on flavour properties that supports specific consumer segments in finding the right taste. The interest in sensory labelling is high due to a growing variety of offered products to choose from as well as a stronger focus on quality and taste. With knowledge about consumers' preference patterns, marketers can use the potential of sensory labelling and can more efficiently design communication strategies to target the relevant segments.

The link between marketing research and sensory analysis has been generally weak until now. Objective sensory perception measured by trained panels does not always represent consumer taste perception accurately. An integration of consumer research into sensory analysis is therefore fundamental, in order to produce and communicate food products target-specifically and more efficiently. Hence, this segmentation should be seen as a first approach towards stronger marketing-oriented sensory research and stresses the potential for differentiation strategies based on sensory marketing.

## 7 Limitations

For the proposed segmentation approach, stated sensory preferences for the five basic tastes were used. In spite of the above mentioned benefits of stated preferences compared to actual taste preferences, there are some issues that question the validity of the use of stated preferences. First, stated taste preferences are not necessarily valid, since they can differ from actual preferences measured, for example in a blind test, as the study by Mehinagic et al. (2012) confirms. It indicates that stated preferences are somehow related to actual preferences. What kind of relation this is and what factors influence it should be subject of further research. Deducing from the literature, an important aspect may be people's poor skills in distinguishing and verbalising taste perceptions (Wilton and

Greenhoff, 1988; Greenhoff and MacFie, 1994). The lack of sensory skills offers a great potential for extrinsic cues, such as product information and product image, to influence taste perceptions, as several studies show (Enneking et al., 2007; Hemmerling et al., 2013; Kähkönen et al., 1995; Wansink and Park, 2002; Wansink et al., 2005). In this regard, it is of particular interest in which way communicated sensory attributes affect taste preferences and perception, and when sensory marketing starts functioning in a deceptive rather than supportive manner. An approach towards objective taste communication can be seen in clean labelling, which stands for the communication of the absence of food additives such as flavour enhancer and preservatives.

Second, there may be differences in responses to and descriptions of taste qualities between consumers from different nations. What Italian consumers describe as sweet might not necessarily be sweet for German consumers. Further research is necessary in order to better understand these culture-specific differences and to generate more comparable data.

It also has to be considered that the sensory appreciation of food is a complex system of various sensory characteristics, and therefore food products should be evaluated in their food contexts (Prescott, 1998). The approach presented here considers preferences for single taste qualities that may vary between different kinds of food. Some people might like the bitterness of coffee, but they might dislike the bitterness of grapefruit at the same time. The same is true for other taste qualities. Thus, in further research, multiple kinds of products should be considered, in order to find the most appropriate indicator products for each taste quality.

The convenience samples used for this analysis are not representative but at least provide a useful starting point for further studies. Therefore, conclusions from this work must be considered as hypotheses that should be tested with a representative samples. Future research should also consider the cross-national context that may bring along the problem of varying usage of scales in different countries.

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# Appendix

## Results of logistic regression

| Step | | Sweet | Salty | Sour | Bitter | Umami |
|---|---|---|---|---|---|---|
| 1 (2CL) | Wald | 8.228 | 38.806 | 168.515 | 239.487 | 266.741 |
| | Exp | 1.196 | 0.670 | 0.370 | 0.320 | 0.285 |
| | Sig | 0.004 | 0.000 | 0.000 | 0.000 | 0.000 |
| | Reg.coeff.B | 0.179 | -0.401 | -0.994 | -1.141 | -1.254 |
| 2 (3CL) | Wald | 5.398 | 0.273 | 75.981 | 119.575 | 321.368 |
| | Exp | 0.814 | 0.953 | 0.421 | 0.314 | 14.419 |
| | Sig | 0.020 | 0.601 | 0.000 | 0.000 | 0.000 |
| | Reg.coeff.B | -2.06 | -0.048 | -0.866 | -1.158 | 2.669 |
| 3 (4CL) | Wald | 130.670 | 198.181 | 23.874 | 124.196 | 2.979 |
| | Exp | 3.244 | 5.439 | 1.662 | 0.293 | 1.219 |
| | Sig | 0.000 | 0.000 | 0.000 | 0.000 | 0.084 |
| | Reg.coeff.B | 1.177 | 1.694 | 0.508 | -1.227 | 0.198 |
| 4 (5CL) | Wald | 96.655 | 119.671 | 31.723 | 2.357 | 9.860 |
| | Exp | 0.244 | 0.127 | 0.432 | 0.805 | 1.702 |
| | Sig | 0.000 | 0.000 | 0.000 | 0.125 | 0.002 |
| | Reg.coeff.B | -1.411 | -2.061 | -0.840 | -0.217 | 0.532 |
| 5 (6CL) | Wald | 41.041 | 0.251 | 0.091 | 147.170 | 45.470 |
| | Exp | 0.401 | 1.071 | 0.960 | 9.341 | 3.332 |
| | Sig | 0.000 | 0.616 | 0.763 | 0.000 | 0.000 |
| | Reg.coeff.B | -0.914 | 0.068 | -0.041 | 2.234 | 1.204 |
| 6 (7CL) | Wald | 129.517 | 188.479 | 13.080 | 13.246 | 61.688 |
| | Exp | 4.780 | 10.678 | 0.660 | 1.776 | 0.362 |
| | Sig | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | Reg.coeff.B | 1.564 | 2.368 | -0.416 | 0.574 | -1.016 |

## II.2 Core organic taste: Preferences for sensory attributes of organic food among European consumers

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*For submission.*

# 1 Introduction

The interest in organic food consumption among European consumers has grown steadily in the last decades in answer to an increasing mistrust towards the food industry. Only in 2011, the European market for organic food increased by nine percent compared to 2010, and it has almost doubled since 2004 (Schaack et al., 2013). Globalisation, intensification and industrialisation of agriculture contribute to the distancing between food production and consumption (Autio et al., 2013; Davies, 2001; Gilg & Battershill, 1998). Additionally, food scares led to consumer scepticism towards, and dissatisfaction with the food industry (Grunert, 2002; Yiridoe et al., 2005). As a consequence, the wish for more transparency as well as more naturalness emerged (Davies, 2001; Devcich et al., 2007; Rozin, et al., 2004; Schösler et al., 2013). The trend towards the need for more transparency and naturalness is not new but has appeared several times before, in the past. While the first approaches towards a wholesome nutrition can be traced back to ancient Greece (Koerber et al., 1987), the American "Natural Food Movement" in the 19$^{th}$ century and the "Lebensreform" in German speaking countries provide relatively more recent evidence for this (Gusfield, 1992; Schösler et al., 2013). Objecting to agriculture's mechanisation and industrialisation, the loss of rural lifestyle, self-sufficiency and independence, these movements promoted the return to a more natural way of life as well as a more natural diet (Vogt, 2007). Addressing the principle that nutrition should be as natural as possible, Bircher-Benner developed the "raw food diet" in Switzerland, while in Germany, Kollath coined the term "wholesome nutrition" (Leitzmann, 2005). A research group around Leitzmann picked these principles up and developed them further.

The organic movement, which emerged from anthroposophically motivated biodynamic farming practices established by Rudolf Steiner in the 1920s (Codron et al., 2006; Kirchmann, 1994), shares many of these ideals opposing the industrialised agriculture and promoting the health of soil, ecosystems and people (IFOAM, 2014). Specifically, European and North American regulations ban the use of mineral fertilisers, chemical pesticides and genetically modified organism from the production of organic food with the aim to protect natural resources, animal welfare and biodiversity. Moreover, they promote production methods that are in line with consumer preferences, in regard to using natural substances and processes for the production of food (Council Regulation (EC) No 834/2007).

Besides altruistic values, such as a more environmental friendly production of food or animal welfare, egoistic buying motivations, such as health promoting aspects and superior product quality in terms of taste, are increasingly gaining relevance and have even partly moved ahead of the altruistic drivers. Several studies, which reveal that taste and appearance are among the most important criteria for organic food purchases, confirm this (Aertsens et al., 2009; Akgungor et al., 2010; Castellini et al., 2008; Cerjak et al., 2010; Hamzaoui-Essoussi & Zahaf, 2012; Hughner et al., 2007; Kuhar & Juvančič, 2010; Padilla Bravo et al., 2013). However, other authors claim that taste is not of particular relevance as an organic food choice criterion. For instance, in a study among organic Danish consumers, Wier et al. (2008) find that taste is ranked as the least important product attribute. Com-

pared to taste, other sensory properties such as appearance, smell and texture are less frequently discussed. Although there is some evidence that consumers value these sensory characteristics of organic food (Chang & Zepeda, 2005; Cicia et al., 2009; Costanigro et al., 2011; Grebitus et al., 2011; Kuhar & Juvančič, 2010; Wirth et al., 2011),Hughner et al. (2007) do not consider them to be among the ten most important purchasing motives. Instead, some authors point out that blemishes are sometimes found to be a deterrent to the choice of organic food (Curtis, 2011; Fotopoulos & Krystallis, 2002; Yue et al., 2009).

In summary, these findings do not show a clear pattern for the role played by sensory characteristics as drivers of organic food consumption. It leaves us to assume that their impact on the organic food choice depends on different factors, among others on the product category and the type of sensory attribute (e.g., taste, appearance, etc.). However, to our best knowledge, quantitative research into consumers' responses to specific sensory properties of organic food has not been conducted so far. Since sensory features are seemingly gaining relevance in the organic field, there is a need for analysing the nature of preferences for sensory characteristics in order to better understand what consumers expect from organic products and what drives their food choices. This is essential for organic practitioners, for the development of target specific products and for marketing strategies.

Thus, rather than only determining whether taste and other sensory characteristics motivate the purchase decisions for organic food, this paper goes beyond that by addressing the question, What organic food properties are appealing to the organic consumer? We approach this objective by means of a concept that we call "core organic taste" (COT). Assuming that organic consumers strive for a natural diet, this concept partly follows Leitzmann's principle of a "wholesome nutrition" (Koerber et al., 1987) taking into consideration sensory attributes that consumers who regularly buy organic food presumably may search for, such as whole grain, less sweetness and a natural flavour due to the absence of artificial additives. Thus, the COT draws upon the ideals of the organic movement and the closely associated principles of a wholesome nutrition. In this study, we attempt to find out whether the original philosophy of the organic food movement is nowadays still relevant to the consumer, becoming apparent in corresponding taste preferences, or whether the conventionalisation and mainstreaming of the organic food market (Berlin et al., 2009; Eden et al., 2008; Pugliese et al., 2013) has led to "mainstream-preferences", i.e., preferences for taste attributes that are characteristic for conventional food.

Against the background of the ongoing globalisation, which can also be observed in the organic food sector due to these structural market changes (Sawyer et al., 2009), it is important to consider consumers' preferences in a cross-national context. In addition, taste and preferences are influenced by cultural and social environments and therefore differ between cultures and individuals (Bourdieu, 2010; Mela, 2001; Wright et al., 2001). Thus, because the concept of a wholesome nutrition, proposed by Koerber et al. (1987), has its origin in some German speaking countries, it may not be fully applicable in other European cultures. Moreover, countries differ with regard to organic food market structures and organic food consumption habits, which can have an influence on the

availability and the exposure of organic food and consequently on preferences for, and expectancies of its sensory features. Therefore, we also explore whether the COT-concept is applicable to other countries and whether these other countries vary in their preferences for sensory properties of organic food. This is particularly important for organic food practitioners who aim to increase their exports in the European market. Thus, it is essential to decide whether to adopt uniform marketing with a standardised product for all countries or a country-specific approach that takes into account the potential diversity of consumers and adapts to local needs and preferences (Douglas & Craig, 2011).

Against this background, the main scope of this paper is to investigate to what extent the concept of "core organic taste" is relevant across different European countries. Specifically, we address the following research questions: (i) What sensory attributes of organic food do organic consumers currently prefer? (ii) Is there a uniform pattern that can be subsumed under the term "core organic taste"? (iii) Are there any differences in consumer sensory preferences (COT-aspects) across European countries? (iv) Do preferences depend on the frequency with which organic food is consumed?

We approach the research questions in an explorative approach by analysing data that was collected in the framework of an EU-funded research project in Italy, Germany, Switzerland, Poland, the Netherlands and France by means of a standardised quantitative questionnaire.

## 2 Conceptual framework

For the exploration of preferences for sensory attributes of organic consumers, we propose the concept of the so called "core organic taste". The term was coined in the framework of the above mentioned research project, according to the results of preceding focus group discussions (Asioli et al., 2011, 2014; Obermowe et al., 2011; Stolz et al., 2010) and organic expertise discussions. It is based on the presumption that organic consumers strive for a natural nutrition. This assumption can be derived from the idea that organic farming promotes a form of agriculture that respects the nature and harmonise with it instead of exploiting it. Thereby, organic farming favours the preservation of the environment, animal welfare and an unadulterated nutrition (Verhoog et al., 2007). Recommending explicitly the consumption of ecologically produced food, Koerber et al. (1987) set up principles for a wholesome nutrition that merge with the organic production philosophy. They conclude that a whole, unprocessed and fresh food item is most likely able to contain all essential nutritional components. Moreover, they claim that the human metabolism and digestion have developed on a basis of a natural nutrition, i.e., a nutrition that was provided by nature (ibid.). Therefore, they propose the following set of general elements that a wholesome nutrition should contain:

- Possibly organically produced food that guarantees a low use of chemicals
- Food with a possibly low degree of processing
- Avoidance of refined products, such as sugar and superfine flour, and luxury foods
- Consumption of whole foods
- Predominantly ovo-lacto-vegetarian food

Bearing in mind these principles and the objectives of organic farming, we infer that consumer who buy organic food value its naturalness and consequently have a preference for product attributes that derive from there. In the same line of argumentation, Pelletier et al. (2013) reveal that young adults who place higher importance on alternative foods, such as organic, local and sustainable products, consume more dietary fibre, fewer added sugars and less fat. Although they establish a link between the preference for alternative foods and dietary quality, they do not deal with preferences for sensory attributes that are specific for organic food products. Even more generally, Wilkins and Hillers (1994) determine a significant positive relationship between the preference for organic food and a wholesome food pattern, though not specifying the elements of the latter. Apart from these studies, quantitative research on this subject is scarce. Moreover, to the knowledge of the authors, there is no study that considers sensory attributes of organic food embedded in a dietary framework. Supported by empirical evidence from qualitative studies with regard to the preferences for sensory attributes or organic food products (Asioli et al., 2011, 2014; Obermowe et al., 2011; Stolz et al., 2010), we therefore elaborated on the following set of characteristics that suggest a certain sensory quality. We call this the "core organic taste", although we do not limit the concept on taste, but we enhance it to organoleptic qualities in general, i.e., visual appearance (e.g., size, colour and form) and sensory attributes (e.g., taste, smell, mouth feel), that we understand as physical outcomes of an organic production process. In the following, we briefly describe the attributes that we incorporate into the concept of COT, which we do not claim to be complete.

**Preference for whole grain:** Cereal grains historically belong to the basic components of human diets for many cultures (Smith et al., 2003) and are nowadays widely consumed in the form of, e.g., bakery products, pasta and breakfast cereal. Besides being a source of carbohydrates and proteins, whole grains also contain many vitamins and minerals that are essentials of human nutrition (Lang & Jebb, 2003; Smith et al., 2003). For refined cereal products, flour is produced by cutting the perishable and indigestible parts of the grain, i.e., particularly the germ. This way, fibres, proteins, vitamins and minerals go missing, reducing the nutritional value (Slavin et al., 2001; Smith et al., 2003). Despite this, refined-grain products account for the majority of grains consumed in Westernised countries (Lang & Jebb, 2003; Richardson, 2003). Moreover, by only using specific parts of the grain, the grain receives a treatment that renders it less natural. In conclusion, being an important nutritional component and also beneficial to health, as many studies show (Lang & Jebb, 2003; Smith et al., 2003), whole grain is suggested to be part of a wholesome and natural nutrition (Koerber et al. 1987). At least in German speaking countries, whole grain products used to be among the

main items in specialised organic food stores, indicating that retailers considered refined grain as not suitable for organic consumers. In recent years, this has changed to some extent. However, the share of whole grain products in organic quality is quite high compared to whole grain food in conventional assortments.

**Preference for a natural fat content:** Another element of wholesome nutrient that Koerber et al. (1987) propose is the inclusion of products with a natural fat content. This refers to, among other things, the natural fat content of milk and dairy products. Providing about 3.2% of protein, cow milk has nutritional value for human beings (Koerber et al., 1987). Raw milk is the purest and most untreated form of milk with the highest nutritional value, containing 3.5% fat or more. However, the consumption of raw milk bears the risk of diseases due to insufficient hygiene and has also become rare due to its low shelf life (Oliver et al., 2009; West, 2008). The customary whole milk has a fat content of 3.5%, sometimes 3.8% in Germany, and therefore hardly differs in its fat-soluble substances compared to raw milk. However, relative to reduced fat milk, whole milk contains about twice as much fat-soluble substances and is therefore preferred over milk with a reduced fat content (Koerber et al. 1987).

**Preference for a natural flavour:** The presumed preference for a natural flavour that is not modified by flavour enhancers and artificial aromas is not directly postulated by the principles of a wholesome nutrition, but can be deduced from the general preference for naturalness. Therefore, the EU regulation (EC) No 834/2007 for organic food bans the usage of artificial aromas and flavour enhancers and thereby supports the retention of an unadulterated flavour. François and Sylvander (2006) found that organic consumers relate artificial flavouring with a bad taste with regard to yoghurt. Moreover, treatments and methods of processing, such as the reduction of milk's fat content or the refining of flour, change the food's nature considerably and may also alter the taste (Bakke et al., 2007; François & Sylvander, 2006; Hamilton et al., 2000; Kähkönen & Tuorila, 1999).

**Preference for less sweetness:** The preference for less sweetness is also directly derived from the principles of a wholesome nutrition. It suggests reducing the consumption of isolated sugar, since the process of isolation from the natural product leads to a loss of almost all beneficial substances (Koerber et al., 1987). It is claimed that isolated sugar only serves the supply of energy, which can easily be sourced from other carbohydrate-rich foods that are less disadvantageous for the human health (Koerber et al., 1987). However, consumers should not substitute isolated sugar with artificial sweeteners. Instead, Koerber et al. (1987) recommend to rather get used to the taste of less sweetness and to satisfy the desire for it by using low amounts of diluted honey, fresh fruits or dry fruits. Pelletier et al. (2013) affirms a preference for less sweetness among US consumers who value organic, local and sustainable food products.

**Preference for freshness:** The freshness of food is another quality criterion that is part of the wholesome nutrition. Koerber et al. (1987) assert that food in its fresh and non-stored condition provides the highest contents of essential substances. For example, apart from lactic-acid fermentation, all methods of conservation of fruit and vegetables entail a reduction in essential substances,

such as vitamins and proteins, and also a reduction in aroma (ibid.). Several studies confirm that freshness is an important purchase criterion for organic consumers (Berlin et al., 2009; Aguirre Gonzalez, 2009; Midmore et al, 2005; Piyasiri & Ariyawardana, 2002).

**Preference for traditional processing methods:** The Food Standards Agency (2008) recommends using the term "traditional" for "a product or method of preparation when newer alternatives are available on the market". Traditional processing methods are thus associated with the usage of ingredients and processes that have existed for a significant period, most likely implying the renouncement of artificial additives and of methods that are typical for the production of industrially manufactured food (Cayot, 2007; Food Standards Agency, 2008), e.g., preservation and standardisation. In line with this, the preference for traditional processing methods is claimed to be motivated by the opposition to industrialised agriculture paired with the desire for additional "non-physical" food values and maintaining local customs, traditions and identity (Inwood et al., 2009; Vizcarra Bordi, 2006). Autio et al. (2013) and Murdoch and Miele (1999) assert that standardised food is equated with unnatural food and, additionally that the craftsmanship of small producers stands for clean and pure food, an idea that is also promoted by the so called Slow Food Movement (Jones et al., 2003). Midmore et al. (2005) argue that tradition is a value related to certain product characteristics, such as freshness and naturalness. Since research on the motives for organic food purchases reveals that organic consumers seek clean, safe, natural and fresh food (Piyasiri & Ariyawardana, 2002; Sirieix et al., 2011; Yiridoe et al., 2005), we conclude that organic consumers have a preference for traditional processing methods that incorporate these attributes and that claim to provide unique organoleptic characteristics (Bower & Baxter, 2000; Kupiec & Revell, 1998; Vizcarra Bordi, 2006).

**Preference for intensive aroma:** The preference for intensive aromas can be deduced from the aforementioned principle of traditional food processing and slow food, since intensive aroma is often a characteristic of traditionally produced food specialties. For example, for the manufacturing of artisanal cheese, raw milk is mainly used, contributing to a unique and more intensive flavour of the final product (Grappin & Beuvier, 1997; Kupiec & Revell, 1998). The former (unsuccessful) proposal by the European Union to ban the usage of raw milk due to high hygienic risks encountered resistance particularly in the traditional and organic food sector (Jordana, 2000; West, 2008).

**Preference for variability (diversity) in production:** The visual appearance of fruits and vegetables is a primary cue used to judge ripeness, freshness and overall quality (Abbott, 1999; Huang, 1996). Commonly, consumers associate blemished and misshaped produce with lower quality, representing less value for money and more preparation time (Duxbury, 2000; Midmore et al., 2005). However, Midmore et al. (2005) and François and Sylvander (2006) reveal that some consumers relate such aesthetic imperfections to the absence of chemicals and pesticides, reinforcing the natural image of organic products and even superior quality. Moreover, Goldman and Clancy (1991) reveal a relationship between the consumers' willingness to accept blemishes and their purchase behaviour towards organic produce. Also, Lin et al. (1986) constitute that the importance of

appearance tends to be lower among consumers with a high preference for organic and pesticide-free products. Thus, from the assumption that organic consumers avoid produce that has been treated with chemicals and pesticides due to its negative features in terms of food safety and environmental quality, we deduce that organic consumers have a preference for produce that shows variety in size, colour and shape.

## 3 Data and methods

### 3.1 Questionnaire design

We developed a standardised quantitative questionnaire that covers (1) organic food consumption frequency, (2) general preferences for sensory properties of organic food and (3) socio-demographic information. Except for the measurement of organic food consumption frequency, we constructed all of the items by ourselves. Organic food consumption frequency is measured by means of an index used in the German National Nutritional Survey II (Max Rubner-Institut, 2008; Padilla Bravo, et al., 2013). It is based on the consumption frequency of organic products from eight different categories (i.e., fruit, vegetables, meat/sausage, eggs, milk/milk products, bread/bakery products, beverages, oil). The frequencies were measured on a scale with the categories “always”=4, “often”=3, “seldom”=2, “never”=1 and “I do not buy this kind of product”=0.

The measurement of stated preferences for sensory properties is based on the concept of the “core organic taste”. Being the first approach of its kind, we attempted to consider as many relevant aspects as possible. However, the pre-test of the questionnaire revealed difficulties in conveying the ideas of some aspects, such as *“home-made flavour”* and *“eating like in former times”*. In addition, *preference for traditional sorts* required a country-specific exemplification, which would have impeded the comparability of sub-samples. Thus, we did not build these dimensions in our questionnaire. The items were either measured on a 7-point Likert scale ranging from -3 (“*I totally disagree”)* to +3 (“*I totally agree”)* or on a 7-point bipolar semantic scale, with item-specific anchors. Table 1 provides information about the used COT-aspects, the ways they are operationalised in the questionnaire and the scale on which these are measured. For most of the COT-aspects we used examples that were intended to facilitate conceptualisation by the respondents. For instance, intensive aroma was exemplified by long matured cheese, natural fat content by dairy products and whole grain by bakery products.

**Table 1: "Core organic taste" aspects**

| Core organic taste aspects | Operationalisation in the questionnaire | Measurement |
|---|---|---|
| Preference for natural flavour (e.g., real vanilla) and less flavour enhancer (e.g., glutamate) | I avoid all types of additional ingredients if possible. | 7-point Likert scale ranging from -3 (I totally disagree) to +3 (I totally agree) |
| Preference for less sweetness | Regarding sweetness, I like it very sweet/not sweet at all. | 7-point bipolar semantic anchor scale ranging from -3 (not sweet at all) to +3 (very sweet) |
| Preference for natural fat content (e.g., whole fat milk) | When eating dairy products, do you generally prefer low fat or full fat products? | 7-point bipolar semantic anchor scale ranging from -3 (I favour low fat products) to +3 (I favour full fat products) |
| Preference for whole grain (e.g., whole grain bakery products) | When eating bakery products, do you generally prefer whole grain or refined products? | 7-point bipolar semantic anchor scale ranging from -3 (I favour refined products) to +3 (I favour whole grain products) |
| Preference for freshness vs. long shelf life (e.g., extended shelf life milk) | (I) It is important to me that the food products I buy are fresh.<br>(II) I prefer fresh products to canned or frozen ones. | 7-point Likert scale ranging from -3 (I totally disagree) to +3 (I totally agree) |
| Preference for intense flavour vs. easy to eat products (e.g., young cheese) | Regarding intensive aroma (e.g., long matured cheese), I like it very intensive/not intensive at all. | 7-point bipolar semantic anchor scale ranging from -3 (not intense at all) to +3 (very intense) |
| Preference for variability (diversity) in production (e.g., fruits and vegetables) | When picking fruits, would you rather prefer products that show variation in size and colour to products that are constantly identical? | 7-point bipolar semantic anchor scale ranging from -3 (I favour identical products) to +3 (I favour variation in products) |
| Preference for traditional processing methods (e.g.,non-homogenised milk) | I prefer food that tastes artisan/hand-crafted (e.g., foods that are produced in a small manufacture.) | 7-point bipolar semantic anchor scale ranging from -3 (I favour industrial production) to +3 (I favour artisan production) |

Finally, the standard socio-demographic aspects, namely age, household situation and education, were included. The questionnaire was translated from English into the different languages of the study countries, and then back-translated into English, ensuring the highest possible standardisation across study countries. After pretesting it among 30 consumers in each country, the questionnaire was edited and revised, taking into account country-specific peculiarities.

### 3.2 Sampling and data collection

We conducted quota sampling for about 300 consumers each in Italy, Germany, Poland, the Netherlands, Switzerland and France. Mainly marketing research agencies using own consumer panels completed the recruitment of survey participants. Data was collected between November 2010 and February 2011. Interviews were conducted using an electronic questionnaire (EyeQuestion) or paper-and-pencil questionnaires, according to consumer preferences. Tests generally lasted between 30 and 45 minutes and participants received a monetary participation reward.

Due to the overall scope of the project, we included only organic consumers in the survey. In particular, we considered consumers who frequently or occasionally consume organic food and who are regularly in charge of doing the grocery shopping in their households. Therefore, we set the following quota restrictions that guaranteed comparable sub-samples: 2/3 of the sample should be females and 1/3 males; 1/2 of the sample should be between 18 and 45 years old and 1/2 between 46 and 75 years old; 2/5 of the sample should be frequent organic food consumers (heavy users) and 3/5 occasional organic food consumers (light users). Light and heavy users were identified through the calculation of the above-mentioned index for the frequency of organic food consumption. Except for some small deviations, quotas were generally achieved in all countries.

### 3.3 Data analysis

We applied descriptive, bivariate and multivariate methods to analyse the data set, using SPSS Statistical Software 21.0.

First, we analysed the total sample and its country-samples in terms of socio-demographic aspects such as gender, age, educational degree and household situation. We then explored the COT-concept. To this end, we performed an explorative factor analysis, computing principal axis factors and rotating them with the Oblimin-rotation. We chose principal axis factors instead of principal components analysis, which is commonly used for data reduction but is unable to reveal latent dimensions that cause the investigated items to covary (Costello & Osborne, 2005). With regard to the rotation method, we preferred Oblimin to Varimax, since we presumed dependencies between the factors that are not reproduced by orthogonal rotation, which therefore perform less accurately (ibid.).

Thereafter, we used correlations between the COT-attributes to reveal if they are related to each other and if they compose one dimension. Subsequently, we explored the nine core organic taste

dimensions by means of an ANOVA in order to test whether sensory preferences vary across countries. A Tukey post-hoc test was used to examine which country-means differ most. The combination of ANOVA and post-hoc tests is frequently used in consumer studies. Finally, we analysed correlations between the core organic taste dimensions and the organic food consumption frequency. We calculated an index of the latter by adding up the frequency-scores for each product category and dividing the obtained sum by the number of product categories that scored greater than zero. A Kolmogorov-Smirnov test did not confirm a normal distribution of either of the two variables. Therefore, we calculated Spearman's correlations.

# 4 Results

## 4.1 Sample characteristics

In total, 1798 consumers were interviewed. With regard to gender and age, the quotas were generally achieved. For the total sample and for most of the sub-samples the share of women was roughly two third. Concerning the age, the quota was generally in compliance. On average, participants were about 45 years old. Considering the degree of education, the majority of the sample declared to have a college or university degree (43.4%), with particularly high shares in the Netherlands (67.5%) and Italy (56.6%). About 28% of the interviewed consumers indicated to possess a school education of 12 or 13 years, with Poland being overrepresented (53.3%) and Italy being underrepresented (12.5%). The majority of German and Swiss consumers stated to possess a secondary school degree, whereas consumers from the other countries are clearly underrepresented in this category, resulting in an average of 18.8% for the total sample. 37% of consumers in the total sample stated to live with a partner. Totally, ca. 27% of the participants revealed to live with a partner and one or more children. In this regard, Dutch consumers clearly indicate a higher proportion (43.6%). 17% of the total sample declared to be single, with a higher share among Germans (23.5%) and a lower share among the Dutch (11.1%). The socio-demographic composition of the sample is shown in Table 2.

**Table 2: Demographics by country**

| | Pooled sample | Italy | Germany | Switzerl. | Poland | Netherl. | France |
|---|---|---|---|---|---|---|---|
| **Sample size** | 1796 | 299 | 294 | 296 | 319 | 290 | 298 |
| **Gender (%)** | | | | | | | |
| Female | 66.8 | 65.4 | 71.1 | 67.2 | 65.5 | 67.5 | 64.1 |
| Male | 33.2 | 34.6 | 28.9 | 32.8 | 34.5 | 32.5 | 35.9 |
| **Age (%)** | | | | | | | |
| 18-45 years | 49.5 | 49.8 | 50.3 | 53.0 | 50.2 | 48.1 | 45.6 |
| >45 years | 50.5 | 50.2 | 49.7 | 47.0 | 49.8 | 51.9 | 54.4 |
| Average | 45.4 | 43.3 | 45.4 | 44.6 | 44.3 | 47.4 | 47.4 |
| **Organic consumption frequency (%)** | | | | | | | |
| Light user | 53.6 | 58.9 | 44.2 | 43.4 | 56.1 | 55.4 | 63.1 |
| Heavy user | 46.4 | 41.4 | 55.8 | 56.6 | 43.9 | 44.6 | 36.9 |
| **Education (%)** | | | | | | | |
| Without formal qualification | 0.4 | 0.3 | 0.0 | 0.3 | 1.3 | 0.0 | 6.7 |
| Secondary education (about 10 years of schooling) | 18.9 | 1.0 | 0.3 | 42.2 | 4.4 | 0.3 | 29.3 |
| Further education (12 or 13 years of schooling) | 27.6 | 12.2 | 20.1 | 22.0 | 53.3 | 20.1 | 25.3 |
| College or university degree (BSc, BA, MSc, MA, PhD) | 43.4 | 56.6 | 67.5 | 29.7 | 40.0 | 67.5 | 33.3 |
| Others | 9.7 | 29.9 | 12.1 | 5.7 | 1.0 | 12.1 | 5.3 |
| **Household situation (%)** | | | | | | | |
| Single | 17.1 | 14.6 | 23.5 | 17.9 | 18.2 | 11.1 | 22.0 |
| With partner | 37.0 | 28.9 | 40.1 | 47.0 | 34.8 | 34.7 | 43.3 |
| Single parent | 3.7 | 1.0 | 3.7 | 3.4 | 6.0 | 4.5 | 6.3 |
| Couple with children | 26.8 | 21.9 | 25.2 | 20.6 | 23.8 | 43.4 | 25.0 |
| Apartment-share | 4.9 | 8.3 | 3.7 | 7.8 | 4.4 | 0.3 | 0.7 |
| Household with people of more than two generations | 5.5 | 15.0 | 2.7 | 1.7 | 7.2 | 0.3 | 1.3 |
| Student accommodation | 2.9 | 8.3 | 0.0 | 0.7 | 2.5 | 2.8 | 0.0 |
| Others | 2.0 | 1.0 | 1.0 | 3.1 | 2.8 | 2.0 | 1.3 |

### 4.2 The concept of Core Organic Taste

The first aim of this study was to explore the nature of the COT-concept. The analysis of correlations between single COT-aspects served to find out whether the concept can be viewed as one-dimensional or if the items represent independent aspects.

The correlation matrix displayed in Table 3 shows mainly low correlations with absolute values below 0.3. Accordingly, the Kaiser-Meyer-Olkin measure of 0.66 indicates a mediocre relationship between the items for the total sample. Finally, an explorative factor analysis confirms that the COT

cannot be considered as one dimension, since three factors (total explained variance=48.04%) emerged, whose reliabilities were unacceptable low. This result is also consistent in all single countries. Hence, the aspects composing the COT cannot be subsumed to one dimension but rather have to be considered one by one. For instance, while the preference for freshness of the total sample is one of the highest (mean=2.40), the preference for a natural fat content in dairy products is negative (-0.65). It cannot be concluded that, in general, organic consumers have a preference for all the proposed food attributes.

Considering that preferences for food are complex and are shaped by many influences (Yiridoe et al., 2005), this finding is not surprising. For instance, with regard to the low preference for a natural fat content in dairy products, we speculate that consumers avoid products with a full fat content due to high fat intake that has been extensively claimed in the public as harmful to personal health (Hamilton et al., 2000). Thus, in this case, there seems to be a conflict of objectives, namely perceived health benefits vs. food ideology, which organic consumers may undergo. However, with respect to less sweetness, both health and ideology appear to be a trade off against taste, since consumers report preferences that are slightly below zero. Hence, a certain degree of sweetness seems to be important, most likely due to sensory quality, although sweet food is commonly associated with unhealthy food. Seemingly, preferences for organic food attributes cannot be explained solely by the fact that consumers are disposed to organic food. Instead, other aspects such as concerns for health and weight control, but also habits, experiences and cultural influences may come into play (Kähkönen & Tuorila, 1999; Yiridoe et al., 2005).

### 4.3 Cross-national comparison of preferences and their relation to organic food consumption

The data enables a cross-national comparison that provides insights into the country-specific relevance of product attributes of organic food (see Table 4). Moreover, it permits the control for the relationship between the stated preferences and the organic consumption frequency (see Table 5). Both will be discussed in the following by making reference to each of the COT-aspects, starting with the product attributes that received the highest scores. With respect to the interpretation of the correlations coefficients, we have to point out in advance that these are rather low with a maximum correlation of r=0.38. Nevertheless, the obtained values indicate interesting tendencies, which need to be validated in future research.

For the comparison of preference patterns in the different study countries, ANOVA and subsequent Tukey post-hoc tests reveal significant differences between countries for almost all sensory characteristics, except for the attribute “less sweetness”. To the contrary, “whole grain” is the sensory product feature that differentiates the most between countries.

Outcomes reveal that particularly freshness and traditional food processing methods are of common importance throughout all investigated countries. Low variances in all sub samples with regard to the absolute freshness (preference for freshness II) of food indicate that European organic consum-

ers widely agree on this aspect. Likewise, the other item measuring preference for freshness, but in relation to canned or frozen food (preference for freshness I), received high scores in all countries, although they remain below the scores of the former. Again, this difference can be interpreted as a trade-off between freshness and convenience. This trade-off particularly becomes evident in Germany and France, which show the largest difference between the scores for both items. Both freshness items show correlations with the organic food consumption frequency (OFCF) index of around r=0.2 for most countries, indicating that freshness tends to be more important to consumers who more often consume organic food. Only in Italy and in the Netherlands are there low correlations leading to the conclusion that in these countries freshness is a product attribute that is generally important.

With regard to the preference for traditional processing methods, high positive values are observed in all countries, even though with substantial distinctions between them. Italy and France report by far the strongest preferences, followed by Poland, whereas the remaining countries show average scores. Parrott et al. (2002) offer an explanation for this result, claiming that two prevalent but not exclusive food cultures exist that divide northern and southern European countries. They suggest that in Northern Europe, great emphasis is placed on functionality-driven commodities and economic efficiency in food production, whereas Southern European countries assign more value to local, traditional and artisanal production (ibid.). Italy and France are known for their culinary culture (Renting et al., 2003) combined with a high share of small-scale family-run food businesses (Hingley & Sodano, 2010). Local food production and traditional artisanry are characteristic of these countries and are part of the culture resulting in stronger preferences for traditionally processed food. This also explains why there is no relation between the preference for artisan-produced food and organic food consumption in Italy, suggesting that this product attribute is of general importance. The high preference of Polish consumers may be caused by the fact that in Poland, industrial agriculture is comparatively underdeveloped and food production is still strongly oriented towards traditional and old-fashioned methods with a low use of fertiliser and other chemicals (Bär 2007; Kociszewska & Nowak, 2003; Nesterov, 2003; Platje, 2004). Again, this may also be the reason why in Poland the preference for this attribute does not seem to depend strongly on organic food consumption. However, for the remaining countries, we observe a linkage between both aspects, particularly in Switzerland.

**Table 3: Correlations between COT-aspects[1] (N=1798)**

| | Whole grain | Variability/ diversity in production | Natural flavour | Less sweetness | Freshness (I) | Freshness (II) | Intense flavour | Natural fat content | Traditional processing methods |
|---|---|---|---|---|---|---|---|---|---|
| **Whole grain** | 1.000 | | | | | | | | |
| **Variability/diversity in production** | 0.105*** | 1.000 | | | | | | | |
| **Natural flavour** | 0.064*** | 0.164*** | 1.000 | | | | | | |
| **Less sweetness** | 0.188*** | 0.082*** | 0.155*** | 1.000 | | | | | |
| **Freshness (I)** | 0.087*** | 0.126*** | 0.232*** | 0.056** | 1.000 | | | | |
| **Freshness (II)** | 0.080*** | 0.071*** | 0.285*** | 0.073*** | 0.362*** | 1.000 | | | |
| **Intense flavour** | -0.002 | 0.043* | 0.027 | -0.009 | 0.009 | 0.024 | 1.000 | | |
| **Natural fat content** | -0.194*** | -0.002 | 0.016 | -0.047** | 0.021 | -0.033 | 0.117*** | 1.000 | |
| **Traditional processing methods** | 0.004 | 0.209*** | 0.276*** | 0.074*** | 0.235*** | 0.199*** | 0.069*** | 0.054** | 1.000 |

Notes: 1: for the measurement scales see Table 1; *: Spearman's correlation is significant on a level of 0.1 (two-sided); **: Spearman's correlation is significant on a level of 0.05 (two-sided); ***: Spearman's correlation is significant on a level of 0.01 (two-sided).

**Table 4: Comparisons of means of COT-aspects between countries**

| Core organic taste aspects[1] | F-values | Italy | Germany | Switzerl. | Poland | Netherl. | France | Pooled sample |
|---|---|---|---|---|---|---|---|---|
| Preference for whole grain: *When eating bakery products, do you generally prefer whole grain or refined products?* | 25.01*** | 0.37 b d e (2.00) | 1.11 a c d e f (1.85) | 0.68 b d e (1.76) | 1.93 a b c f (1.54) | 2.24 a b c f (1.35) | 0.55 b d e (2.04) | 1.15 (1.91) |
| Preference variability/ diversity in production: *When picking fruits, would you rather prefer products that show variation in size and color to products that are constantly identical?* | 6.10*** | 1.74 b c e f (1.51) | 0.83 a d (1.78) | 0.79 a d (1.58) | 1.39 b c e (1.83) | 0.47 a d f (1.75) | 1.04 a e (1.62) | 1.05 (1.73) |
| Preference for natural flavour and less flavour enhancers: *I avoid all types of additional ingredients if possible.* | 5.41*** | 1.60 b c,d e (1.57) | 0.57 a d e f (1.87) | 0.54 a d e f (1.74) | 1.14 a b c e (1.82) | 0.12 a b c d f (1.61) | 1.41 b c e (1.66) | 0.90 (1.79) |
| Preference for less sweetness: *Regarding Sweetness, I like it…* | 1.06 | -0.32 (1.45) | -0.26 (1.45) | -0.49 d (1.29) | -0.16 c (1.47) | -0.16 (1.40) | -0.42 (1.49) | -0.30 (1.43) |
| Preference for freshness (I): *I prefer fresh products to canned or frozen ones.* | 20.48*** | 2.07 b e f (1.18) | 1.41 a c d (1.51) | 1.96 b d f (1.37) | 2.38 b c e f (1.21) | 1.69 a d (1.36) | 1.50 a c d (1.69) | 1.84 (1.43) |
| Preference for freshness (II): *It is important to me that the food products I buy are fresh.* | 7.70*** | 2.46 e (0.86) | 2.27 d (1.08) | 2.41 d (0.96) | 2.67 b c e f (0.97) | 2.18 a d (1.07) | 2.36 d (1.07) | 2.40 (1.01) |
| Preference for intense flavour: *Regarding intensive aroma (e.g., long matured cheese), I like it…* | 2.16* | 0.60 d (1.74) | 0.21 c (1.74) | 0.85 b d (1.60) | 0.12 a c e (1.82) | 0.54 d (1.70) | 0.51 (1.83) | 0.47 (1.76) |
| Preference for natural fat content: *When eating dairy products, do you generally prefer low fat or full fat products?* | 14.85*** | -1.21 b c d f (1.63) | -0.51 a c e (2.25) | -0.02 a b d e (2.12) | -0.61 a c (2.13) | -1.07 b c f (1.80) | -0.48 a e (2.11) | -0.65 (2.05) |
| Preference for traditional processing methods: *I prefer food that tastes artisan/hand-crafted (e.g., food that is produced in small manufactures).* | 18.21*** | 2.44 b c d e (1.18) | 1.39 a d f (1.35) | 1.43 a d f (1.34) | 1.94 a b c e f (1.50) | 1.21 a d f (1.22) | 2.34 b c d e (0.93) | 1.80 (1.35) |

Notes: 1: for measurement scales see Table 1; *: ANOVA, p<0.1; ***: ANOVA, p<0.01; a: indicates statistically significant difference from cluster 1 (p<0.05), according to Tukey post-hoc test; b: indicates statistically significant difference from cluster 2 (p<0.05), according to Tukey post-hoc test; c: indicates statistically significant difference from cluster 3 (p<0.05), according to Tukey post-hoc test; d: indicates statistically significant difference from cluster 4 (p<0.05), according to Tukey post-hoc test; e: indicates statistically significant difference from cluster 5 (p<0.05), according to Tukey post-hoc test; f: indicates statistically significant difference from cluster 6 (p<0.05), according to Tukey post-hoc test.

**Table 5: Correlations between organic food consumption frequency and COT-aspects by country**

| Core organic taste aspects | Italy | Germany | Switzerl. | Poland | Netherl. | France | Pooled sample |
|---|---|---|---|---|---|---|---|
| Preference for whole grain: *When eating bakery products, do you generally prefer whole grain or refined products?* | 0.21*** | 0.28*** | 0.13** | 0.17*** | 0.10 | 0.24*** | 0.16*** |
| Preference variability/ diversity in production: *When picking fruits, would you rather prefer products that show variation in size and color to products that are constantly identical?* | 0.12** | 0.33*** | 0.22*** | 0.06 | 0.09 | 0.12** | 0.13*** |
| Preference for natural flavour and less flavour enhancers: *I avoid all types of additional ingredients if possible.* | 0.07 | 0.38*** | 0.35*** | 0.09 | 0.31*** | 0.20*** | 0.19*** |
| Preference for less sweetness: *Regarding Sweetness, I like it…* | 0.08 | 0.13** | 0.08 | 0.02 | 0.08 | 0.09 | 0.07*** |
| Preference for freshness (I): *I prefer fresh products to canned or frozen ones.* | 0.11* | 0.20*** | 0.20*** | 0.17*** | 0.09 | 0.19*** | 0.14*** |
| Preference for freshness (II): *It is important to me that the food products I buy are fresh.* | 0.10 | 0.23*** | 0.21*** | 0.18*** | 0.08 | 0.25*** | 0.16*** |
| Preference for intense flavour: *Regarding intensive aroma (e.g., long matured cheese), I like it…* | -0.02 | 0.16*** | 0.08 | -0.04 | 0.16*** | 0.06 | 0.06*** |
| Preference for natural fat content: *When eating dairy products, do you generally prefer low fat or full fat products?* | -0.02 | 0.01 | 0.23*** | -0.03 | 0.07 | 0.02 | 0.05** |
| Preference for traditional processing methods: *I prefer food that tastes artisan/hand-crafted (e.g., food that is produced in small manufactures).* | 0.08 | 0.26*** | 0.35*** | 0.13* | 0.26*** | 0.23*** | 0.15*** |

Notes: *: Spearman's correlation is significant on a level of 0.1 (two-sided); **: Spearman's correlation is significant on a level of 0.05 (two-sided); ***: Spearman's correlation is significant on a level of 0.01 (two-sided).

Whole grain is the product attribute with the largest differences across countries in terms of mean preferences. Again, France and Italy reveal similar preferences, which are close to zero. Despite this, correlations of $r > 0.2$ reveal that frequent organic consumers in Italy and France tend to have a preference for whole grain. The strongest dependency between both aspects exists in Germany. To the contrary, in the Netherlands, the country with the strongest preference for whole grain bakery products, no such correlation exists, suggesting that consumers independently of their OFCF prefer whole grain products to those made out of refined flour. These results are partly in agreement with the findings of François and Sylvander (2006) who reveal that organic consumers from Switzerland, Germany and France, value whole meal bread, while Italian consumers value white bread. However, they also find that Italians associate whole meal bread with organic bread. Also, Arvola et al. (2007) show that Italian consumers perceive fewer differences in benefits between whole grain and refined food, suggesting that Italians expect whole grain products to have an inferior taste.

With regard to the preference for variations in appearance of fruit and vegetables, results are mixed. In the Netherlands, the natural appearance of produce does not appear to be important, either to frequent or occasional consumers. To the contrary, Polish consumers prefer natural looking produce independently of their OFCF. The same can be concluded for Italy and France. They show relatively strong mean preferences and low correlations. In Germany and Switzerland, the preference for variation in appearance is especially shared among frequent organic consumers.

The preference for natural flavour related to the absence of additives, is on average low, especially in Germany, Switzerland and the Netherlands. However, these three countries show the highest relations to OFCF, revealing that an increased preference for natural flavour comes along with a more frequent OFCF. To the contrary, in Italy and Poland a preference for the absence of additives is not characteristic for frequent organic consumers but rather an attribute that is generally valued.

The average preference for intense flavours, exemplified by long matured cheese, is positive but rather low in all countries, especially in Poland and Germany. Germany and the Netherlands are the only countries that show significant but weak correlations with OFCF. However, the relatively low values question the belonging of the preference for intense flavour to the general COT. Despite this, high standard deviations indicate that some segments prefer this taste.

As stated above, less sweetness and a natural fat content in dairy products are not part of the preferred product attributes. The former obtains similar negative values close to zero in all countries. Only for Germany, there is a slight tendency that frequent organic consumers increasingly prefer less sweetness. Also with regard to the preference for a natural fat content in dairy products, we conclude that this attribute should not be considered as an element of the COT. The only exception is Switzerland, which reports increased preferences among frequent organic consumers. This is in accordance with the findings of François and Sylvander (2006) who reveal that Swiss organic consumers refuse low-fat yoghurt because of its inferior taste.

Considering the correlations between the stated preferences for organic product attributes and the OFCF per country provides evidence for the rudimental existence of the COT. This is true for Germany, with relatively high correlations for almost all product attributes, followed by Switzerland. Thus, in these two countries there is a general tendency of higher stated preferences for organic food attributes, which relates to increased organic food consumption. This may be due to the fact that the concept of a wholesome nutrition, which builds the basis for the COT, has its origin in Germany and in Switzerland (Leitzmann, 2005). To the contrary, Italy, Poland and the Netherlands show only a few relatively high correlations, suggesting that in these countries the preferences for the investigated product attributes, in general, do not depend on organic food consumption but are presumably shaped by other factors.

## 5 Conclusions and implications

The contribution of this research is twofold. On a marketing's perspective, food marketers benefit by improving the understanding of organic consumers in the European market. It sheds light on the expectations and preferences of both organic consumers in general and committed organic consumers that more frequently purchase food in organic quality. The results indicate that the COT is not applicable in general and that only single elements appear to be of relevance for most countries. Nevertheless, for Germany and Switzerland the COT has proven its potential value.

With regard to some product attributes, the latter seem to have preferences that diverge from those of the general organic buyership. This issue deserves more attention in the future in order to develop products and communication strategies that meet the differing expectations of both consumer groups. Moreover, the cross-national comparison reveals differences in consumers' preferences, which need to be analysed in more detail. Although one can speculate that some of these discrepancies are due to cultural diversity, this assumption, and also other possible underlying reasons, such as attitudes, habits and experiences, cannot be analysed in this study. This leaves room for more comprehensive research in the focal area.

Nevertheless, the obtained findings provide trend information on whether internationalisation seems to be a promising strategy for organic food suppliers and if so, which countries should be targeted with what approach. This is important, since, due to conventionalisation and mainstreaming, globalisation has also found its way into the organic food sector and thus represents a challenge, but also a chance for organic agri-businesses (Sawyer et al., 2009). With regard to this, we found that the relevance of single product attributes varies across countries. For instance, bakery products made from whole grain are of general importance in the Netherlands but seem to be valued predominantly by committed organic consumers in other countries, such as Germany, France and Italy. Likewise, a natural fat content of dairy products appears to be increasingly accepted by frequent organic consumers only in Switzerland, whereas in all other countries frequent and occasional consumers show a slight, in the case of Italy even a relatively strong, aversion towards it. Thus, against the notion

that food consumption around the globe is converging (Conner, 1994; Craig & Douglas, 2006; Mak et al., 2012), consistent expectations towards specific organic food product attributes do not exist per se in Europe. Similar preference patterns can be observed only for singular countries, although this contains some exceptions. France and Italy, for example, on average, show similar preferences for most of the product attributes. However, in France, a natural flavour, freshness and traditional processing become especially important with an increasing OFCF, whereas in Italy these seem to be of general relevance. Also, Germany and Switzerland show similar average preference patterns that, in the case of a natural fat content of dairy products, tend to diverge with an increasing commitment to organic food. Hence, for these country pairs, a standardisation of certain products may be an opportune strategy. Nevertheless, in most cases, differentiation of products is necessary in order to comply with specific consumer needs and expectations.

From an academic perspective, this paper provides first insights into the relevance of consumer preferences and expectations with regard to organic taste attributes. Literature on the relevance of single product attributes, especially with regard to sensory properties, in a cross-national context is scarce. Therefore, this exploratory approach can be seen as an encouragement to further explore consumers' preferences and to gain a deeper understanding of these and how they influence organic food choices and consumption behaviour. As the COT summarises multiple sensory preferences, it can be understood as a "taste style". Such "taste styles" deserve further exploration, justifying the opening of a new research field, since they may also be reasonable for other segments outside the organic food sector, e.g., for health oriented taste.

## 6 Limitations

Conclusions from this study can only be made with caution due to several constraints that come along with this exploratory approach. First of all, we want to point out that the data used for the presented analysis was collected for another purpose and was therefore not aligned to our research concern, which may affect the explanatory power of the obtained results. Second, we applied convenience sampling in all countries resulting in non-representative sub-samples, which may bias the results of the cross-national comparison.

Although there is evidence that the usage of stated preferences better predicts consumer behaviour (Tuorila, 1987), others obtain contrary result (Tuorila-Ollikainen et al., 1986; Shepherd et al., 1991/2). Thus, it should be considered that the used stated preferences do not necessarily translate into market behaviour. With regard to this, a common difficulty is a possible bias due to the phenomena of social desirability (Fisher, 1993). Some consumers may answer in a certain way that they believe to be desirable, instead of stating their true preferences.

Another limitation is caused by the conceptualisation of the used items. Some of them, e.g., the preference for intense flavour, are rather abstract and may not have been easy to understand. Moreover, we assumed that respondents from all countries conceptualised these variables in the same way. In

future research, items should be validated before usage. Besides, product-specific examples were provided for generic COT-aspects in order to facilitate their conceptualisation by respondents. For the preference for intensive aromas, we used the example of long matured cheese. However, respondents may like long matured cheese, but dislike other products that have intense aromas, such as sheep meat. Thus, more research is necessary in order to comprehensively account for the various facets of a sensory product attribute.

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# Appendix

## Results of factor analysis

| Factor | | Items | Loadings | Cronbach's Alpha | Explained variance |
|---|---|---|---|---|---|
| 1 | Passion and curiosity for cooking | I am an excellent cook. | 0.78 | 0.85 | 18.29% |
| | | I like cooking as professional cooks would do. | 0.70 | | |
| | | I am always looking for new taste experiences. | 0.58 | | |
| | | I love cooking or baking. | 0.58 | | |
| | | I know exactly which ingredients I need to prepare a high-quality meal. | 0.55 | | |
| | | I like to try out new recipes. | 0.44 | | |
| 2 | Exclusive consumption | For well-known branded food products I definitely pay something more. | 0.53 | 0.68 | 7.80% |
| | | I like to buy food products that are enriched with additional healthy ingredients. | 0.53 | | |
| | | Food branded products support my buying-decisions. | 0.48 | | |
| | | When I buy expensive and exclusive food products, I feel good about it. | 0.41 | | |
| | | I like buying food products in speciality food stores where I can get expert advice. | 0.34 | | |
| 3 | Authenticity[1] | For me it is important to buy traditional products from my region. | 0.49 | 0.51 | 5.98% |
| | | It is important to me that the food products I buy are fresh. | 0.44 | | |
| | | I prefer fresh products to canned or frozen ones. | 0.32 | | |
| 4 | Willingness to pay for quality | I don't mind paying a higher price for very tasty products. | 0.84 | 0.76 | 4.40% |
| | | I don't mind paying a higher price for high-quality food products. | 0.77 | | |
| 5 | Convenience | For me eating should be quick. | 0.57 | 0.62 | 4.27% |
| | | Cooking is a task that is best over and done with. | 0.57 | | |
| | | For me shopping should be quick. | 0.49 | | |
| | | When preparing meals I prefer to use ready-to-eat products. | 0.40 | | |
| 6 | Health/Body weight-consciousness[1] | When eating I am very health-conscious. | 0.58 | 0.56 | 3.70% |
| | | At eating, I aim a healthy diet. | 0.48 | | |
| | | I prefer products that are low in calories. | 0.46 | | |
| | | I don't watch my weight when I eat or drink. | -0.37 | | |
| 7 | Sensory information | Sensory perception should be a matter of experience; a label is not useful at all. | -0.63 | 0.51 | 3.47% |
| | | Labels referring to the sensory properties of food could help me to find the kind of taste I am looking for. | 0.55 | | |

| | | | | | |
|---|---|---|---|---|---|
| 8 | Usage of product information[1] | I read very carefully what is written on the packaging of food products. | 0.62 | 0.67 | 3.23% |
| | | I would like to get more information about sensory properties of food products. | 0.57 | | |
| | | I avoid all types of additional ingredients if possible. | 0.43 | | |
| | | I know very well how to recognize high-quality food products. | 0.31 | | |
| 9 | Importance of sensory features | For me eating is always a matter of taste enjoyment. | 0.55 | 0.60 | 3.20% |
| | | To me flavour of food is the most important aspect. | 0.49 | | |
| | | At eating, I am a real gourmet. | 0.46 | | |
| 10 | Labels as quality signals | Labels are useful to evaluate the quality of food products. | 0.76 | 0.59 | 2.84% |
| | | I am searching for labels in order to buy high quality products. | 0.51 | | |
| 11 | Planning | I always plan what we are going to eat a couple of days in advance. | 0.47 | 0.46 | 2.74% |
| | | I write a shopping list to guide my food purchases. | 0.45 | | |

Notes: KMO=0.86; explained variance=59.9%; scale from -3 (I totally disagree) to +3 (I totally agree); 1: Factor loadings were multiplied by -1 in order to facilitate interpretation.

## II.3 Organic food labels as a signal of sensory quality –insightsfrom a cross-cultural consumer survey

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## Abstract

Abstract Organic food labels are promising tools to transmit the positive image of organic products to consumers. Besides health-related aspects and environmental concerns, declaration of organic quality may have a positive impact on consumers' taste perception. Many studies have proven the positive image of organic products, but very few have considered the link between labeling a product as organic and the consumer's evaluation of sensory quality. This paper therefore investigates how organic consumers from six European countries (Germany, France, Italy, Poland, Switzerland, and the Netherlands) are influenced by the information that strawberry yogurt is produced organically or conventionally. Within the framework of a European Union-funded research project, a crosscultural survey with a total of N=1,797 respondents was conducted between October 2010 and February 2011. Standardized computer-assisted interview techniques were combined with sensory tests. Results show that the presence of an organic label may lead to an enhancement of taste perception.With the exception of Italy, consumers evaluated the same product sample slightly better when an organic label was shown. For the evaluation of conventional products, the opposite effect was found for three out of six countries. These findings reveal that the positive sensory image of the organic food branch transfers to single organic products, resulting in a better taste evaluation. However, the relatively weak label effect observed in all study countries suggests that an improvement of the sensory image of organic products is advisable. This can be addressed by enhancing the sensory performance of food products as well as by implementing extensive sensory marketing activities.

**Keywords:** Organic food, Organic labels, Taste evaluation, Consumer study, Cross-cultural survey, Sensory image

## 1 Introduction

In an otherwise stagnating and saturated food market, the consumption of organic products has grown considerably in many European countries in recent years. Particularly in countries where consumers are increasingly concerned about issues such as poor food hygiene and related health threats, organic products have gained a considerable market share (Stenzel 2008; Canavari and Olson 2007). A major factor for this successful development of the organic food industry is the positive image that many consumers attribute to organic products. This includes benefits for health as well as for the environment, but also sensory characteristics such as smell, taste, or appearance (Defrancesco and Rossetto 2007; Idda et al. 2008; Hamm and Gronefeld 2004).

In order to recognize organic products and distinguish them from conventional ones, appropriate labeling is essential. Product labels are useful instruments to establish consumer trust and to reduce search costs. At the same time, labels can help to avoid confusion and increase the profile of organ-

ic food, so that the abovementioned organic image positively influences consumers' choice of product (Padel and Midmore 2005). However, the actual influence of the labeling of organic food and the related taste image remains unstudied for many product categories.
Therefore, the aim of this study is to describe and to compare the effect of organic labeling on consumers' taste evaluation of strawberry yogurt in six European countries (Germany, France, Italy, Poland, Switzerland, and the Netherlands). It is based on a quantitative consumer survey with a total of 1,797 participants, carried out within the framework of the European Union (EU)-funded research project ECROPOLIS between October 2010 and February 2011.

## 2 Organic food labeling

According to Council Regulation No 1169/2011 of the European Union (2011), labels are "any tag, brand, mark, pictorial or other descriptive matter, written, printed, stenciled, marked, embossed or impressed on, or attached to the packaging or container of food". The labeling of food products as organic has been legally regulated within the EU since 1991 (European Union 1991) and is subject to the requirements of the European Union (2007), which provides for the use of an institutional EU organic label in all member states. The first EU Community logo was used on a voluntary basis, but in practice failed to meet the expectations of consumers and actors in the organic food sector (European Union 2010). Thus, inMarch 2010, a compulsory EU label for prepackaged organic food was introduced (ibid.). In addition, there is a wide range of country-specific organic labels in the form of labels or brands on the national level (Dimitri and Oberholtzer 2005; Janssen and Hamm 2011).
The purpose of labels is to transmit information about a product that otherwise would not be recognizable or testable by the consumer (Villiger 2000; Ward and Jauregui 2006). By doing so, labels decrease information asymmetry and reduce search costs. This supports consumers inmaking informed and more confident food choices, which allows them to select products that are in line with their preferences (Teisl and Roe 1998). This benefit is especially relevant for products with experience attributes, and even more for those with credence attributes (ibid.) such as organic products. From the producers' and retailers' point of view, labels can also render product packaging visually recognizable, in order to differentiate from other competing products (Block and Perrachio 2006).
Concerning the effect of labels in the food sector, the literature suggests that a generally positive consumer attitude towards such product labels can be assumed (Block and Perrachio 2006;Wills et al. 2009). Consumers usually want condensed information about the food products, as this can increase transparency for their evaluation of the products (Baltas 2001; Wills et al. 2009; McEachern and Warnaby 2008). Nevertheless, it should be noted that despite considerable interest from consumers, they are often not able to interpret the information that should be communicated by a label. In addition, they generally spend little time considering and processing the product information communicated by a label (Block and Perrachio 2006). Against this background, it is important that food labels are easily understandable for consumers, i.e., that they are comprehensible and self-explanatory (Carpenter and Larceneux 2008).

Regarding the consumption of organic products, there are a number of studies that deal with factors influencing (nonsensory) perceived product quality (Stolz et al. 2009; Grebitus et al. 2007; Chinnici et al. 2002; Schifferstein and Oude Ophuis 1998; Hughner et al. 2007; Zanoli and Naspetti 2002). However, the majority of the studies provide conclusions about the consumers' stated or expected quality perception. So far, there are relatively few studies that discuss the influence of organic labeling on real experienced quality perception, e.g., in the form of sensory evaluation. Scholderer et al. (2004) provide one approach, in which consumer expectations concerning pork from free range systems are analyzed. Using a taste test with regular pork consumers in Denmark, besides the general meat production type (organic/conventional) also information on the label (organic product, free range, conventional production, or no information) was varied in order to test which of these variables influences the perception and evaluation of quality. The results of the Danish study show that information from the organic label has a highly significant influence both on expected and on experienced quality evaluation for organic meat, while no relationship was found between the actual meat type (organic/conventional) and the evaluation of the samples (ibid.).

A similar approach was followed by Napolitano et al. (2010). They investigated the effect of information about organic production on the liking of Pecorino cheese by differentiating between perceived (sensory test without any information), expected (produced by information regarding the production methods, i.e., conventional or organic), and actual liking (sensory evaluation of only the organic cheese combined with information either regarding animal welfare, environmental pollution or food safety, or all of them combined) (ibid.). They revealed that information about organic production methods can have a positive effect on Italian consumer expectations, which suggests that consumers link organic standards to high expected sensory quality. The opposite effect was observed for the conventional cheese, which received higher scores for the perceived than for the expected liking (ibid.). They also found that the information given about organic farming affected the actual liking of cheese. The selected consumer panel included subjects that reported consuming organic products at least occasionally (ibid.).

Annett et al. (2008) also addressed this issue, examining the impact of health and environmental information pertaining to organic production methods on sensory consumer acceptance of organic and conventional 60% whole wheat bread in Canada. Measuring the hedonic liking of both bread samples under blind and labeled conditions, they found that the survey participants were affected by the label and both health and environment related information (ibid.). While the organic bread was liked better after presenting information concerning the production methods, the liking of the conventional sample did not change between the blind and labeled condition (ibid.). The mean liking scores of the organic bread sample was higher than the mean scores of the conventional in both the blind and the labeled sensory test (ibid.).

There is, however, also empirical evidence that organic labeling does not necessarily improve the perceived quality of a product. Fillion and Arazi (2002) tested 14 different orange juices of both organic and conventional quality on 301 English consumers. About 150 participants performed the sensory testing blind, whereas the other half evaluated the products with organic juices identified by

a label stating "organic". They found no significant difference between the evaluation scores of the blind-tasting group and the informed group.

The above presented results lead to the assumption that the impact of an organic label on perceived taste may vary between different product categories and different countries. Thus, it is worth examining if there is a benefit from organic labeling for the product category yogurt, and how this may vary between different regions of Europe. Likewise, it is of interest if information about conventional quality changes the consumer's taste perception of strawberry yogurt, especially since only organic consumers were interviewed in the present study, for whom the phenomenon of social desirability[1] may apply. So far, of the above presented studies (Napolitano et al. 2010; Annett et al. 2008; Scholderer et al. 2004), only Annett et al. (2008) analyzed the latter aspect, although not focusing on organic consumers. Therefore, this paper analyzes the question, to what extent information about a product being organic or conventional influences the taste perception of strawberry yogurt. In focus group interviews performed by Stolz et al. (2010), it was found that organic consumers have a preference for the naturalness of food. Therefore it is also of interest, whether organic consumers prefer the organic strawberry yogurt over a conventional one with fruit aroma added. Finally, we analyze whether the results depend on the organic consumption frequency and vary between countries.

In order to answer these questions, taste preferences for strawberry yogurt were measured in a standardized way, both blindly and as a function of organic labeling. Due to the international nature of the study, country-specific variability in organic food labels could not be avoided. The individual situation in which an organic label is used should be considered in the analysis and the interpretation of the results, as this can play a role in influencing consumers in their evaluation of products, for example through different levels of awareness, knowledge, or attention paid (cf. Thøgersen 2000). Table 1 illustrates the organic labels shown in the single countries.

The label with the highest level of recognition or availability, based on expert evaluation, was selected for each country. Since the consumer survey of the EU-funded project started only a few months after the release of the compulsory EU organic logo, it was most likely that the new EU organic label would not have been recognized by survey participants. Thus, in Italy and Poland, the former EU community logo (European Union 1991) served the purpose of the study best. In Germany, the best known label is the national state-run label (BMELV 2012). Likewise, in France, the "AB" label of the French Ministry of Food, Agriculture and Fisheries was chosen (Ministry for Food and Fisheries 2009; Agence Bio 2012). In Switzerland, the logo of the private umbrella organization Bio-Suisse, called "Knospe" (in English: bud), was used (Bio-Suisse 2012). In the Netherlands, the label of the nonprofit inspection body Skal was selected (Skal 2012a, b).

[1] The phenomenon of social desirability can be described as the dishonest answer behavior in interviews, whereby the interviewees, particularly concerning sensitive topics, tend to answer questions according to what is socially correct and acceptable behavior, rather than according to fact (Fisher 1993).

**Table 1: Organic food labels included in the study**

| Country | Organic label | |
|---|---|---|
| **Italy** |  | Former community logo of the European Union for Italy (European Union 1991; European Union 2010) |
| **Germany** |  | Label of the German Ministry of Food, Agriculture and Consumer Protection (ÖkoKennzG 2001; BMELV 2012) |
| **Switzerland** |  | Label of the private umbrella organization Bio-Suisse (Bio Suisse 2012) |
| **Poland** |  | Former community logo of the European Union for Poland (European Union 1991; European Union 2010) |
| **The Netherlands** |  | Label of the non-profit inspection body Skal; Skal operates under the mandate of the Dutch Ministry of Economic Affairs, Agriculture and Innovation (Skal 2012; Skal 2012a) |
| **France** |  | Label of the French Ministry of Food, Agriculture and Fisheries (Ministry for Food, Agriculture and Fisheries 2009) |

# 3 Methods

## 3.1 Method of data collection

The data for the present study was collected in the framework of the EU research project ECROPOLIS that aimed at analyzing sensory characteristics of organic products using an international and interdisciplinary approach. For data collection, a standardized computer-based consumer survey was carried out between October 2010 and February 2011.

In order to determine the relevant aspects for the design of the questionnaire, an in-depth literature review (Canavari et al. 2009) as well as qualitative interviews with experts (researchers in the field of sensory research and marketing, and stakeholders in the organic sector) and organic consumers were carried out in the form of focus group interviews beforehand (Maciejczak 2009; Stolz et al. 2010). The ideas gained from the interviews were then operationalized in a standardized question-

naire, which also included sensory tests of strawberry yogurt. Besides taste preferences, the test subjects were asked to evaluate statements regarding their organic consumption behavior, their purchase, cooking and eating habits, their attitude towards product information and food labeling, as well as some sociodemographic criteria. Translation from English into the corresponding languages and back again into English ensured a high standardization of the questionnaire throughout the participating countries. Moreover, the same test design for sensory testing was used in all countries.

### 3.2 Sensory testing

Although sensory perception refers to all senses, this investigation only concerns the taste evaluation of the test subjects. This restriction simplifies the study, as it can be assumed that taste is the most appealing sense. Additionally, this investigation does not treat taste as differentiated perception of a single sense, but rather as being the total sensory impression from the combination of different senses (Knoblich and Fries 1996).

A merely stated or predicted preference for certain foods has proven to be an unreliable instrument for the measurement of product quality in earlier studies (Hui 2010). Thus, as early as the 1940s, a standardized method to measure consumer acceptance or preference on the basis of a real taste evaluation was developed (Hadary 1945). Since then, methods of sensory evaluation by the consumer have been accepted and established as scientific research methods for the measurement of perceived food product quality (Lawless and Heymann 2010).

Accordingly, in the present study, a hedonic taste test was carried out, in which test subjects were asked to record their degree of actual liking of a specific product, in order to eliminate the expected problem of socially desirable answer behavior. We chose strawberry yogurt as indicator product, since its availability in all study countries and its simple preparation guaranteed a standardized testing procedure and comparable results. Test subjects received the strawberry yogurt in two versions: an organic sample without aroma additives and a conventional sample with added aroma. In order to achieve the highest possible level of standardization and reliably measure consumers' preference for either one, the same type of organic yogurt was used as the basis of all samples, which is available at food retailers in all participating countries. This is important to improve the comparability of the results between countries (Schubert and Godersky 1996). The yogurt was then mixed with strawberry concentrate at exactly the agreed proportions. The strawberry concentrate was provided by a producer of fruit preparations and was organic. For the conventional sample, a strawberry aroma, which is usually used in the production of conventional strawberry yogurt, was added to the basic organic fruit preparation. Thus, the conventional sample only differed from the organic sample in the presence of an aroma additive, while the rest of the recipe, i.e., the yogurt base and the

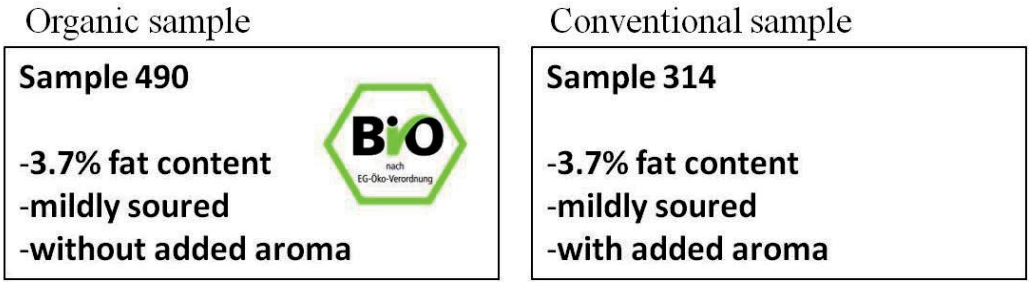
relative amounts, was the same.[2] The organic sample therefore serves as an indicator for the preference for naturalness.

**Table 2: Sensory testing design**

| Test | Product | Sample presentation | Information |
|---|---|---|---|
| blind | organic yogurt | coded sample | none |
| | conventional yogurt | coded sample | none |
| labelled | organic yogurt | coded sample with organic label and information | 3.7% fat content, mildly soured, without added aroma |
| | conventional yogurt | coded sample with information | 3.7% fat content, mildly soured, with added aroma |

In the first stage, the test subjects tasted the products blindly, i.e., without the provision of any information about the products, and evaluated their liking. Subsequently, the test subjects were asked to evaluate a set of items concerning general aspects of food labeling and product information before the second stage of sensory testing was conducted. Here, the test subjects were asked to taste and evaluate the very same products as in the blind test while basic product information on the fat content, the consistency, and the existence of aroma was provided (see Table 2). For the organic sample, the most common organic label in the respective country was shown (see Table 1). The organic label was omitted for the conventional sample, as illustrated for the example in Germany in Figure 1 (for the purpose of the present publication, the information on the tags was translated from German into English). The effect of the organic label on taste evaluation was measured through the difference in evaluation between the blind and labeled test, which was measured on a seven-level hedonic scale from +3="I like it very much" to −3="I don't like it at all".

**Figure 1: Tags of strawberry yogurt samples in the labelled taste test in Germany**




### 3.3 Sample

A total of N=1,797 test subjects, about 300 consumers in each of the participating countries, were interviewed. Due to the scope of the EU-funded project to build an organic consumer typology based on taste preferences, only organic consumers were asked to participate in the survey. In order

[2]It should be noted, that the term "conventional" is used for the strawberry yogurt sample with added aroma, although it is technically of organic quality.

to ensure representative and comparable subsamples, the recruitment of test subjects was carried out according to the following quota for the characteristics: sex (66.7% women, 33.3% men), age (50%, 18–45 years; 50%, >45 years) and organic consumption intensity (60%light, 40%heavy users). An index based on the consumption frequency of organic products from eight different categories (i.e., fruit, vegetables, meat/sausage, eggs, milk/milk products, bread/bakery products, beverages, and oil) was used to determine the organic consumption frequency. In addition, the participants were supposed to be at least partly responsible for household food purchase and willing to test strawberry yogurt in order to take part in the survey. These requirements were, apart from some small deviations, achieved in all study countries. The main sociodemographic characteristics of the total sample as well as the country-specific partial samples are displayed in Table 3.

**Table 3: Socio-demographics of the sample**

| | Pooled sample | Italy | Germany | Switzerl. | Poland | Netherl. | France |
|---|---|---|---|---|---|---|---|
| **Sample size** | 1797 | 301 | 294 | 296 | 319 | 289 | 298 |
| **Gender (%)** | | | | | | | |
| Female | 66.8 | 65.4 | 71.1 | 67.2 | 65.5 | 67.5 | 64.1 |
| Male | 33.2 | 34.6 | 28.9 | 32.8 | 34.5 | 32.5 | 35.9 |
| **Age** | | | | | | | |
| 18-45 years (%) | 49.5 | 49.8 | 50.3 | 53.0 | 50.2 | 48.1 | 45.6 |
| >45 years (%) | 50.5 | 50.2 | 49.7 | 47.0 | 49.8 | 51.9 | 54.4 |
| Average | 45.4 | 43.3 | 45.4 | 44.6 | 44.3 | 47.4 | 47.4 |
| **Education (%)** | | | | | | | |
| Without formal qualification | 0.4 | 0.3 | 0.0 | 0.3 | 1.3 | 0.0 | 6.7 |
| Secondary education (about 10 years of schooling) | 18.9 | 1.0 | 46.9 | 42.2 | 4.4 | 0.3 | 29.3 |
| Further education (12 or 13 years of schooling) | 27.7 | 12.5 | 28.6 | 22.0 | 53.3 | 20.1 | 25.3 |
| College or university degree (BSc, BA, MSc, MA, PhD) | 43.4 | 56.6 | 23.8 | 29.7 | 40.0 | 67.4 | 33.3 |
| Others | 9.7 | 29.7 | 0.7 | 5.7 | 1.0 | 12.2 | 5.3 |
| **Household situation** | | | | | | | |
| Single | 17.1 | 14.6 | 23.5 | 17.9 | 18.2 | 11.1 | 22.0 |
| With partner | 37.0 | 28.9 | 40.1 | 47.0 | 34.8 | 34.7 | 43.3 |
| Single parent | 3.7 | 1.0 | 3.7 | 3.4 | 6.0 | 4.5 | 6.3 |
| Couple with children | 26.8 | 21.9 | 25.2 | 20.6 | 23.8 | 43.4 | 25.0 |
| Apartment-share | 4.9 | 8.3 | 3.7 | 7.8 | 4.4 | 0.3 | 0.7 |
| Household with people of more than two generations | 5.5 | 15.0 | 2.7 | 1.7 | 7.2 | 0.3 | 1.3 |
| Student accommodation | 2.9 | 8.3 | 0.0 | 0.7 | 2.5 | 2.8 | 0.0 |
| Others | 2.0 | 1.0 | 1.0 | 3.1 | 2.8 | 2.0 | 1.3 |

## 4 Data analysis

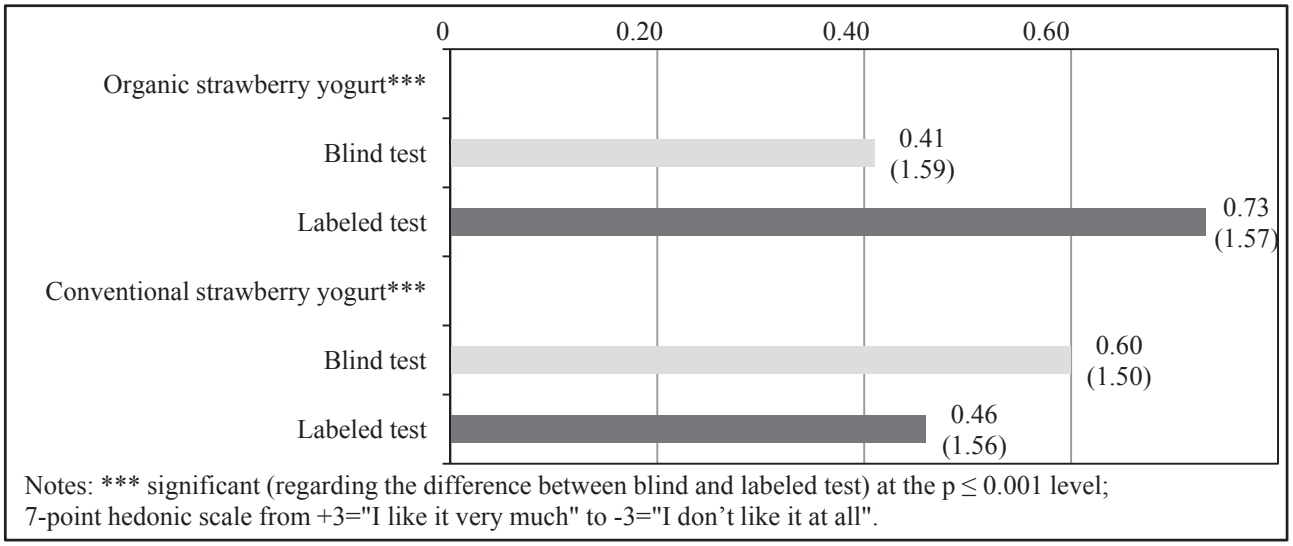
The analysis of the data was carried out using quantitative analytical methods with the statistics software PASW 20. The results of the blind and labeled tests were compared as dependent pair-wise samples to analyze the effect of the organic label respectively of the information about conventional quality on the taste evaluation by consumers. The normality of the relevant variables was tested by applying a Kolmogorov-Smirnov test (Hair et al. 2010). Since normality could not be confirmed, the nonparametric Wilcoxon test was applied subsequently (Bortz and Schuster 2010). In order to analyze whether effects depend on the organic consumption intensity, correlations between the metric scaled organic consumption frequency index and relevant liking variables were calculated for each country.

## 5 Results

Figure 2 shows the mean scores for liking in the blind and in the labeled test of the organic and the conventional strawberry yogurt for the total sample.

Considering the six study countries in total, the four strawberry yogurt samples were evaluated positively on average, although all mean liking scores only range from 0.41 to 0.73. Comparing the means of the blind and labeled taste evaluations of the organic strawberry yogurt, the mean absolute difference of 0.32 is highly significant. The same is true for the conventional strawberry yogurt: the mean of the blind test (mean=0.60) is significantly higher than that of the labeled test (mean=0.46). Hence, it can be concluded that for both the organic and the conventional strawberry yogurt, the liking in the blind test significantly differs from the liking in the labeled test. This indicates that the information provided influenced the consumer taste perception positively in the case of the organic strawberry yogurt and negatively in the case of the conventional strawberry yogurt. Tables 4 and 5 show, whether this trend can also be observed in individual countries.

**Figure 2: Mean liking scores (standard deviation) of strawberry yogurt samples by all test subjects (N=1797)**




Notes: *** significant (regarding the difference between blind and labeled test) at the $p \leq 0.001$ level;
7-point hedonic scale from +3="I like it very much" to -3="I don't like it at all".

**Table 4: Effect of the organic label in individual countries**

| Country | Sample size | Mean (sd.) blind | Mean (sd.) labeled | Mean differences (sd.) labeled-blind | Sig. |
|---|---|---|---|---|---|
| France | 298 | 0.53 (1.76) | 0.73 (1.70) | 0.21 (1.74) | 0.011 |
| Germany | 294 | 0.35 (1.51) | 0.69 (1.54) | 0.34 (1.68) | 0.000 |
| Italy | 301 | 0.74 (1.41) | 0.59 (1.52) | -0.15 (1.50) | 0.073 |
| Netherl. | 289 | -0.07 (1.60) | 0.37 (1.54) | 0.43 (1.51) | 0.000 |
| Poland | 319 | 0.40 (1.66) | 1.06 (1.63) | 0.66 (1.80) | 0.000 |
| Switzerl. | 296 | 0.47 (1.50) | 0.91 (1.40) | 0.44 (1.51) | 0.000 |
| Pooled sample | 1797 | 0.41 (1.59) | 0.73 (1.57) | 0.32 (1.65) | 0.000 |

**Table 5: Effect of information about conventional quality in the individual countries**

| Country | Sample size | Mean (sd.) blind | Mean (sd.) labeled | Mean differences (sd.) labeled-blind | Sig. |
|---|---|---|---|---|---|
| France | 298 | 0.53 (1.63) | 0.11 (1.70) | -0.42 (1.92) | 0.000 |
| Germany | 294 | 0.55 (1.56) | 0.35 (1.52) | -0.20 (1.69) | 0.014 |
| Italy | 301 | 0.80 (1.41) | 0.33 (1.50) | -0.48 (1.47) | 0.000 |
| Netherl. | 289 | 0.23 (1.50) | 0.27 (1.49) | 0.04 (1.56) | 0.421 |
| Poland | 319 | 0.78 (1.45) | 1.02 (1.57) | 0.24 (1.65) | 0.008 |
| Switzerl. | 296 | 0.70 (1.38) | 0.63 (1.41) | -0.07 (1.42) | 0.190 |
| Pooled sample | 1797 | 0.60 (1.50) | 0.46 (1.56) | -0.15 (1.64) | 0.000 |

In almost all countries, a significant positive effect[3] of organic labeling was observed. While in Poland, this is even a strong positive effect; the weakest impact can be found in France. Italy is the only country in which the liking in the blind test of the organic strawberry yogurt is significantly ($p<0.1$) higher than the liking under informed conditions. It can therefore be assumed that Italian consumers' taste perception was slightly influenced in a negative way by the organic label, while in all other countries the organic label positively influenced consumers' liking. No significant correlation between the organic consumption frequency and the mean difference between the blind and labeled evaluation was found.

Table 5 clearly shows that the results differ to a great extent between countries when it comes to the effect of information about conventional quality.While in France, Italy, and Germany, consumers tend to like the strawberry yogurt less when they know that it is of conventional quality, Dutch and Swiss consumers do not seem to be influenced by this information at all. Poland is the only country where consumers rated liking under informed conditions higher than liking in the blind test. Again, no significant correlation was found between the organic consumption frequency and the mean difference between liking in the blind test and liking in the labeled test of the conventional strawberry yogurt sample.

[3]The effect strength is derived from the mean differences between the means of the blind and the labeled tests displayed in the fourth column of Table 4 and 5.

In the blind test, the conventional strawberry yogurt achieved slightly higher scores than the organic one. The mean difference of 0.20 is highly significant and indicates that organic consumers like the flavored strawberry yogurt sample better than the natural one. Table 6 displays the country-specific results of the comparison between the liking in the blind test of organic strawberry yogurt only with fruits and the liking in the blind test of the conventional sample. A preference for naturalness cannot be found in any of the study countries. While French and Italian organic consumers like the organic and the conventional sample on average to the same extent, in all other countries a preference for the flavored sample was observed. These results do not vary between heavy and light users, as no significant correlation between the organic consumption frequency and the mean difference between the liking in the blind test of the organic and the conventional strawberry yogurt sample was found.

**Table 6: Blind tested preference for naturalness vs. aroma**

| Country | Sample size | Mean (sd.) org. (natural) | Mean (sd.) conv. (aroma) | Mean difference (sd.) natural vs. aroma | Sig. |
|---|---|---|---|---|---|
| France | 298 | 0.53 (1.76) | 0.53 (1.63) | 0.00 (1.97) | 0.324 |
| Germany | 294 | 0.35 (1.51) | 0.55 (1.56) | -0.20 (1.69) | 0.009 |
| Italy | 301 | 0.74 (1.41) | 0.8 (1.41) | -0.06 (1.51) | 0.195 |
| Netherl. | 289 | -0.07 (1.60) | 0.23 (1.50) | -0.29 (1.51) | 0.000 |
| Poland | 319 | 0.4 (1.66) | 0.78 (1.45) | -0.37 (1.51) | 0.000 |
| Switzerl. | 296 | 0.47 (1.50) | 0.7 (1.38) | -0.23 (1.73) | 0.008 |
| Pooled sample | 1797 | 0.41 (1.59) | 0.60 (1.50) | -0.20 (1.66) | 0.000 |

## 6 Discussion

By combining a standardized quantitative consumer survey and sensory testing, data on the effect of product information in the form of organic labels on the taste evaluation of organic consumers was gathered. Higher scores for the liking in the labeled test of the organic strawberry yogurt than in the blind test reveal that an organic label with additional product information influences the consumers taste evaluation in almost all study countries. Although the observed organic label effect was rather weak, the findings lead to the conclusion that the existing sensory image of the European organic food sector is positive among consumers of organic food in all countries except for Italy. Our results from Italy are in contrast to the findings of Napolitano et al. (2010), who revealed that information about organic production methods have a significantly positive effect on the Italian consumers' actual liking of Peccorino cheese. A possible explanation for our results is provided by Sinesio et al. (2009) and Scintu et al. (2010), who showed that in countries rich in culinary specialties and characterized by a long food tradition, consumers associate tasty food more with local specialties than with organic labels. Other aspects such as local origin, traditional production methods, or a unique recipe could play a similarly large role in the evaluation of the quality of a food product, and thus the distinction between organic and conventional becomes less important for sensory evalua-

tion. More research should be carried out on the aspects influencing consumers taste perception, especially in Italy where results concerning the influence of organic labeling are ambivalent. One restriction of the present study is that only the organic label effect for one product, i.e., strawberry yogurt, was tested. Analyzing other products may lead to different results and therefore should be considered for further research.

The organic label effect may also be the result of a brand or image transfer, whichmay work similarly to the country-of-origin-effect, whereby the image of a country is transferred to a product that is labeled with its origin (Verlegh and Steenkamp 1999). Apparently, for organic consumers, previous positive taste experiences build the current sensory image of the organic food branch, which serves as a branding for products that are marked with an organic label. In addition, the positioning of organic food products in the premium and gourmet food segment and corresponding sensory marketing activities (e.g., the usage of sensory information on packaging) might contribute to this image. The better taste image of organic food is a widely held belief and has become one of the most relevant buying motivations for consumers (Plaßmann and Hamm 2009; Baranek 2007; Kuhnert et al. 2003), even though it is not empirically confirmed in blind tests that organic products actually taste better.

The fact that most consumers attribute a better taste to a product when they know it is organic may also partly be due to the halo effect. This effect describes the tendency to generally judge a product based on its overall impression, instead of considering single product attributes that actually are independent from each other (Leuthesser et al. 1995). In this case, the general positive image of the organic label leads to a biased taste perception (Canavari et al. 2009). A further interpretation could be the theory of cognitive dissonance, in which a person's behavior can be caused by an attempt to avoid contradictions between cognitions (Festinger 1957). It is therefore possible that the test subjects conform to their habit of regularly consuming organic products and evaluate the organic products in the labeled test better than in the blind test, thereby justifying their organic food consumption. In this context, it should be noted that only test subjects familiar with the consumption of organic products were involved. Furthermore, respondents were informed about the study's focus on organic food in the recruitment interview before the test. Therefore, the previously mentioned phenomenon of social desirability should be taken into consideration. This could have led to the test subjects attributing a high quality and thus a better taste to organic products, in line with the widespread opinion held in certain sections of society (Hill and Lynchehaun 2002).

Yet another aspect regarding habitualization has to be considered: In four out of six countries, the flavored version was significantly preferred over the natural one. France and Italy are the only countries where both strawberry yogurt samples were evaluated about equally. These results reveal that organic consumers do not necessarily favor more natural tasting food, which is in contradiction to the results of the focus group interviews conducted by Stolz et al. (2010). This is true for both heavy and light users. Considering that taste is a matter of experience and habitualization (Capretta et al. 1973), this finding leads to the conclusion that organic consumers have not yet become accus-

tomed to the taste of organic food, while they are highly accustomed to the taste of flavored food and therefore evaluate the conventional sample better.

With respect to the effect of information about conventional quality, the results are mixed. A negative influence on the taste evaluation in the labeled test was found in France, Italy, and Germany. Here again, social desirability and cognitive dissonances have to be taken into account, since it must be assumed that organic consumers wouldrather not admit liking a conventional product. In the Netherlands and Switzerland, no differences between liking in the blind test and liking in the labeled test were found, which is in accordance with the results by Annett et al. (2008). In Poland, however, there was even a significantly better assessment of the conventional sample in the labeled test. This suggests that in some countries organic consumers do not per se attribute a bad image to conventional strawberry yogurt, perhaps due to similar quality orientations in organic and conventional food retail. Poland, however, is characterized by its traditional agriculture and its food manufacturing that is still less industrialized than in other countries (Obermowe et al. 2011; Bär 2007). This may result in a closer relationship between consumers and producers and consequently in greater consumer trust in food production in general. In addition, the Polish organic market is still considered immature compared to other nations, and the supply of organic products is mainly limited to seasonal fresh fruit and vegetables (ibid.), which could also explain the high acceptance of conventional food. Moreover, due to traditional production methods with less use of pesticides and mechanization, the actual difference between conventional and organic food is small, so that the image of conventional food is better than in Western Europe (Bär 2007).

## 7 Conclusions

The present study suggests that the sensory image of the organic food branch has a positive impact on organic consumers' taste evaluation of organic strawberry yogurt. Positive organic label effects were observed in five out of six countries. However, these effects were rather weak and in Italy even negative, which leads to the conclusion that the sensory image of organic products throughout Europe has the potential to be improved. Especially in countries like Italy, the current sensory image of organic products cannot compete against the country's long tradition of food and culinary specialties. Therefore, actors in the organic sector should follow two strategies. From the food technological perspective, the product-specific improvement of sensory quality is required. Organic producers sometimes perform sensory analyses, but usually in a non-systematic and non-standardized way. However, in a study about Italian producers, the necessity of increasing the use of these analyses of their products and to improve their reliability was expressed, since sensory analysis is perceived as a tool to better identify and meet the needs of consumers (Asioli et al. 2012). To this end, traditionally trained or expert panels could be employed for flavor profiling, but also untrained consumer panels could carry out affective sensory testing (Meiselman 1993). Additionally, sensory perception can be enhanced through learning, meaning that actors of the organic food market could bring their customers closer to their products by training their sensory abilities

(Asioli et al. 2013). From themarketing perspective, extensive sensory marketing activities are needed in order to successfully communicate the specific sensory properties of organic food, e.g., by advertising campaigns of the quasibrand “organic” (Guion and Stanton 2012; Bijoor 2006). Other promising tools can be derived from wine marketing, such as the aroma wheel for the sensory description of food or aroma labeling (Latour and Latour 2010).

In the long term, organic labels can serve as signals for high quality and taste value and thus convey the positive organic taste image to the consumer only if the expected product quality is actually fulfilled. Therefore, efforts should bemade to improve the sensory quality of organic products by extensively using adequate instruments of sensory research.

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## II.4 Preference for naturalness of European organic consumers –First evidence of an attitude-liking-gap

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*For submission.*

# 1 Introduction

The conscious consumption of food is steadily gaining importance. The ongoing globalisation of food production, the industrialisation and intensification of agriculture as well as numerous food scandals have increased consumers' awareness for health and the environment, while nourishing their scepticism towards the food industry (Autio et al., 2013; Albersmeier & Spiller, 2010; Davies, 2001; Gilg & Battershill, 1998). Consumers have started questioning the origin, modes of production and particularly the nature and content of their food (Gilg & Battershill, 1998). In this context, a strong movement towards natural food can be observed throughout the world (Davies, 2001; Devcich et al., 2007; Rozin et al., 2004; Schösler et al., 2013), which according to Franchi (2012) implies a sense of nostalgia for an uncontaminated age with anti-industrial demands and claims against the advancing lack of transparency in the food industry and detaching from nature. The desire to return to a more natural lifestyle is not a recent one and has its roots in the 19$^{th}$ century (Schösler et al., 2013). In German speaking countries it became known as the "Lebensreform". This, among other movements, promoted the return to a more natural diet, opposing the agriculture's mechanisation and industrialisation, the loss of rural lifestyles and the associated self-sufficiency and independence (Vogt, 2007). The American "Natural Food Movement" induced similar cultural changes in the 1830s that objected to modern food technology (Gusfield, 1992).

Today, the claim "natural" is one of the most used terms in food marketing. In 2008, a study conducted by Mintel market research revealed that food and beverage claims "classified" as "natural" – including all natural, no additives/preservatives, organic and wholegrain – were the most frequently featured on new products globally. "Natural" claims appeared on nearly one in four (23%) food and drink launches in 2008" (Mintel, 2008).

The trend towards naturalness is especially manifested in the worldwide growth of the organic food market that is considered as one important category of natural food (Hamzaoui Essoussi & Zahaf, 2008). Moreover, an increasing emergence of, and interest in alternative consumer food initiatives, such as community gardens, allotments, box-schemes and grower's groups, mirror the strides for a more genuine life style in general and food consumption, particularly among certain consumer groups (Autio et al., 2013; Lamine et al., 2012; Murtagh, 2010). Additionally, the conventional food industry responds to the consumers' desire for more natural nutrition by increasingly offering products with allegedly clean labels. These labels advertise the absence of additives such as artificial flavour enhancers, colourants and aroma. In a report by the Kampffmeyer Food Innovation GmbH (2012), clean labelling is described as a way of labelling food that appears "clean" in the eyes of consumers. Moreover, the report lists some aspects that are characteristic for clean labels, such as short lists of ingredients, no usage of scientific designations for ingredients, additional claims emphasising the absence of certain artificial additives, a greater naturalness or proximity to nature of the product and also references to manual or traditional production and recipes (ibid.). There is no legal or scientific definition for the concept of clean labelling. According to the German consumer

association Verbraucherzentrale (2010), worldwide there are about 20,000 food products labelled as "clean".

However, the concept of naturalness regarding food is generally vague, unclear and sometimes even deceiving to consumers (Bender, 1989), especially when compared to the term organic, as Abrams et al. (2010) as well as Gifford and Bernard (2011) revealed. The Oxford Dictionary (2014) defines the term natural as "existing in or derived from nature", "not made or caused by humankind" and "having had a minimum of processing or preservative treatment". This is in accordance with how consumers from different countries (France, the USA, the UK and the Netherlands) primarily define the word natural in the context of food, namely by the aspects of not being transformed, originating from nature and being free of additives (Rozin, 2008; Verhoog et al., 2007). Franchi (2012) points out that the term nature recalls an authentic and "unspoilt" world. The author even refers to nature as a brand representing healthiness, reliability and reassurance in terms of safety and security of food (ibid.). In contrast to organic, a legal definition of the naturalness of food does not exist (except for poultry and meat in the USA (USDA, 2005)). This means that the term natural is widely used and sometimes also exploited by the food industry (Bender, 1989), as market surveys from different countries like the USA, the UK, Australia and Germany exemplarily show (Cornucopia Institute, 2011; Food Standards Agency, 2008; Verbraucherzentrale, 2010; Williams et al., 2009). The only step towards regulating the usage of the term natural until now was taken by the United States Department of Agriculture (USDA, 2005), which established a legal framework for applying natural claims on poultry and meat. According to this, such a claim demonstrates that "the product does not contain any artificial flavor or flavoring, coloring ingredient, or chemical preservatives […] or any other artificial or synthetic ingredient; and [that] the product and its ingredients are not more than minimally processed" (USDA, 2005). Nevertheless, a legal definition and framework for all remaining product categories and for other countries is missing and thus contributes largely to the blurry application of the term natural by food producers and its varied perception among consumers (Williams et al., 2009).

Despite the increasing demand for natural food, the current relevance of naturalness as a self-contained topic has so far not been the focus of appropriate amounts of marketing research. Often it is approached as an additional or subordinated aspect within organic research areas (e.g., Asioli et al., 2014; Guido et al., 2010; Lockie & Lyons, 2002; Lockie et al., 2004; Onyango et al., 2007; Schutz & Lorzenz, 1976) and the research of genetically-modified (GM) products (a review of literature concerning naturalness of GM-products is provided by Gregorowius et al., 2012). Some research has been done on the meaning and/or perception of naturalness in general (Siipi, 2013) or in combination with organic (Rozin, 2005; Verhoog et al., 2007) as well as in comparison with organic (Gifford & Bernard, 2011).

Besides many studies that refer to single aspects of naturalness, e.g., products free of chemicals, pesticides and additives, sparse empirical evidence exists confirming that the concept of naturalness as a whole concerns consumers when purchasing food. In a ranking of fruit choice motives con-

ducted by four cross-cultural consumer groups, naturalness is rated as one of the most important aspects by a majority of the sample (Onwezen & Bartels, 2011). Also, Hauser et al. (2011) identify authenticity/naturalness as one out of four value-dimensions that consumers consider when purchasing, preparing and eating food. In addition, Li and Chapman (2012) and Rozin et al. (2004) analyse motives for naturalness-seeking behaviour. Rozin et al. (2004) propose two categories of beliefs, namely instrumental (motives such as healthiness, superior taste, environmental benefits, safety) and ideational/moral (e.g., natural is inherently better, natural is prior to human intervention). With regard to instrumental motives, Li and Chapman (2012) empirically confirm this by finding that natural food products are perceived as healthier, more environmental-friendly, safer and better tasting by consumers than products that are not claimed to be natural.

Further research on consumers' perception of, and attitude towards, naturalness and on how these influence the preferences for it was not found. However, this is essential for gaining knowledge about consumers' food choices. Attitudes form expectations, which again may influence the sensory perception of a product, even prior to tasting (Cardello, 1994; Deliza & MacFie, 1996; Imram, 1999). Consequently, high expectations lead to an increased probability to purchase a product (Deliza & MacFie, 1996). An understanding of whether and how attitudes are related to a product's taste perception is therefore important in order to avoid negative disconfirmation or dissatisfaction, cognitive dissonances and consequently product rejection, which occur when expectations regarding the taste cannot be met by the product (ibid.; Cardello, 1994; Festinger, 1957; Grunert, 2002).

Apart from studies that analyze if the positive taste image of organic products holds true (Fillion & Arazi, 2002; Napolitano et al., 2010; Schutz & Lorenz, 1976), no attempt has been undertaken so far to test the claim that natural food products taste better and whether consumers with a positive attitude towards naturalness actually prefer the taste of a natural product over the taste of a more processed one. The present study attempts to fill this gap by exploring the preference for naturalness in a cross-national context. Besides examining consumers' attitude towards naturalness and its relation to other nutrition-related aspects, the main scope of the study is to analyse the link between the attitude towards natural food and the sensory preference for naturalness. We use two samples of strawberry yoghurt, whose production and preparation was highly standardised and varied in only one aspect, namely the added aroma. This way, differences in liking can be explicitly traced back to the absence or presence of aroma, which is attributed to naturalness or unnaturalness.

Since various surveys reveal that food consumption and nutrition is strongly shaped by culture (Askegaard & Madsen, 1998; Saba, 2001; Thøgersen, 2010), the study considers organic consumers from Italy, Switzerland, the Netherlands, Poland, France and Germany in order to contribute to a better understanding of the drivers for natural food choices in Europe. The choice of organic consumers is primarily due to practical considerations, since the data that we analyze in this study was originally used to gain knowledge about organic consumers' responses to sensory product information and general sensory attributes of organic products. The quantitative survey conducted in the before mentioned countries provides insights on how naturalness is currently valued within Europe,

enables the consideration of country-specific differences and contributes to the generation of more detailed consumer knowledge.

## 2 Material and methods

### 2.1 Questionnaire and data collection

Data was collected between October 2010 and February 2011 in the framework of an EU-funded research project dealing with sensory aspects of organic food in Italy, Switzerland, Poland, the Netherlands, France and Germany. Participants were asked to fill out a digital standardised questionnaire regarding socio-demographics, organic consumption behaviour and dietary habits. With respect to consumer's dietary habits, the FRL-model, which was developed by Grunert et al. (1993) for the detection of food related trends among consumers in a cross-cultural context, served as the basis. From the original 23 food-related lifestyle dimensions, each represented by three items, we selected 16 dimensions that were considered as relevant for the scope of the project. In order to reduce the complexity of the questionnaire, we primarily chose one item for each dimension instead of all three proposed by Grunert et al. (1993). Most of the items were adopted in their original version or with slightly modified wording. Some variables were rephrased in order to better meet the study's scope. In addition, we extended the model by dimensions that preliminary literature and qualitative surveys found to be relevant for the research question (such as knowledge/involvement regarding quality, time constraints and health-/weight-consciousness and sensory properties of organic food). Statements were evaluated using a 7-point-Likert scale that we coded as reaching from -3 (I totally disagree) to +3 (I totally agree). For the evaluation of stated preferences for sensory properties of organic food, we used bipolar semantic scales also coded as ranging from -3 to +3.

Moreover, participants conducted a hedonic liking test, in which they recorded the degree of liking of two different kinds of strawberry yoghurt on a scale from -3 (I don't like it at all) to +3 (I like it very much). By comparing products with and without flavour enhancers, this test is used to analyse a prominent concept of naturalness, i.e., the absence of flavouring that is common in both the organic and the conventional food sector (Siipi, 2013).

The questionnaire was translated from English into the corresponding languages and back into English again in order to ensure a high level of standardisation throughout participating countries. Country-specific adaptations were considered. The design for sensory testing and the tested product samples were the same in all countries.

### 2.2 Subjects

In each country a convenience sample of about 300 organic consumers was selected. These were mostly recruited via household panels by marketing research agencies, but in two cases they were conducted via e-mail and an announcement on a homepage or via announcements in organic food

stores. Since the original project dealt with consumers' responses to sensory characteristics of organic food products, participants were required to be organic consumers and to be at least partly responsible for household food purchases. For comparable subsamples, the recruitment of test subjects was carried out according to the following quota for the characteristics gender (66.7% women, 33.3% men), age (50% 18-45 years, 50% >45 years) and organic consumption intensity[1] (60% light users, 40% heavy users). This was achieved, apart from small deviations, in all countries. It has to be mentioned that the sub-samples are not representative of the country's populations, which may affect the validity of comparisons between countries conducted in this study. Table 1 displays the main socio-demographic characteristics of the total sample as well as the country-specific subsamples.

### 2.3 Sensory testing

For sensory testing, participants evaluated their overall liking of two strawberry yoghurt samples. We chose strawberry yoghurt as the indicator product due to its availability and popularity in all study countries and its standardisable preparation process that guaranteed comparable results throughout all countries and testing phases. Samples were prepared at testing locations by blending the same amounts of plain yoghurt and fruit concentrate. For both yoghurt samples, the same type of plain organic yoghurt was used, which was available at food retailers in all countries, except for Italy, where theyoghurt had to be supplied from Switzerland. Also, both samples contained the same amount of the same strawberry concentrate. The strawberry concentrates were supplied by a German producer of fruit preparations to all study countries.

The two versions differed only in terms of aroma additives: While the strawberry concentrate of sample 1 did not contain any aroma additives, the concentrate of sample 2 contained a strawberry flavour enhancer.[2] Therefore, sample 2 had a more intensive but maybe somewhat artificial strawberry flavour than sample 1. We assume that consumers who perceive a taste difference between both samples in terms of flavour intensity attribute this difference to a flavour enhancer, knowing that the maximum of taste they can get from a fruit concentrate cannot equal the one obtained from a fruit concentrate enhanced in flavour. Thus, we presume that due to the added aroma, sample 2 is perceived as less natural than sample 1. Our definition of naturalness is therefore an objective approximation, taking the dominant marketing concept of preventing flavour enhancer as "natural" (Mintel, 2008, Siipi, 2013).

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[1]An index based on the consumption frequency of organic products from eight different categories (i.e., fruit, vegetables, meat/sausage, eggs, milk/milk products, bread/bakery products, beverages, oil) was used to determine the organic consumption frequency according to the calculations in the German National Nutritional Survey II (Max Rubner-Institut, 2008).

[2] The here used flavour enhancer was declared as "natural flavour".According to the EU regulation (EC) No 1334/2008 (European Commission, 2008), a flavour can be described as natural if the used components are obtained entirely from natural origin, i.e., vegetable, animal or microbiological material, by appropriate physical, enzymatic or microbiological processes. The usage of gene technology is not banned from this. However, this does not mean that the flavour components are obtained from strawberries.

Test subjects tested and evaluated both samples blindly, i.e., without the information about the products' ingredients and formulation, on a scale ranging from -3 (I don't like it at all) to +3 (I like it very much). Servings were coded with a three digits number.

**Table 1: Socio-demographics of the total sample and sub-samples**

| | Pooled sample | Italy | Germany | Switzerl. | Poland | Netherl. | France |
|---|---|---|---|---|---|---|---|
| **Sample size** | 1796 | 299 | 294 | 296 | 319 | 290 | 298 |
| **Gender (%)** | | | | | | | |
| Female | 66.8 | 65.4 | 71.1 | 67.2 | 65.5 | 67.5 | 64.1 |
| Male | 33.2 | 34.6 | 28.9 | 32.8 | 34.5 | 32.5 | 35.9 |
| **Age (%)** | | | | | | | |
| 18-45 years | 49.5 | 49.8 | 50.3 | 53.0 | 50.2 | 48.1 | 45.6 |
| >45 years | 50.5 | 50.2 | 49.7 | 47.0 | 49.8 | 51.9 | 54.4 |
| Average | 45.4 | 43.3 | 45.4 | 44.6 | 44.3 | 47.4 | 47.4 |
| **Organic consumption frequency (%)** | | | | | | | |
| Light user | 53.6 | 58.9 | 44.2 | 43.4 | 56.1 | 55.4 | 63.1 |
| Heavy user | 46.4 | 41.4 | 55.8 | 56.6 | 43.9 | 44.6 | 36.9 |
| **Education (%)** | | | | | | | |
| Without formal qualification | 0.4 | 0.3 | 0.0 | 0.3 | 1.3 | 0.0 | 6.7 |
| Secondary education (about 10 years of schooling) | 18.9 | 1.0 | 0.3 | 42.2 | 4.4 | 0.3 | 29.3 |
| Further education (12 or 13 years of schooling) | 27.6 | 12.2 | 20.1 | 22.0 | 53.3 | 20.1 | 25.3 |
| College or university degree (BSc, BA, MSc, MA, PhD) | 43.4 | 56.6 | 67.5 | 29.7 | 40.0 | 67.5 | 33.3 |
| Others | 9.7 | 29.9 | 12.1 | 5.7 | 1.0 | 12.1 | 5.3 |
| **Household situation (%)** | | | | | | | |
| Single | 17.1 | 14.6 | 23.5 | 17.9 | 18.2 | 11.1 | 22.0 |
| With partner | 37.0 | 28.9 | 40.1 | 47.0 | 34.8 | 34.7 | 43.3 |
| Single parent | 3.7 | 1.0 | 3.7 | 3.4 | 6.0 | 4.5 | 6.3 |
| Couple with children | 26.8 | 21.9 | 25.2 | 20.6 | 23.8 | 43.4 | 25.0 |
| Apartment-share | 4.9 | 8.3 | 3.7 | 7.8 | 4.4 | 0.3 | 0.7 |
| Household with people of more than two generations | 5.5 | 15.0 | 2.7 | 1.7 | 7.2 | 0.3 | 1.3 |
| Student accommodation | 2.9 | 8.3 | 0.0 | 0.7 | 2.5 | 2.8 | 0.0 |
| Others | 2.0 | 1.0 | 1.0 | 3.1 | 2.8 | 2.0 | 1.3 |

## 2.4 Data analysis

Data analysis was carried out using quantitative analytical methods with the statistics software IBM SPSS Statistics 21. Besides the above mentioned analysis of socio-demographic aspects, we used bivariate and multivariate methods to explore the data. First, an explorative factor analysis was conducted in order to reduce the large amount of items to a smaller number of dimensions. The Kaiser-Meyer-Olkin (KMO) criterion and Bartlett's test of sphericity confirmed the eligibility of the data (KMO=0.819, significance according to Bartlett=0.000). We calculated principal axis factors and conducted an Oblimin-rotation (delta=0). The choice for using principal axis factors instead of principal components analysis used for data reduction was due to their ability to reveal latent variables that cause the investigated items to covary (Costello & Osborne, 2005). With regard to rotation method, we preferred Oblimin over Varimax, since we presumed dependencies between the factors that are not reproduced by orthogonal rotation (ibid.). Thus, using the oblique rotation Oblimin, we expected more accurate results. The initially emerging factors were successively reduced by eliminating items with loadings below 0.32, according to Tabachnick and Fidell (2001). At the end, six components with an eigenvalue greater than 1 were extracted, which explained 54.71% of the total variance. Among these six factors, one can be interpreted as the attitude towards naturalness. For verifying the factors' internal consistency, we performed Cronbach's Alpha tests for each factor. Values for Cronbach's Alpha ranged from 0.580 to 0.830. Finally, factor scores were calculated and served for further analyses, i.e., ANOVA and Pearson's correlation. We controlled for the assumptions required for ANOVA and Pearson's correlation (i.e., normal distribution, homoscedasticity and linearity), which were mainly confirmed. ANOVA with Tukey post-hoc tests were used to detect whether differences with regard to food consumption behaviour exist between countries. Pearson's correlation between the naturalness-component and the other five dimensions were calculated in order to explore whether and how the attitude towards naturalness is related to other nutrition and food consumption habits. Moreover, we defined the sensory preference for naturalness as the distance between the overall liking of sample 1 (natural strawberry yoghurt) and the overall liking of sample 2 (flavoured strawberry yoghurt). The minimum value of -6 was interpreted as the highest preference for the flavoured sample and the maximum value of +6 was understood as the highest preference for the natural sample. A value of zero showed indifference, i.e., participants evaluated both samples equally. Since these values have to be interpreted as ranks, the non-parametric Wilcoxon test for paired samples was subsequently applied to check whether differences were significant (Bortz & Schuster, 2010). Finally, we calculated the correlation coefficients between the naturalness-factor and sensory preferences for naturalness for the total sample and for single countries. Due to the violation of assumptions for Pearson's correlation, we applied non-parametric Spearman's correlation.

# 3 Results

## 3.1 Dimensions of nutrition and consumption behaviour

The results of the principal axis factor analysis are displayed in Table 2. *Cooking passion* is the dimension that explains the largest part of the total variance, namely 20.71%. It contains variables that express dedication, curiosity and joy for the preparation of food. Five items are subsumed under the term *health/body weightconsciousness*, meaning the conscious consumption of food with respect to physical health and body weight control. The factor *willingness to pay for quality* refers to the disposition to pay premiums for superior quality and for the taste of the food product. Under *convenience* we can find variables regarding quick and easy shopping, preparation and eating. *Novelty-seeking* represents variables that imply the positive attitude towards and the curiosity for new food experiences regarding taste, products and recipes. The factor *naturalness* contains six items covering different aspects that all belong to the concept of naturalness as confirmed by other studies. The highest loading item refers to the avoidance of additives, such as flavour enhancers, conservatives and colourants, and thus the demand for unadulterated food.The second item takes into account the relevance of regional as well as traditional food. The variable "*I prefer food that tastes artisan/hand-crafted*" considers small-scale food production as opposed to industrialised food production. Two variables measure the preference for freshness. One of them also considers it in comparison with canned or frozen food products. The last item reflects the common association of naturalness with health.

Table 3 displays the mean factor scores for the six food-related lifestyle dimensions for each country. ANOVA reveal significant differences between countries for all factors. A Tukey post-hoc test determines which countries mainly contribute to these differences. The *naturalness* results reveal to be one of the most discriminating dimensions. Italian consumers assign the highest level of importance to a natural nutrition, followed by France and Poland, which show slightly lower values. The Netherlands attribute by far the least importance to naturalness. Also, German consumers consider it less important than the average, whereas Swiss people have an average stance compared to the other countries. Figure 1 illustrates how the scores for the factor naturalness are distributed in every country.

Another highly distinguishing aspect is the consciousness for one's own health and body weight. Switzerland is the country that perceives this dimension as the least important, whereas the Netherlands attaches the highest relevance to it. Poland shows a slightly above average value, while the remaining three countries hold an average attitude towards health and body weight with respect to the other countries. In the case of *cooking passion*, Swiss consumers appear to be the most passionate about cooking, closely followed by France. Dutch and Italian consumers seem to be the least passionate about it. Germany and Poland show values close to zero, indicating an average stance in relation to the other four countries. With respect to *WTP*, Switzerland reports by far the highest factor score, suggesting that their willingness to pay for tasty and high-quality food is higher than in other countries. The lowest disposition to spend more money on superior food quality is observed in Poland, closely followed by Italy. Germany, the Netherlands and France show values close to zero and thus are located in between these

extremes. With reference to *novelty-seeking*, Polish consumers attach the highest importance to it and Dutch people the lowest. For Switzerland, France and Germany, we find values close to the average. Italy attaches the second highest importance to it. For *convenience*, we observe values that do not differ to a great extent from the average. Germany attaches the highest important to it, Italy the lowest. The remaining four countries reveal an attitude towards convenience that corresponds to the average.

**Table 2: Results of explorative factor analysis**

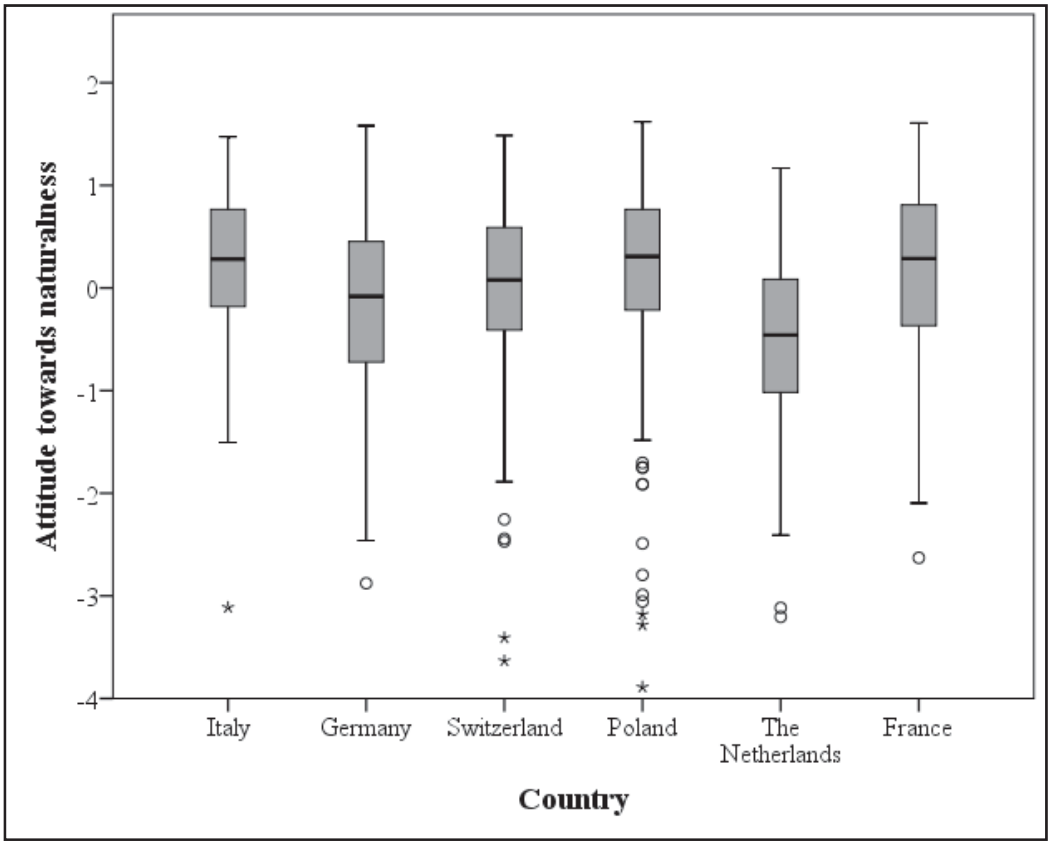
| Factor | Items | Loading | Cronbach's Alpha | Variance explained |
|---|---|---|---|---|
| Cooking passion | I am an excellent cook. | 0.87 | 0.83 | 20.71% |
| | I know exactly which ingredients I need to prepare a high-quality meal. | 0.68 | | |
| | I love cooking or baking. | 0.55 | | |
| | I like cooking as professional cooks would do. | 0.54 | | |
| | I am always looking for new taste experiences. | 0.36 | | |
| Health/Body weight-consciousness | I prefer products that are low in calories. | 0.68 | 0.58 | 8.80% |
| | When eating dairy products, do you generally prefer low fat or full fat products? | -0.54 | | |
| | I don't watch my weight when I eat or drink. | -0.41 | | |
| | When eating bakery products, do you generally prefer whole grain or refined products? | 0.36 | | |
| | When eating I am very health-conscious. | 0.34 | | |
| Willingness to pay for quality | I don't mind paying a higher price for very tasty products. | 0.83 | 0.76 | 7.69% |
| | I don't mind paying a higher price for high-quality food products. | 0.75 | | |
| Naturalness | I avoid all types of additional ingredients if possible. | 0.55 | 0.67 | 7.01% |
| | For me, it is important to buy traditional products from my region. | 0.54 | | |
| | It is important to me that the food products I buy are fresh. | 0.54 | | |
| | I prefer food that tastes artisan/hand-crafted (e.g., food that is produced in small manufactures). | 0.43 | | |
| | I prefer fresh products to canned or frozen | 0.42 | | |
| | When eating I am very health-conscious. | 0.40 | | |
| Convenience | Cooking is a task that is best over and done with. | 0.65 | 0.62 | 5.99% |
| | For me eating should be quick. | 0.51 | | |
| | For me shopping should be quick. | 0.49 | | |
| | When preparing meals I prefer to use ready-to-eat products. | 0.44 | | |
| Novelty seeking | I am always looking to experience new taste. | 0.58 | 0.68 | 4.52% |
| | When I go shopping, I enjoy trying new food products. | 0.56 | | |
| | I like to try out new recipes. | 0.44 | | |

**Table 3: Mean factor scores (standard deviation) per country (range: -3 to +3)**

| | F-value[1] | Italy | Germany | Switzerl. | Poland | Netherl. | France |
|---|---|---|---|---|---|---|---|
| **Cooking passion** | 5.89*** | -0.10 $^{cf}$ (0.92) | -0.06 $^{c}$ (0.86) | 0.19 $^{abe}$ (0.88) | -0.01 (1.00) | -0.14 $^{cf}$ (0.85) | 0.13 $^{ae}$ (0.92) |
| **Health/ Body weight consciousness** | 21.91*** | 0.01 $^{ce}$ (0.74) | 0.05 $^{cde}$ (0.79) | -0.35 $^{abdef}$ (0.78) | 0.15 $^{bcf}$ (0.83) | 0.28 $^{abcf}$ (0.75) | -0.05 $^{cde}$ (0.84) |
| **WTP** | 11.94*** | -0.12 $^{c}$ (0.85) | -0.01 $^{c}$ (0.86) | 0.33 $^{abdef}$ (0.70) | -0.16 $^{c}$ (1.06) | 0.04 $^{c}$ (0.77) | -0.06 $^{c}$ (0.95) |
| **Naturalness** | 35.66*** | 0.26 $^{bce}$ (0.66) | -0.19 $^{acdef}$ (0.88) | 0.04 $^{abe}$ (0.79) | 0.17 $^{ae}$ (0.89) | -0.48 $^{abcdf}$ (0.79) | 0.18 $^{ae}$ (0.80) |
| **Convenience** | 4.23*** | -0.16 $^{bd}$ (0.84) | 0.15 $^{a}$ (0.84) | -0.01 (0.78) | 0.03 $^{a}$ (0.91) | -0.01 (0.78) | -0.01 (0.75) |
| **Novelty seeking** | 15.06*** | 0.16 $^{bef}$ (0.76) | -0.10 $^{ad}$ (0.81) | -0.01 $^{de}$ (0.79) | 0.25 $^{bcef}$ (0.87) | -0.24 $^{acd}$ (0.80) | -0.09 $^{a}$ (0.80) |

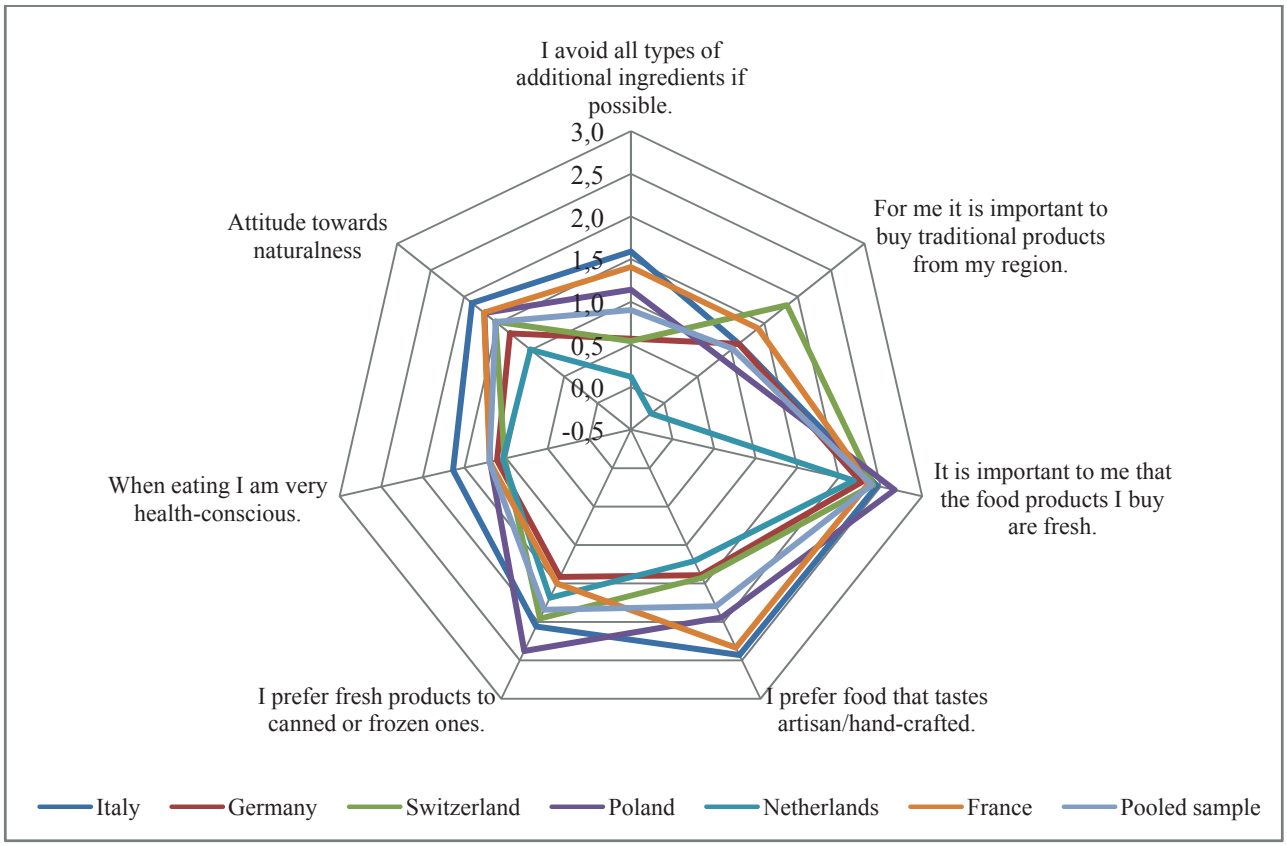
Notes: 1: ANOVA tests; ***: significant at the level of 0.001; a: indicates statistically significant difference from Italy at the level of 0.05, according to Tukey post-hoc test; b: indicates statistically significant difference from Germany at the level of 0.05, according to Tukey post-hoc test; c: indicates statistically significant difference from Switzerland at the level of 0.05, according to Tukey post-hoc test; d: indicates statistically significant difference from Poland at the level of 0.05, according to Tukey post-hoc test; e: indicates statistically significant difference from the Netherlands at the level of 0.05, according to Tukey post-hoc test; f: indicates statistically significant difference from France at the level of 0.05, according to Tukey post-hoc test.

**Figure 1: Distribution of factor scores for naturalness**



For the focal factor *naturalness*, the means for the six items that have factor loadings above 0.32 and the average scores over these items were calculated for each country in order to get an approximate impression of how naturalness and its single aspects are evaluated in each country (DiStefano et al., 2009). As Figure 2 displays, all countries report a positive attitude towards naturalness, whereby the means range from 1.01 to 1.88. An ANOVA reveals that the attitude towards naturalness differs significantly between countries. Also for the single aspects from which the naturalness-factor is composed, we find mostly positive means in all countries. Only consumers from the Netherlands reveal an indifference towards purchasing traditional products from their region and for avoiding all types of additional ingredients.

**Figure 2: Means of naturalness-items and sum scores for the factor naturalness per country**




Note: All items are measured on 7-point scales ranging from -3 (I totally disagree) to +3 (I totally agree).

## 3.2 Relation between naturalness and the dimensions of nutrition and food consumption behaviour

We further explore the naturalness factor by correlating it to the other five dimensions of food consumption behaviour (Table 4). Apart from one exception, all correlations are significant at the 0.01 level. The strongest link can be found between the factors *naturalness* and *cooking passion* (r=0.39***). Hence, consumers with a higher affinity for natural food tend to be more passionate about food consumption and its preparation. This is particularly true for Switzerland, Germany and

Poland. Also, the relation to *novelty-seeking* is relatively high for the total sample (r=0.39***), indicating that consumers with a more positive attitude towards naturalness are more likely to seek new taste and product experiences. With respect to single countries, the highest correlation between *naturalness* and *novelty-seeking* can be found in Poland (r=0.51***). France is the only country that shows a negative correlation, suggesting that French naturalness-affine consumers are less adventurous and perhaps more guided by habits and traditions. This is the only result that substantially differs from all the other outcomes. Pieniak et al. (2009) confirm that among French consumers the importance of natural content is positively related to traditional food consumption. We can also observe a positive correlation for naturalness and the positive disposition to pay a price premium for superior quality and taste (r=0.30***), indicating that the more positive the attitudes towards naturalness is, the more consumers are willing to spend a bit more for tasty and high-quality food. This is particularly true for Germany, since it shows a correlation coefficient of r=0.41***, followed by the Netherlands, Switzerland and Poland. The lowest positive link for the total sample exists between *naturalness* and *health/body weightconsciousness* (r=0.19***). When considering single countries we observe mixed results, with France showing a correlation coefficient that is much higher than the one of the total sample (r=0.36***) and Switzerland with a coefficient that is slightly lower than the one of the total sample (r=0.15**). From that we can conclude that in countries like France and Italy, more naturalness-oriented consumers tend to care more for their physical health and their body weight, whereas in countries like Switzerland and the Netherlands this link is rather weak. A negative correlation exists between the attitude towards naturalness and convenience-orientation. Particularly for German (r=-0.41***) and Dutch (r=-0.39***) consumers, an increasing affinity for naturalness comes along with a decreasing relevance of convenience related to food consumption. This tendency is less clear for Poland (r=-0.16***) and France (r=-0.20***).

**Table 4: Correlations between naturalness and dimensions of nutrition and food consumption behaviour**

| Country | Cooking passion | Health/Body weight consciousness | WTP | Convenience | Novelty seeking |
|---|---|---|---|---|---|
| **Italy** | 0.30*** | 0.28*** | 0.29*** | -0.26*** | 0.39*** |
| **Germany** | 0.45*** | 0.21*** | 0.41*** | -0.41*** | 0.23*** |
| **Switzerland** | 0.47*** | 0.15** | 0.35*** | -0.27*** | 0.40*** |
| **Poland** | 0.42*** | 0.21*** | 0.34*** | -0.16*** | 0.51*** |
| **Netherlands** | 0.45*** | 0.19*** | 0.37*** | -0.39*** | 0.36** |
| **France** | 0.30*** | 0.36*** | 0.26*** | -0.20*** | -0.27** |
| **Pooled sample** | 0.39*** | 0.19*** | 0.30*** | -0.28*** | 0.39*** |

Notes: ** Pearson's correlation is significant at the level of 0.05(two-sided); *** Pearson's correlation is significant at the level of 0.01(two-sided).

### 3.3 Attitude towards and sensory preference for naturalness

For sensory testing, participants evaluated their liking for both yoghurt samples (see chapter 2.3) on a scale ranging from -3 (I don't like it at all) to +3 (I like it very much), without the information about the samples' ingredients and formulation. Outcomes reveal that both yoghurts are evaluated positively in almost all countries, although all mean liking scores only range from -0.06 to 0.81. Only Dutch consumers, on average, neither liked nor disliked the yoghurt sample without aroma additives. In France, both samples were liked to the same extent.

Within our exemplary definition of naturalness as food without flavour enhancer, the distance between the liking scores of both samples is interpreted as sensory preference for naturalness. Table 5 indicates that, on average, the sensory preference for naturalness is negative and that the participants of this survey (except for the French) preferred the flavoured yoghurt over the yoghurt flavoured with fruit concentrate without aroma additives. Apart from France and Italy, this difference is statistically significant in all countries.

**Table 5: Means (standard deviations) of liking of yoghurt samples and sensory preference for naturalness per country**

| Country | Liking of yoghurt without additives mean (sd) | Liking of flavoured yoghurt mean (sd) | Sensory preference for naturalness mean (sd) | Sig.[1] |
|---|---|---|---|---|
| **Italy** | 0.72 (1.40) | 0.81 (1.40) | -0.09 (1.47) | 0.306 |
| **Germany** | 0.35 (1.51) | 0.55 (1.56) | -0.20 (1.69) | 0.018 |
| **Switzerland** | 0.47 (1.50) | 0.70 (1.38) | -0.23 (1.73) | 0.015 |
| **Poland** | 0.40 (1.66) | 0.78 (1.45) | -0.38 (1.51) | 0.000 |
| **Netherlands** | -0.06 (1.60) | 0.23 (1.50) | -0.29 (1.51) | 0.000 |
| **France** | 0.53 (1.76) | 0.53 (1.63) | -0.00 (1.97) | 0.648 |
| **Pooled sample** | 0.41 (1.59) | 0.60 (1.50) | -0.19 (1.66) | 0.000 |

Notes: The scales of the variables "Liking of yoghurt without additives" and "Liking of flavoured yoghurt" range from -3 (I don't like it at all) to +3 (I like it very much); the scale of the variable *sensory preferences for naturalness* ranges from -6 (strongest aversion) to +6 (strongest preference); 1: Wilcoxon test for paired samples.

In summary, there is a positive attitude towards natural food in all study countries and a negative sensory preference for naturalness in almost all countries except for France. In order to test whether both are significantly linked, we calculate Spearman's correlation between both aspects. Table 6 shows that the correlation between the stated preference for naturalness and the sensory preference for the natural yoghurt in the blind test is close to zero for the total sample, indicating that no (linear) direct linkage exists between attitude towards naturalness and sensory preference for a yoghurt without aroma enhancer compared to one with flavour enhancer. However, taking into account single countries, relatively weak significant positive correlations appear for Germany (r=0.13**) and Italy (r=0.11*). This leads to the conclusion that in these countries there is a slight tendency that the more positive the attitude towards naturalness, the stronger the sensory preference for the natural yoghurt. We do not obtain significant results for the remaining countries.

**Table 6: Means of and correlations between attitude and sensory preference per country**

| | Sensory preference for naturalness mean (sd) | Attitude towards naturalness mean (sd) | Correlations |
|---|---|---|---|
| **F-value** [1] | $2.02^{+}$ | $35.66^{+++}$ | - |
| **Italy** | -0.09 (1.47) | 0.26 (0.66) | 0.11* |
| **Germany** | -0.20 (1.69) | -0.19 (0.88) | 0.13** |
| **Switzerland** | -0.23 (1.73) | 0.04 (0.79) | 0.05 |
| **Poland** | -0.38 (1.51) | 0.17 (0.89) | 0.00 |
| **Netherlands** | -0.29 (1.51) | -0.48 (0.79) | 0.04 |
| **France** | -0.00 (1.97) | 0.18 (0.80) | 0.02 |
| **Pooled sample** | -0.19 (1.66) | 0.00 (0.85) | 0.06*** |

Notes: 1: ANOVA tests; +: significant at the level of 0.1; +++; significant at the level of 0.01 *: Spearman's correlation is significant on a level of 0.1 (two-sided); **: Spearman's correlation is significant at the level of 0.05(two-sided); ***: Spearman's correlation is significant at the level of 0.01(two-sided).

Finally, we wanted to know how many participants, who stated agreement in regard to the avoidance of food additives, actually preferred sample 1 (strawberry yoghurt without aroma additives) to sample 2 (strawberry yoghurt with flavour enhancer). Therefore, we categorised consumers based on their scores for sensory preference and on their agreement to the statement "*I avoid all types of additional ingredients if possible*". Table 7 illustrates the distribution of consumers in a simple 3x3 matrix. First, it clearly confirms that the majority of consumers value the absence of additional ingredients (61.0%) and that there is only a small part, to which the reluctance of additives is not important (15.2%). Moreover, it indicates that only 19% of participants state that they like to avoid additives and simultaneously prefer the yoghurt sample without aroma additives, whereas almost one fourth of the total sample claims the absence of additives to be important, but reveals a sensory preference for the flavour enhanced yoghurt sample in the blind test. According to the Kruskal-Wallis-test, there is a significant association between the two ordinal variables (Chi-square=11.33; $p<0.01$).

**Table 7: Distribution of consumers according to their sensory preference and their attitude towards avoidance of additives**

| | | | | | |
|---|---|---|---|---|---|
| Avoid additives | agreement | 24.9% | 17.1% | 19.0% | **61.0%** |
| | indifference | 14.5% | 8.4% | 8.9% | **31.8%** |
| | disagreement | 6.3% | 4.2% | 4.7% | **15.2%** |
| | **Total** | **42.3%** | **27.4%** | **30.3%** | **100.0%** |
| | | aversion | indifference | preference | **Total** |
| | | Sensory preference for yoghurt without flavour enhancer | | | |

Notes: disagreement < 0; agreement > 0; indifference = 0; aversion <0; preference >0

## 4 Discussion and conclusions

As stated above, naturalness is a rather vague concept that is difficult to define although it is playing an increasing role in food marketing (Rozin, 2005, Siipi, 2013). From a consumer point of view, the factor analysis conducted in this study revealed that the dimension "naturalness" is composed of several aspects that seem to be quite diverse at first glance. However, previous research confirms that all these aspects are reasonably subsumed under naturalness. With regard to the highest loading item referring to the avoidance of additives, such as flavour enhancers, conservatives and colourants, Roininen et al. (2001) and Schösler et al. (2013) also find this to be a characteristic of naturalness.

The second item takes into account the relevance of regional and traditional food. Schösler et al. (2013) report that consumers are more sensitive to the issue of familiarity, trust and geographical vicinity and strive for being connected with nature by consuming food that is native to their home region. Also, Kuznesof et al. (1997) and Murdoch and Miele (1999) conclude that locally recognisable foods convey proximity to nature to the consumer. Moreover, Hauser et al. (2011) reveal that traditional farming methods are important to consumers and related this issue to the value-dimension authenticity/naturalness. In a literature review, Bazzani and Canavari (2013) emphasise the emergence of alternative food networks promoting traditional and local food production, quality and natural aspects of food as a response to the conventional and industrialised food stream. Findings from this study also justify the relationship between the factor naturalness and the variable "*I prefer food that tastes artisan/hand-crafted*" that considers small-scale food production as opposed to industrialised food production. Autio et al. (2013) and Murdoch and Miele (1999) assert that standardised food is equated with unnatural food and, on the other hand that the craftsmanship of small producers stands for clean and pure food. Also, Goodman and Watts (1994) accuse conventional industry of replacing "natural" production processes by industrial activities and of substituting natural products by standardised and industrialised ones. This idea is also promoted by the so called Slow Food Movement (Jones et al., 2003)

The preference for freshness is measured by two variables. One of the variables also considers naturalness in comparison with canned or frozen food products. Schösler et al. (2013) and Murdoch and Miele (1999) support the assumption that freshness can be understood as an important aspect of naturalness as opposed to food preservation, preparation and packaging. These minimise the impact of the biological or natural content of food products.

The last item addresses the common association of naturalness with health, which is confirmed, e.g., by Rozin (2005), Guido et al. (2010), and Siipi (2013).

One objective of this study was the exploration of the attitude towards naturalness in different European countries. Explanations for differences may be found in culture and tradition as well as in different structures of food supply chains. Italy and France, for instance, are known for their long-lasting cultural and gastronomic traditions (Renting et al., 2003) combined with a high share of

small-scale family-run food businesses (Hingley & Sodano, 2010). Local food production and traditional artisanry are characteristic of these countries and inherit a less industrialised production of food, which may be perceived as closer to nature (Autio et al., 2013; Hauser et al., 2011; Murdoch & Miele, 1999; Schösler et al., 2013). Parrott et al. (2002) support this by determining two prevalent but not exclusive food cultures that divide northern and southern European countries. They suggest that in Northern Europe, great emphasis is placed on functionality-driven commodities, economic efficiency in food production and aspatial approaches to food quality, whereas Southern countries assign more value to local, traditional and artisanal production (ibid.). This is confirmed by our data. Italian and French consumers belong to those countries with the most positive attitude towards naturalness. They particularly value food that tastes artisan or hand-crafted more than other naturalness-aspects and also more than other countries (see Figure 2).

The relatively high affinity towards naturalness among Polish consumers can be explained by the fact that industrial agriculture and food manufacturing are comparatively underdeveloped and strongly oriented towards traditional and old-fashioned methods with a low use of fertiliser and other chemicals (Bär, 2007; Kociszewska & Nowak, 2003; Nesterov, 2003; Platje, 2004). Moreover, Polish consumers have little trust in industrially produced agricultural products (Platje, 2004).

On the contrary, Switzerland, Germany and particularly the Netherlands show comparatively low attitudes towards naturalness, which goes in line with the approach of alternative geography of food proposed by Parrott et al. (2002). Nevertheless, the relative low importance of naturalness in Switzerland and Germany is somewhat surprising, since one might expect that their well-developed organic food markets are associated with a high demand for naturalness. However, this could also indicate that consumers from these countries distinguish between organic and natural food insofar as they do not necessarily attribute all aspects of naturalness to organic food products due to the conventionalisation of the organic food industry that has taken place in the last decades (Berlin et al., 2009; Eden et al., 2008; Pugliese et al., 2013). These consumers might be aware of the organic sector's change from a niche market motivated by ideals, values and beliefs to an almost mainstream trend that is manifested in de-regionalisation and strong incorporation within conventional food networks (Lockie & Lyons, 2002).

Furthermore, the data reveals that the stated preference for naturalness among European organic consumers is detached from the actual sensory preference forit, measured in a blind test. Based on the assumption that participants associate flavour intensity to the usage of flavour enhancers rendering the product less natural, correlations between the two variables indicate that for most countries we cannot conclude that more naturalness-affine consumers actually prefer the taste of more naturally flavoured yoghurt. Merely for Germany and Italy did we find weak positive correlations, which indicate only tendencies. Since for the remaining countries correlations are not significant, we have to assume that hypothesis of a relation between the attitude towards naturalness and the taste preference for natural yoghurt is not confirmed.

In the style of the attitude-behaviour-gap, we interpret this as an attitude-liking-gap, since attitude towards naturalness and taste preference for yoghurt without resp. with flavour enhancer are unlinked. Laureati et al. (2013) report similar results when analysing consumers' liking of organic and conventional yoghurt in dependence of their sustainability-orientation. They find that sustainable consumers do not significantly prefer the organic yoghurt to the conventional one, under both blind and informed condition, but that they like both samples equally.

In contrast to that, Fernqvist and Ekelund (2013) find positive correlations between the attitude towards organic products and the taste of tomatoes labelled as organic, although these were rather weak. However, in this case the well-known label effect on sensory perception changes the framework.

In a literature review, Fernqvist and Ekelund (2014) analysed the effect of attitudes towards, interest in and consciousness for health on the liking of products with health claims. They conclude that in most cases there is no significant effect of health attitudes, interest or consciousness on hedonic ratings of products with a health claim. Only two studies reveal a positive influence and are thus in accordance with the findings of Fernqvist and Ekelund (2013). Nevertheless, these studies, apart from Laureati et al. (2013), differ in one important aspect from our analysis, namely that liking was evaluated under informed conditions (labelled test), thus not measuring the actual taste preference, but a perception that is presumably influenced by the organic label and the well known label impact (Hemmerling et al., 2013; Napolitano et al., 2010; Napolitano et al., 2010b).

Reasons for the attitude-liking-gap may be due to consumers being used to flavour-enhanced food. According to the mere-exposure effect (Pliner, 1982), they might have built preferences for food that has a more intense flavour by being constantly exposed to (high) doses of aromas and flavour enhancers in the course of their lives. In general, existing literature (Saba et al., 1998; Shepherd et al., 1991/2a, 1991/2b; Tuorila, 1987) as well as the results of country comparisons in this article support the notion that taste highly depends on experience. Moreover, previous research asserts that sensory skills of consumers are weak (Wilton & Greenhoff, 1988; Greenhoff & MacFie, 1994). Thus, consumers might also have difficulties to distinguish a natural product from a flavour-enhanced one. For example, we have to consider the likelihood that participants do not necessarily link a more intense flavour to the usage of flavour enhancers. We cannot exclude the possibility that they believe that yoghurt with natural strawberry concentrate has a more intense flavour than strawberry yoghurt with flavour enhancers.

For the case when participants of the present study actually identified the natural sample but nevertheless preferred the flavoured one, it is possible that the taste perception simply overlaid the attitude, which is also suggested by Rozin et al. (2004). Regarding this, several researchers emphasise the major importance of liking for the food choice by constituting that a food is unlikely to be eaten if its sensory properties are not perceived as positive (Furst et al., 1996; Hetherington & Rolls, 1996; Steptoe et al., 1995). Accordingly, Tuorila and Pangborn (1988), Wardle (1993) and Woodward et al. (1996) found out that liking was a stronger predictor of food consumption than health

beliefs. Negative consequences of unhealthy nutrition can be observed by the consumer and can seem to concern them, yet do not prevail in the influence liking has on food consumption. Contrary, negative consequences of unnatural eating habits are not scientifically proven and not apparent to the consumer, which gives even more reason to not despise a product that is perceived as better tasting.

The classification of test subjects displayed in Table 7 stresses the extent of the inconsistency in attitude and taste preference in a blind test framework. We observe that about 60% of participants revealed a high importance for naturalness, but only 19.0% actually prefer the taste of the yoghurt sample without aroma additives. 42.0% of the consumers consider the naturalness of food products to be important, but they do not show a preference for the natural option, which we assume is sensed by less flavour intensity. We presume that their ability to sensorially perceive that food taste may have been enhanced using ingredients not complying with a common definition of "natural" is weak.

However, when purchasing food, the 42% of consumers, characterised by a difference between stated preferences and liking in a blind test, could rely on corresponding product descriptions. Although taste has been commonly defined as an experience attribute that can be verified during consumption (Darby & Karni, 1973; Grunert et al., 2004), the lack of ability to distinguish naturalness by tasting suggests that it should rather be considered partly as a credence attribute, at least for complex dimensions. In a real consumption situation, factors influencing the sensory evaluation of a product such as labels, origin, ingredient lists, brands, price and the context of consumption cannot be excluded (Enneking et al., 2007; Hemmerling et al., 2013; Kähkönen et al., 1995; Wansink & Park, 2002; Wansink et al., 2005). There is a reasonable chance that the evaluation of a food product from this consumer group in a purchase and/or consumption situation is influenced more by extrinsic product information rather than by sensory properties. In this case, consumers may follow marketing signals and consequently buy the product with a natural claim. On the other hand, there is a chance of dissatisfaction and subsequent rejection on the part of the consumer, for example, when a product is advertised as natural but cannot fulfil consumers' sensory expectations deriving from the claim.

For companies in the natural market segment, the advertisement of naturalness should therefore not concentrate too much on taste aspects of a food product. Respecting that consumers' sensory skills are limited and taste perception is easily suggestible, other product attributes that do not allow a highly subjective evaluation, such as production and processing methods as well as ingredients, could move in the focus of marketing claims instead.

Also, the fact that the sample contains only organic consumers should be taken into account. Since one common purchase motive for organic food is the perception that it is more natural than conventional food, we expected that the participants of this survey would reveal a stronger sensory preference for the natural yoghurt sample than for the flavoured sample, due to presumably being more exposed to food that is produced with fewer unnatural ingredients. However, the results suggest that

European organic consumers are not particularly sensible to natural taste. This is confirmed by additional analyses that found no relation between the sensory preference for naturalness and the frequency with which organic food is consumed.

Concluding, the present study demonstrates that (organic) consumers from different European countries have a positive attitude towards naturalness, however, that cannot predict the actual sensory liking of a product in a blind test. Thus, in the case of naturalness of yoghurt, which is assumed to be sensed by the degree of flavour intensity, there seems to be a difference between stated preferences and liking in a blind test. We label this effect as an attitude-liking-gap.

For different reasons, more research is needed in this field. First, the convenience sample used for this analysis is not representative, but at least provides a useful starting point for further extensive analyses. Conclusions from this work must therefore be considered as hypotheses that should be tested with larger and representative samples. Second, in this study we exemplarily tested only one product category, strawberry-flavoured yoghurt. A broader range of products should be analysed for confirmation of the obtained results. Another point to consider in future research is the cross-national context that may bring along the problem of varying usage of scales in different countries. Additionally, we obtain rather moderate values for the reliability of some factors. This may be due to the possibly inaccurate measurement of the concept of naturalness and of other food-related lifestyle dimensions due to using a survey instrument that was not solely designed for this analysis. This stresses the need for a more extensive investigation of the concept of naturalness and its contributing aspects.

So far, marketing research and sensory analysis have traditionally been two separate disciplines. The findings of this paper suggest that a stronger linkage between both is essential, in order to understand consumer food choice behaviour, to develop new products and target-specific marketing strategies.

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# Chapter III: Excursus

## III Developing an authenticity model of traditional food specialties: does the self-concept of consumers matter?

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## Abstract

**Purpose:** In this study we develop an authenticity scale for food specialties considering both the subjective and the object-based dimensions of authenticity. We further measure its relationship with personality traits, such as consumer self-concept and identification with the product (antecedents), as well as with the consumption intention (consequences).

**Design/methodology/approach:** Hypotheses were analysed by means of a structural equation model using AMOS. Calculations were based on data collected through an online survey of 138 German respondents who were recruited by a consumer panel.

**Findings:** Both subjective and object-based perceived authenticity significantly influence the purchase intention. The subjective authenticity, which is affected by the consumer's self-identification with the product and personality traits such as determination and passion, mediates object-based authenticity's role.

**Research limitations/implications:** The results presented in this paper will help to further understand what influences the perception of authenticity of a traditional food product and how it affects purchase intentions. More influencing variables should be considered in future research. Also, the model should be tested for other product groups. Repeated analyses considering larger samples are necessary to confirm the presented results.

**Practical implications:** A deeper understanding of what psychological and social factors affect the perception of a product's authenticity is important for creating appropriate marketing strategies.

**Originality/value:** The proposed model attempts to explain consumer behaviour by using existing psychological theories. Instead of dealing with either objective-based or individually perceived authenticity dimensions, it considers both and tries to establish a linkage between them.

**Keywords:**authenticity, traditional food specialties, food consumption, identification, underdog

## 1 Introduction

Consumers today have access to a greater number of food products than ever before, but not all products are considered as evenly authentic. The effects of the globalisation of agricultural markets are usually associated with a plethora of anonymous, standardised food products, which are referred to in the literature using terms such as fast-food infatuation (Jones et al., 2003) or McDonaldisation (Ritzer, 2000). However, as Lee and Wall (2012) point out, globalisation simultaneously has the contrasting effect of exposing and valorising the food specialties of even small producers, as these specialties are perceived as different, tastier and relevant for the consumer (Winter, 2003). Hence,

the abundance of products perceived as inauthentic is advantageous at times (Vannini and Williams, 2009), because consumers increasingly begin to search for "something real from someone genuine, not a fake from some phony" (Gilmore and Pine, 2007).

In this context, "the management of the customer perception of authenticity" turns out to be the main source of competitive advantage (Gilmore and Pine, 2007). As a matter of fact, studies developed to analyse the construct of authenticity have increased over the years, especially in the tourism literature, which is essentially due to the experiential nature of tourist services (Pine and Gilmore, 1998). In contrast, in the food literature authenticity studies have predominantly focused on rules developed to assess the origin of food products from a bio-chemical perspective. Only a few studies, such as the one of Liao and Ma (2009) and Camus (2004), have surveyed the determinants of food authenticity from a consumer perspective. While there is a vast literature on authenticity theories, remarkably few scholars have provided empirical evidence on this subject by using a quantitative research design, with the notable exception of Camus (2004). However, the latter does not measure the influence of perceived authenticity on consumption, leaving its value in economic terms unclear.

In addition, authenticity research cannot refrain from including recent discoveries of psychology and consumer research.For instance, according to Paharia et al. (2011), consumers react positively when products are described with narratives that elicit feelings of passion and determination because it reflects so-called underdog attributes of their own personality. In this way, consumers who see themselves as underprivileged would be more likely to identify with a product described as an underdog competing against a giant embedded in the globalised market. Traditional food specialties are defined as products that are characterised by particular qualitative aspects and by a specific cultural identity (Jordana, 2000). Small-scale operators often produce them, and as stated by Eden and Bear (2010), "'small' and 'local' are seen as essentially better and certainly more ethically sound than 'big' and 'global' in commercial terms". Nevertheless, an analysis on the effect of personality traits on the perceived authenticity of food specialties has not been conducted yet.

To this end, we developed an authenticity model and measured its relationship with personality traits (antecedents) as well as with consumption intention (consequences). Our model demonstrates that both subjective and object-related authenticities are essential dimensions to understand consumer perception of product authenticity. Furthermore, the data confirms the highly important role of personality-related attributes since they help consumers to better identify with the product (Von Alvensleben, 2000; Orth et al., 2005). We finally argue that the use of such a model in marketing could better tailor speciality products by linking them to particular consumer typologies.

Authenticity, consumer personality and consumption

Many scholars address the effects of globalisation on consumers as a loss of identity, and consequently, individuals in search of authenticity are in search of themselves (Price and Walker, 1991). The concept of the *extended self,* first coined by Belk (1988), is helpful to contextualise consumer

personality in the global marketplace. According to Belk, the act of buying a product does not only allow individuals to possess an object but also to project their own personality on that object, hence giving them the possibility to find themselves or who they would like to be (Bergadaà, 2008). For instance, in her analysis on perceived authenticity of art-related handcraft, she explains that consumers do not purchase the object according to an economic logic but because they reflect their actual or desired personality (Bergadaà, 2008). The large body of literature on brands has even moved a little further by shifting the focus from the consumer personality to the product personality. According to this approach, humans confer anthropomorphic attributes to inanimate objects reaching in this way a high degree of identification with them (Bech-Larsen, 2007; Bruhn et al., 2012).

Against this background, the role of perceived authenticity appears crucial in bonding together consumer and product personalities, thus mediating between consumer identification and consumption. Until now, only one study has succeeded to measure the positive value of authenticity on consumption (Castéran and Roederer, 2013). However, in the field of food consumption, no studies have been conducted so far.

Profiling the consumer of localised food products

In psychological research, recent discoveries of Paharia et al. (2011) show a particularly strong and positive effect on the consumption of products when these are described as "underdogs", i.e., made by producers of comparatively humble origins, who have eventually reached success, thanks to their determination and passion. Furthermore, the authors demonstrate that in some circumstances the underdog effect is particularly strong, such as when it is mediated by consumers' identification with the product and when consumers "strongly self-identify as underdogs" (Paharia et al., 2011).

Although the communicative strategy of the underdog narratives is used also by big enterprises like Apple, in this study we claim that local products are particularly suitable candidates to be associated with underdogs. Especially unknown food specialties, produced by small-scale businesses and in traditional ways, carry by definition the attributes of humble beginnings and noble struggles against (stronger) adversaries. Furthermore, with regard to consumers with a positive attitude towards local products (Steenkamp and de Jong, 2010), we claim that especially consumers who identify themselves as intrinsically passionate may be attracted by local unknown food specialties.

## 2 The debate on authenticity

In the previous paragraphs, we introduced the relationship between local food consumers and their intention to consume food specialities. Thereby, we individuated some psychological traits as facilitators in the perception of food authenticity. Since the latter is vehemently debated in the consumer literature, in the remainder of the paper, we offer a systematisation of the concept of authenticity of traditional food specialties and we propose a model to measure its dimensions and its influence on consumption intention.

Subjective authenticity of traditional food

A large number of studies document an increasing interest in local and traditional food (Eden and Bear, 2010; Kneafsey, 2010; Winter, 2003), which has turned many traditional specialties into heritage food and food items into icons of past agrarian life (Jones et al., 2003). Such "cultural turn into agriculture" (Winter, 2005) cannot fully be understood without a review of the multiple associations that individuals attach to local food (Kneafsey, 2010). As a consequence of repeated food scandals (Albersmeier et al., 2009), as well as the increasing dependence of individuals to convenience food (Alonso, 2010), consumers feel they have lost the knowledge necessary to make discerning decisions about the multiple dimensions of quality (Jaffe and Gertler, 2006), termed by many scholars as consumer food illiteracy or consumer deskilling (Alonso, 2010; Jaffe and Gertler, 2006). The embeddedness of local food in re-territorialised, alternative agro-food networks (Ilbery and Kneafsey, 1999; Ilbery, 2005; Winter, 2005) encourages the re-establishment of trust and confidence in food products (Tregear et al., 2007; Halweil, 2004) and contributes to rural and social development (Goodman, 2004).

Thus, local food is not only seen as a simple commodity (Marsden, 1998; Marsden et al., 2002) but also as a way to establish close relationships among consumers and producers while empowering the local community. In fact, being mainly commercialised through direct sales channels, local food products usually display higher economic returns with retention of profits within the community and increment social interactions between consumers and producers (Goodman, 2004). In addition, food products produced via small-scale domestic manufacture are often produced without the use of additives and involve a high degree of manual work. This artisanal character is often attractive to consumers because they perceive it as a creative (Sidali et al., 2013) and intimate culinary artefact (Ananieva and Holm, 2006), as demonstrated by the vast literature on embodiment and sensuality in relation to food (Holloway et al., 2007).

In addition, although many scholars warn of the negative consequences derived from a simplistic equalling of local with quality (Edwards-Jones, 2008; Winter, 2003), the positive halo-effect of local food has been repeatedly confirmed. For instance, Kneafsey (2010) reports that local food products are something preferred a priori to larger scales products. Liao and Ma (2009), in their qualitative study on heterogeneous consumers, reveal the existence of a cluster of individuals that appreciate authentic products because of their perceived aura of purity. Finally, recent studies point out that consumers tend to associate local food with environmental protection, animal welfare (Fonte, 2008; Sidali et al., 2013) and other sustainability issues. In this regard, Lee and Wall (2012) present a framework to successfully establish a food cluster. In this framework, environmentally friendly strategies attract consumers searching for authentic products, thus acting as a facilitator for the creation of the food cluster.

Object-based authenticity of traditional food

According to Steenkamp and de Jong (2010), a culture of consumption deals with products consumed across place and time. Accordingly, we refer to the product-specific, temporal and spatial attributes to systemise object-based authenticity.

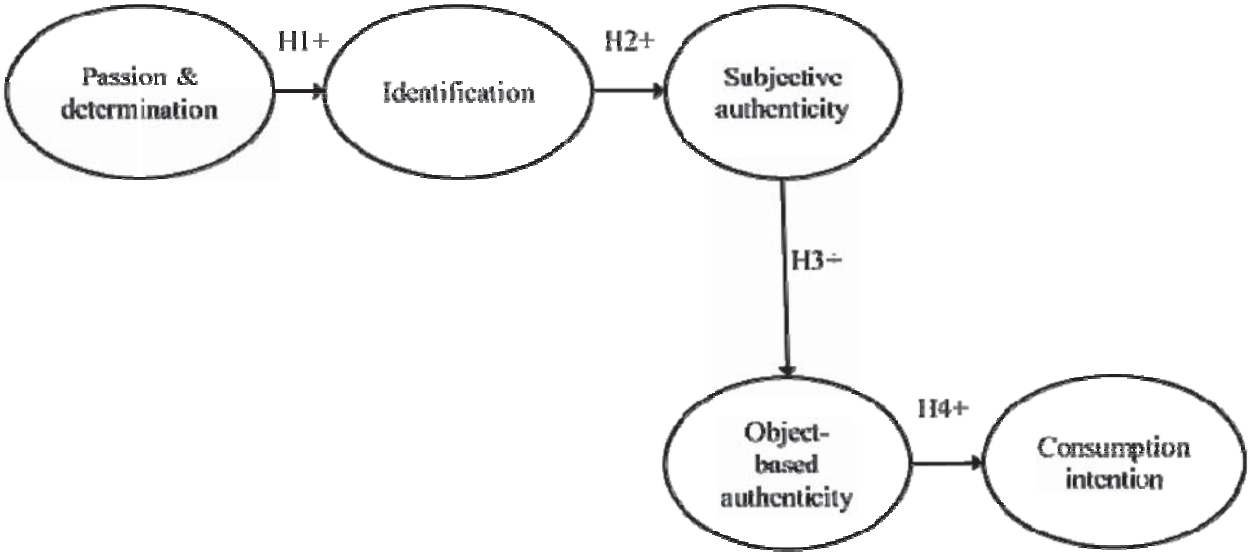
Quality claims concerned with the method of production, such as "traditional production method" or "traditional recipe" are credence attributes; therefore, they are not verifiable by the end user (Kolar and Zabkar, 2010; Nelson, 1970). Accordingly, quality state-run labels, such as organic or geographical indications, or private labels, such as the Slow Food Label, are important to safeguard the credibility of the claims. As a result, in conventional supply-chains food companies have started to develop product lines whose marketing and labelling strategies evoke credence attributes such as traditional homemade methods (Jolly, 1999).

Furthermore, temporary references also serve to reinforce consumers' perceived authenticity of a product. For instance, if a company can demonstrate some form of tradition that it has preserved over the years, it increasingly enhances the perceived objective authenticity of the product (Gilmore and Pine, 2007; Liao and Ma, 2009). Similarly, stating the first year of production seems to also be an effective way to increase the product's authenticity in the eyes of consumers. Hence, the legitimising power of history is so strong (Comaroff and Comaroff, 2009) that no 'authenticitisation' process can ignore it, not even at the level of international politics (e.g., heritage list of UNESCO) or industry, as confirmed by the existence of consultancies merely specialised in history marketing (e.g., iwf (Institute for Corporate and Economic History, Hamburg/Germany). Finally, regarding the spatial dimension, many scholars affirm that a known local origin is the most important attribute authenticating a product (Beverland, 2005; Groves, 2001; Kuznesof et al., 1997; Lewis and Bridger, 2001).

## 3 Proposed theoretical framework

In the following, we propose a model to measure food (subjective and object-based) authenticity as well as to identify its relevant determinants and its consequence on consumption intention. As explained in detail in the remainder of the paper, we will test the following proposition: passionate and determined consumers will feel an identity with a food specialty thereby generating an individually constructed idea of authenticity about the product (subjective authenticity). The latter will positively contribute to a perception of object-based authenticity with the product, eventually resulting in an intention of consuming the mentioned specialty.

**Figure 1: Proposed model of authenticity**




Regarding local and traditional food specialties, the literature asserts that these are often produced by small and passionate entrepreneurs (Belletti et al., 2007) that, with their determined behaviour to compete against global players of the food industry, attract consumers of local specialties (Toler et al., 2009) and rural culinary tourists (Cederholm and Hultman, 2010). The market for traditional specialties substantially represents a niche, i.e., a market segment within the larger marketplace consisting of groups of consumers who have similar demographic, buying behaviour and lifestyle characteristics (Thilmany, 2008). According to the theory of the underdog-effect proposed by Paharia et al. (2011), consumers who self-identify as underdogs have a higher preference and purchase intention for products that they perceive as particularly determined and passionate to succeed when the odds are against them. This leads to hypothesis H1:

H1: The more passionate and determined the consumer is, the more likely he/she identifies with the niche product.

Identification

As mentioned before, several marketing studies show that consumers prefer products reflecting their actual or desired personality (Dittmar, 1992; Kassarjian, 1971; Sirgy, 1982) and as a consequence continuously construct their identity through purchasing certain products (Niinimaki, 2010). For instance, Cook et al. (2002), Sparks and Shepherd (1992) and Whitmarsh and O'Neill (2010) reveal that a person's identification with green consumers positively influences his or her intention to purchase environmental friendly products. McCracken's (1989) model of meaning transfer can

also be applied in this context, since it hypothesises that meaning moves from a good to its consumer supporting the creation and expression of self-identity. This leads to the second hypothesis:

H2: The higher the identification with the niche product is, the higher the individually constructed authenticity.

Individually constructed authenticity and object-based authenticity

Although the study of authenticity has led to many conceptualisations and different definitions, the particular relevance of the subjective dimension of perceived authenticity seems to find a higher consensus among scholars (Camus, 2004; Castéran & Roederer, 2013). For instance, Franchi (2011) and Marsden (1998) demonstrated how affective dimensions related to food such as emotions and values can significantly influence mental images and even the sensory perception of food. Likewise, subjective authenticity may reinforce the mental images that consumers have of a food specialty regarding its perceived product's settings (place, method of production, quality and time). This concern is addressed in the following hypothesis:

H3: The individually constructed authenticity has a significant and positive influence on object-based authenticity.

Consumption

A plethora of studies point out that authenticity is a purchase argument and an important issue for marketing (Beverland, 2005; Lunardo and Guerinet, 2007; Gilmore and Pine, 2007). As demonstrated by Castéran and Roederer (2013) in the field of tourism, we also expect that a positive perception of object-related authenticity of a food specialty leads to a positive intention to consume it in the future, as constituted in H4:

H4: The object-based authenticity has a significant and positive influence on the stated intention to consume the niche product.

## 4 Study design and methods

Measurement development

In order to test the hypotheses a soft cheese from a low mountain range in the southwest of Germany, the Odenwald, was chosen as an example of an underdog product. This regional specialty has a long tradition dating back to the 18th century. Nowadays, it is produced by only one local family-run diary following its traditional artisan procedure. The cheese's name, *Odenwälder Frühstückskäse* (breakfast cheese from the Odenwald), has been protected by the European Union since 1997 as a PDO (protected designation of origin)-product. The cheese is hardly known beyond the region's borders. For this reason, participants received the following informative text in German, on the basis of which they had to evaluate subsequent statements regarding the product.

"*Britta and Kurt Kohlhage own the Hüttenthal Dairy in the Odenwald region. They produce the Odenwälder Frühstückskäse using milk only from the Odenwald region. Since this cheese stems from an ancient recipe, the European Union protects it with the PDO (Protection Designation of Origin) label. Although they are the last producers of this cheese specialty, Mr and Mrs Kohlhage don't do it because of the label. Of course they are proud to produce it, but they remain down to earth. 'The regional authorities of Giessen decided to help us in gaining the protection, we don't know anything about bureaucracy involved' they say, adding 'we only care about cheese and not about the label. But because the authorities took care of the application process, we went along with it. Now we see that the customers like this authentic cheese, and we're happy about that.'*"

The questionnaire was composed of three main parts: socio-demographics, product-related attributes and a self-assessment of being passionate and determined. With respect to product-related attributes, the respondents had to evaluate different properties of the *Odenwälder Frühstückskäse* regarding its origin, production, quality and originality. Moreover, they had to assess the perceived identity/personality of the cheese as well as of the dairy where it is produced. The majority of items were taken from scales that measure the authenticity of food products and that were originally applied by Camus (2003) and Maille and Camus (2006). Respondents also had to state the frequency and intention of their consumption of the study cheese. Items regarding the self-assessment of being passionate and determined were taken from the underdog scale developed by Paharia et al. (2011) and partly modified. Finally, respondents were asked to provide common socio-demographic information.

Data collection and research sample

After pretesting the questionnaire with about 20 respondents and conducting some minor changes, the study was designed as an online survey in Germany in December 2012 using the software Unipark. All items were randomised. For the analysis presented here, a sample of 150 participants was used. The sample was recruited via a consumer panel. Screening out the respondents who took

less than five minutes to fill out the entire questionnaire led to a cleaned sample (n=138). In order to participate in the study, respondents had to be at least 18 years old and had to state at least an occasional consumption of cheese. We strived for a sample that is representative for the German population with regard to age, gender and income. Almost half of the sample was male and the average age was 49 years. 43.5% of the respondents earn below 1501€ per month, 22.5% earn between 1501€ and 2000€, and 34% earn more than 2000€. 27.5% of all participants have a university-entrance diploma and nearly 12% have an academic degree. The rest of the sample has a lower educational level. About one third live in small cities with up to 30,000 inhabitants, and almost one half live in big cities. 28% of all participants are singles, 45% share their household with one other person. The majority does not have any children. Descriptive statistics were calculated with IBM SPPS Statistics 21.

## 5 Results

Measurement model

As shown in Table 1, the measurement model consists of four measurement variables for passion, three for identification, five for subjective authenticity, six for objective authenticity and one for intent to consume.

The measurement model possesses a one-dimensional measurement of constructs such that each observed variable is related to a single latent variable (Anderson and Gerbing, 1988). By means of second-generation criteria (e.g., indicator and construct reliability, variance extracted), we further analysed whether variables in the model that exceed or are very close to the minimal threshold indicated in the literature. The indicators appear to be reliable (indicator reliability above or close to the threshold of 0.40), and the values for composite reliability are above the critical limit of 0.60. Regarding the average variance extracted (AVE), passion is close to the critical limit of 0.50, while all the other constructs have good reliability (see Table 1).

We also tested the model for convergent and discriminant validity. All t-values of the indicator loadings on the respective latent variables are statistically significant, thus convergent validity is supported. Discriminant validity is assessed with a$\chi^2$-test for pairs of latent variables with a constraining correlation coefficient between two latent variables set to 1. All unconstrained models have a significantly lower value of $\chi^2$ than the constrained models. This leads to the conclusion that discriminant validity is supported. The results of the confirmatory factor analysis show that the hypothesised measurement model fits the data reasonably well and the overall fit indices are appropriate. The goodness-of-fit indices for the measurement model are within the conventional ranges (see Table 1).

**Table 1: Overall CFA for the measurement model (n=138)**

| Construct and indicators[1] | Standardised loading (t-value) | Construct and indicator reliability | Average variance extracted |
|---|---|---|---|
| *Passion* | | *0.79* | 0.49 |
| I always stay determined even when I lose. | 0.84 | 0.70 | |
| Compared to others, I am more passionate about my goals. | 0.66 (5.82) | 0.44 | |
| Even when I've failed I have not lost hope. | 0.65 (5.72) | 0.42 | |
| When others expect me to fail I do not quit. | 0.62 (5.50) | 0.38 | |
| *Identification with product* | | *0.87* | 0.70 |
| This cheese fits with my life and my shopping style. | 0.92 | 0.85 | |
| I can identify with this cheese. | 0.86 (9.90) | 0.74 | |
| This product is the expression of myself. | 0.72 (8.17) | 0.52 | |
| *Subj. authenticity* | | *0.93* | 0.74 |
| This product protects the biodiversity in the region. | 0.81 | 0.66 | |
| This product embodies moral purity. | 0.80 (9.14) | 0.64 | |
| This product is trustworthy. | 0.90 (11.02) | 0.82 | |
| This product is artisanal. | 0.89 (10.81) | 0.80 | |
| This product supports the region. | 0.90 (10.95) | 0.81 | |
| *Obj. authenticity* | | *0.91* | 0.64 |
| I can imagine where this cheese is produced. | 0.74 | 0.54 | |
| I am sure that the quality of this product is above average. | 0.84 (8.31) | 0.70 | |
| I can imagine how this cheese is produced. | 0.71 (6.99) | | |
| I am sure that this cheese is made in a traditional way (traditional method). | 0.88 (8.76) | 0.78 | |
| I am sure that all the ingredients come from the Odenwald region. | 0.81 (8.07) | 0.66 | |
| These cheese-makers are also oriented to preserve tradition. | 0.80 (7.91) | 0.64 | |
| *Consumption (stated intention)*[2] | | | |
| I will (further) consume this cheese in the future. | - | - | - |

Notes: 1: 5-point rating scale (1=totally disagree to 5=totally agree); 2:tests not possible for one-item construct.

Structural model

Following the proposed measurement model of this study, an empirical structural equation model was developed in order to test whether the hypothesised theoretical model is consistent with the collected data. The model includes the exogenous latent variable passion and the endogenous latent variables of identification, subjective authenticity, objective authenticity and consumption (seeFigure 1). It is worth noting that identification is explained by passion, subjective authenticity by identification, objective authenticity by subjective authenticity and intention to consume by objective authenticity. In the following, the percentage of variation in the endogenous factors accounted for by the exogenous factors is reported. The exogenous variable of passion can explain 21% of the

variation in identification while the latter explains 45% of the variation in subjective authenticity. Furthermore, 90% of variation in objective authenticity is explained by subjective authenticity. Finally, 23% of the variation in intention to consume is explained by objective authenticity.

Our model not only explains significant amounts of the variation in the endogenous variables, but it also displays goodness-of-fit indices within an acceptable range. The Satorra-Bentler scaled $\chi^2$ is not significant ($\chi^2$=171, df=149, p=0.106). The fit between the structural model and data was evaluated by different types of measures such as the root mean square error of approximation (RMSEA), the comparative fit index (CFI) and normed fit index (NFI). All fit statistics measures are within an acceptable range (RMSEA=0.04, GFI=0.85, NFI=0.878, CFI=0.982). We tested the hypotheses by examining the sign, size and statistical significance of the structural coefficients. The hypotheses about the relationship among the constructs tested in the final model are supported (see Table 2). The parameter estimates for the relationship of passion with identification is statistically significant and consistent with the proposed direction of the hypothesis (H1). The effect of identification on subjective authenticity is significant and positive (H2) as well as for subjective authenticity on objective authenticity (H3). The effect of the latter on consumer (H4) is positive and significant. The magnitude of the coefficient scores indicates that subjective authenticity has the largest influence on objective authenticity, while passion displays the weakest influence on identification. Furthermore, Sobel's test indicates a significant indirect effect for subjective authenticity on consumption intention through object-based authenticity (b=0.59***, t=3.96) indicating full mediation of the latter on consumption intention.

**Table 2: Test of hypotheses**

| Path | Proposed direction | Unstandardised path coefficients (t-test) | Result |
|---|---|---|---|
| H1: Passion positively influences identification | + | 0.57 (3.87) | Supported |
| H2: Identification positively influences subjective authenticity | + | 0.63 (6.46) | Supported |
| H3: Subjective authenticity positively influences object-based authenticity | + | 0.84 (4.84) | Supported |
| H4: Object-based authenticity positively influences consume intention | + | 0.70 (4.60) | Supported |

## 6 Discussion

The scope of this article was to developed an authenticity model for niche products that relates food properties associated with the perceived origin of food (so-called object-based authenticity) to more intangible characteristics that derive from the mind-set of individuals (i.e., individually constructed authenticity and identity). Our model confirms that both subjective and object-based authenticity co-exist and are essential dimensions in understanding consumer perception of product authenticity.

In previous literature, both are treated as contrasting concepts (Grayson and Martinec, 2004; Reisinger and Steiner, 2006). However, our study suggests that they should be considered as two self-contained dimensions that both contribute to the understanding of perceived authenticity.

Apart from that, the study substantially contributes to existing marketing literature, demonstrating the importance of personality-related attributes that help consumers to better identify with the product (Von Alvensleben, 2000; Orth et al., 2005). Existing literature shows that identification with a product or organisation affects purchase intention, for instance in the case of green consumption. However, research on psychological dimensions that drive the identification with a product and influence the perception of authenticity of traditional food specialities mediating purchase behaviour is scarce. Our study addresses this research gap.

By doing so, it motivates a more comprehensive perspective of food consumption in general. Consumers that view themselves as underdogs tend to identify with products that convey the same image and perceive them as more authentic. This leads finally to an increased purchase intention, as suggested by the underdog-effect (Paharia et al., 2011). Findings indicate that deeply anchored psychological concepts (i.e., passion and determination) and emotions and memories elicited by these concepts play a significant role in the complex process of making a food choice. This is in line with Franchi (2011) who emphasises that food choices are not a rational or conscious cognitive exercise, but that food consumption rather involves multiple emotional dimensions that often root themselves in an individual's history and memory. Existing research also suggest that the product or the company producing it do not force a product image, but that it is rather a bilateral process that highly involves the consumers' psyche. They are also in accordance with existing literature (Franchi, 2011; Liao and Ma, 2009) claiming that food is not only valued for its utility or function as a commodity, but that it has also a symbolic, social and cultural significance.

Findings additionally imply that consumers associate a niche product's perceived authenticity with the image of its producer being underprivileged, most likely in comparison with global players in a highly competitive food industry. This can be understood as an expression of opposition towards the advancing industrialisation and intensification of agriculture and hence as an expression of a desire for a more nostalgic and traditional production of food. Autio et al. (2013) emphasise the common notion that consumers more and more disagree with industrial global food production systems, which they perceive as harmful in terms of personal health, general social justice and environmental justice. Outka (2009) adds that nostalgic authenticity is perceived as being separated from the mass market and the factory system. Purchasing authentic products from a traditional small-scale and artisan production can therefore be seen as an escape from the conventional marketplace into the niche market (Autio et al., 2013). This thought may also explain the statistical significance of the proposed model, despite the fact that the tested regional specialty and its producers were most likely unknown to the survey participants. The informative text given in the interview seemed to be capable of eliciting values and sentiments that are not limited to people living in the

same region and knowing the product, but that are generally shared by consumers. This suggests that such a model is also applicable for other traditional or regional food specialties.

Moreover, although we focused our investigations on traditional food specialties, the fundamentality of the analysed psychological dimensions suggests that they may also be relevant for other categories of food, e.g., other niche-products with high quality characteristics, such as organic food, or even for conventional products. We are aware that passion and determination represents only small parts of the human psyche and that further psychological constructs should be considered in future research.

Other limitations have to be considered for the interpretation of the data and for future research. Our ultimate dependent variable, stated intention to consume, displayed low explained variance (adjusted $R^2$=0.23). One possible explanation is that further relevant factors have not been included in the model. For instance, Kim et al. (2012) claim that there are numerous identities that a person might use. With respect to this, further psychological dimensions have to be investigated in order to find out which consumers' identities match the image of a product and whether, or how, these influence the perception of authenticity and consequently consumption behaviour. Furthermore, the quantitative measurement needs to be validated with a larger sample of consumers. Finally, as this study was based on only one product, it would be interesting to also check the model with further niche products to see whether the model may be confirmed. Finally, we argue that the use of such a model could better tailor speciality products by linking them to particular consumer typologies. Thus, in order to develop a measurement concept for product authenticity, more work has to be done.

## 7 Conclusions

This article substantially contributes to the academic literature due to its high degree of innovation. First, relatively little research has been done on the authenticity of food products as well as on traditional food specialties that use the EU labelling schemes, PDO (protection designation of origin) or PGI (protected geographical indication). As stated above, authenticity is a concept not easy to grasp and define, neither for the consumer nor for the researcher. The proposed model can be viewed as a first attempt to encourage more research in this field. Moreover, PDOs and PGIs have relatively recently been introduced and have not gained much attention in theory or in practice so far. The proposed model is a first approach towards a deeper understanding of consumer behaviour with regard to these schemes. In order to gain more knowledge about how the consumer perceives these schemes and how marketing strategies can effectively incorporate them, such research is necessary. Besides, a quantitative approach that uses multivariate statistics to establish causalities between psychological concepts and consumption behaviour in the context of certified traditional food specialties is new. Finally, the study offers potential for extension in terms of the conceptualisation and the methodology. With respect to the former, other product categories and niches or market seg-

ments can be considered. Concerning the latter, causalities to other psychological constructs that affect the creation or strengthening of identification should be analysed.

Based on these, various implications emerge for practitioners. The obtained findings can help managers and producers develop strategies and ideas on how to use the concept of identification for marketing purposes. Increasing the consumers' identification with a product can have the desired effect to retain customers and foster their loyalty (Bhattacharya et al., 1995). Finally, this will lead to the overall objective, to increase sales.

However, it should be stressed that with focus on the here tested cheese product we can conclude that the used communication tool, i.e., the text containing facts about the history, the character and the production methods of the company, reveals to be effective. It reinforces the identification of the consumer with the product and thereby increases purchase intention. The fact that consumers value the authenticity of products, which we interpret as one sign of increasing skepticism or opposition towards industrialised and intensified agriculture as well as globalisation, seems to be a promising approach for the marketing strategies of small-scale companies that produce traditional food specialties. Thus, producers/marketers should strongly communicate authenticity and also their "underdog-story" and try to develop meaningful communication messages. However, a more careful analysis of the effectiveness of such communication tools is necessary.

Apart from a narrative information text, other strategies can be applied to strengthen the consumers' identification with a product. For instance, enabling consumers to visit the production place can enhance trust and perceived closeness to the producer, which are essential for a positive customer-producer relationship. A similar possibility to stimulate customer involvement is courtyard festivals. Moreover, communicating additional values apart from authenticity, such as environmental friendly production, animal welfare or social responsibility, can also be useful in order to strengthen the bond to existing customers and attract new ones.

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# Summary

This dissertation intends to investigate consumer behaviour with a special emphasis on the influence of sensory food attributes and consumers' preferences for them. It highlights the relevance of consumers' sensory perception and preferences for the research of food choices and indicates the need for a stronger integration of sensory analysis in food marketing research. This research concern is explored by using the organic food market as an example. Due to its quality and premium orientation, the organic market offers great potentials for differentiation strategies based on sensory properties. Through a comprehensive and systematic literature review of international research on organic food consumption behaviour, we discover the role that sensory aspects had played until now in organic marketing research and reveal the need for more sensory-oriented consumer research. Based on this, in the context of six European organic markets, consumers' stated preferences and actual sensory preferences are explored, shedding light on the role they play in consumption behaviour. In addition to sensory preferences, the dissertation offers insights into a further perceptual construct that appears to be relevant for consumer behaviour, namely the perceived authenticity of traditional food specialties.

This concluding section presents the main findings of the six research articles comprising the dissertation and outlines some implications for marketing and research. Moreover, it evaluates the limitations of the included studies from which further need for research is derived.

## Remarks on the main findings

This section provides an overview and discussion of the main findings of each of the three chapters. With regard to the literature review presented in chapter I, reference is only made to those outcomes that are related to the research concern of this dissertation.

### Relevance of sensory perception in organic food consumption

By screening English peer-reviewed articles that were published between 2000 and 2011 in scientific journals, 279 studies dealing with organic food consumption behaviour were systematically selected and analysed. This literature review ("*Consumption behaviour regarding organic food from a marketing perspective – A systematic literature review*") enables us to estimate the role that taste and other sensory attributes play in consumer behaviour and marketing research. With regard to the former, a common finding from a large part of the analysed literature is that consumers from different countries around the world mainly associate a good or, relative to conventional products, a better taste with organic food, which is also revealed as one of the most important purchasing criteria besides health and environmental benefits. Also, a good or better appearance is attributed to the mentioned perceptions and beliefs about organic food, although it is stated seldom as the most important purchasing motive. However, the role that appearance plays in consumers' organic food

choices is not clear, since there are some, although relatively few, consumers who perceive organic food as worse looking. Thus, for some consumers the appearance of organic food represents a barrier to purchase it. Not only with regard to appearance but also to the sensory attributes smell and texture, which are hardly distinctly discussed, there is room for further research.

Apart from studies investigating how consumers generally perceive organic food and what product attributes are relevant to them, relatively few publications explicitly investigate the sensory perception of organic food. Some of these examine the actual liking of organic food products under blind conditions, whereas others analyse the effect of information on the taste evaluation. Three studies also quantify the effect of sensory perception on the willingness to pay. Table 1 provides an overview of the main results of these articles.

Table 1 demonstrates the high heterogeneity of the findings, stressing that the claim that organic food tasting better than conventional food is not true per se, but highly depends on different factors. Not only the investigated product category, but also the survey locations are important aspects to consider for interpretation. Due to differing experimental designs and conditions, the extent to which the results can be generalised is therefore highly limited.

In summary, article I confirms the widespread notion that taste is an important factor to consumers when purchasing organic food. With respect to the role played by sensory preferences in marketing research, the outcomes suggest that this issue has received relative little attention. A large amount of evidence exists for the apparent relevance of taste compared to other product properties of organic food choices. However, detailed information about the specific preferences for organic food properties is not available and research into the effects of sensory perception and preferences on consumer behaviour with regard to organic food is scarce, since only three of the 279 reviewed studies directly link both aspects.

**Table 1: Findings of the literature review with regard to sensory preferences**

| Attribute | Main findings | Authors (year of publication) | Country | Product |
|---|---|---|---|---|
| **Actual sensory preferences (testing under blind conditions)** | | | | |
| Taste | Higher scores for organic quality | Annett et al. (2008)<br>Kihlberg & Risvik (2007) | Canada<br>Sweden | Bread |
| | | Revilla et al. (2008) | Spain | Lamb meat |
| | | Fillion & Arazi (2002) | England | Orange juice |
| | | Napolitano et al. (2010a) | Italy | Beef |
| | Higher scores for conventional quality | Markus et al. (2011) | Canada | Beef |
| | No significant difference between organic and conventional quality | Martin & Rasmussen (2011) | Arizona | Wine |
| | | Napolitano et al. (2010b) | Italy | Cheese |
| | | Fillion & Arazi (2002) | England | Milk |
| **Influenced sensory preferences (testing under informed conditions)** | | | | |
| Taste | Positive organic information effect | Di Monaco et al. (2007) | Italy | Soup |
| | | Napolitano et al. (2010a) | Italy | Beef |
| | | Napolitano et al. (2010b) | Italy | Cheese |
| | | Annett et al. (2008) | Canada | Bread |
| | No organic information effect | Poelman et al. (2008) | England, Netherlands | Pineapple |
| | Negative organic information effect | Tagbata and Sirieix (2008) | France | Chocolate |
| **Effect of sensory perception on the willingness to pay (WTP)** | | | | |
| Taste | Positive relationship between WTP and expected liking (stated liking after provision of information) for organic beef and cheese, whereas actual liking (liking before provision of information) is not significantly correlated with it. | Napolitano et al. (2010a)<br>Napolitano et al. (2010b) | Italy | Beef, cheese |
| Appearance | WTP a premium for organic apples decreases as the level of spots on the organic apples increases. | Yue et al. (2009) | Iowa | Apples |

Sensory preferences

A plethora of research reveals that consumers claim taste to be of paramount importance when purchasing organic food. However, the majority of these studies do not account for the compex role that sensory preferences play in consumer behaviour. Chapter II attempts to fill this research gap by proposing some ways of approaching this topic.

The analysis of stated preferences provides valuable insights into preference patterns of organic consumers. First, article II.1 ("*Cross-national sensory segments in the organic market based on stated preferences for the five basic tastes")* shows that similar patterns of general taste preferences exist across countries. Considering not only the spatial distance but also cultural differences between the six studied European countries, this is an interesting result. Second, it highlights that organic consumers of the same country have different taste preferences, revealing the need and the potential for product differentiation. Moreover, the identified taste segments differ significantly in their age, their country membership and their organic food consumption frequency. Particularly the latter finding suggests that organic food consumption affects taste preferences. The article II.2 ("*Core organic taste: Preferences for sensory attributes of organic food among European consumers")* investigates this issue in depth by testing the application of the so called "core organic taste", a set of different taste attributes that are characteristic for organic food. The assumption that organic food consumers, presumably driven by the organic movement philosophy, have a preference for a core organic taste cannot be confirmed in general. Most countries show preferences only for single attributes, which moreover vary between countries. Only for Germany and Switzerland there is the tendency that consumers prefer the proposed core organic taste. These findings indicate the high importance of considering cultural aspects when dealing with more specific food attributes of consumers from different countries.

Taking into consideration that in a real purchase situation consumers usually cannot taste the product before buying it, previously made sensory experiences, which form quality expectations and consequently stated preferences, are the basis for a buying decision (Grunert, 2002). Nevertheless, it is also important to know the factors that influence the evaluation of taste perceptions. In order to approach this question, blind and labelled sensory tests of strawberry yoghurt were performed. The main result of article II.3 ("*Organic food labels as a signal of sensory quality – insights from a cross-cultural consumer survey")* indicates the existence of an organic label effect, i.e., the organic label improving the sensory perception of a product. The main outcome of article II.4 ("*Preference for naturalness of European organic consumers – First evidence of an attitude-liking-gap*") suggests that organic consumers prefer flavour-enhanced yoghurt, which we define as "unnatural" compared to the natural unflavoured yoghurt, although they have a positive attitude towards naturalness. Thus, without product information, consumers prefer the flavour-enhanced yoghurt. However, knowing that the yoghurt is organically produced, consumers prefer the yoghurt without flavour enhancer. On the one hand, these findings highlight the power of marketing claims over consumers' sensory preferences, especially due to consumers assigning a lot of value to the taste of food. On the other hand, they underline the superior role of sensory preferences, since attitudes seem to lose relevance when being confronted with the actual sensory liking.

The fact that product information and labels are capable of affecting the perception of taste reflects the existing relationship between sensory perception and marketing in praxis. A stronger link between marketing and sensory research is therefore necessary in order to better understand these ef-

fects and to determine under which conditions they can be maximised, i.e., for what product types, in which countries and with what additional product information.

Excursus

The excursus ("*Developing an authenticity model of traditional food specialties: does the self-concept of consumers matter")* explores another perceptual dimension of consumer behaviour that adds to the complexity of food choices, particularly in the case of products like traditional food specialties that have an added emotional, cultural and/or social value.

The findings reveal that the consumer's identification with a niche product has a positive effect on its perceived authenticity. In this study, the personality traits passion and determination are analysed, based on the assumption that these characteristics are also ascribed to niche products, which are most likely perceived as passionate and determined to overcome difficult situations confronted with in the globalised food market. Thus, consumers that view themselves as passionate and determined tend to identify with products that convey the same image, and they perceive them as more authentic, leading finally to an increased purchase intention. Although the investigations focused on traditional food specialties, the fundamentality of the analysed psychological dimensions, i.e., passion and determination, suggests that their relevance for other food categories, such as organic products, which are likewise often associated with authenticity or naturalness and also still have, at least in some countries, niche-product-character competing against the globalised and industrialised food industry.

**Implications for marketing and research**

This dissertation addresses the role that sensory preferences play in consumer behaviour emphasising the high potential for the communication of sensory properties for organic food marketing. Some implications for marketers and practitioners in the organic food sector can be derived from the presented findings.

First of all, on the basis of the results, a stronger usage of sensory aspects for food marketing is recommended. Consumers claim that taste is an important attribute of organic food and thus seem to be a good target for the communication of sensory benefits. To this end, different marketing tools are available that can be used to position a product in the market and to differentiate it from competing ones. This is especially important for organic products, for which higher prices, compared to conventional products, have to be justified. Besides the here analysed methods, namely the organic label and additional product information, other tools such as sensory labels and the distinct description of taste attributes but also product tastings at the point of sale are valuable options. These are, to a relatively low extent, already applied in practice. However, there is evidence that sensory research has not been established sufficiently in the field of food marketing. According to a survey that assesses the status quo of the application of sensory analysis in the German food sector, sensory evaluation is still predominantly integrated into the departments of quality assurance and product

development (DLG, 2013). Only about 16% of all participating company representatives reported that sensory analysis is part of their market research (ibid.). The outcomes of this dissertation reveal that in the context of food consumption, sensory preferences are strongly linked to marketing. Therefore, a stronger consideration of sensory aspects in marketing is promising, but first it requires a more intense integration of sensory analysis within market research.

The observed organic label effect implies that the cultivation of the positive image that organic food inheres should not be disregarded. Consumers have mainly positive associations with organic food and tend to also transfer these to the taste of organic products, as it is hypothesised by the halo-effect (Canavari et al., 2009; Leuthesser et al., 1995). However, this does not mean that marketing tools should be used to compensate insufficient sensory quality. If a product tastes worse than expected, consumers may become dissatisfied and reject it in the future (Cardello, 1994; Deliza & Macfie, 1996; Festinger, 1957; Grunert, 2002). This can also have the reverse effect that consumers start associating a bad taste with organic food in general. Thus, the promised sensory quality has to be in accordance with the actual sensory quality of a product (Moskowitz, 1995; Scharf & Schubert, 1996). Sensory quality is a basic requirement for the consumption of food, which must not be neglected (Eertmans et al., 2001). Especially for product innovations, which, to some extent, also organic food products belong to, an appealing quality claim is important to attract consumers in the first instance, but only a truly appealing taste is able to prompt repeated purchases. Moreover, the conclusion about the halo-effect should not be oversimplified. On the one hand, organic food may not enjoy such a positive and comprehensive image in all countries. On the other hand, research has shown that the information effect is not to be generalised but that it is rather product-specific.

Further, the identification of cross-national taste segments suggests that internationalisation can be a promising option for organic food suppliers, at least in terms of sensory preferences. Especially against the background of the ongoing globalisation which also found its way into the organic food sector due to increasing demand and the conventionalisation of market structures (Berlin et al., 2009; Eden et al., 2008; Pugliese et al., 2013; Sawyer et al., 2009), this issue is of increasing relevance. The finding that the same taste patterns exist in different countries suggests the cross-national marketing of a standardised product focusing on the same market segments. This can foster the obtainment of economies of scales rendering the entry in different markets attractive (Steenkamp and Hofstede, 2002).

At the same time, findings highlight the necessity and the potential of product differentiation in order to address specific preferences of consumers. Against the background of various changes in the organic food sector, the organic consumer has become increasingly heterogeneous (Dimitri & Dettmann, 2012; Pearson et al., 2010; Pino et al., 2012). Besides the core organic consumers, occasional organic consumers are a promising segment since they are the ones who show a predisposition towards organic food and are the likely recipient for the communication of advantages of organic food (Midmore et al., 2011). Our results indicate that taste preferences differ between these consumer groups, e.g., frequent organic consumers tend to have stronger preferences for specific

attributes of organic food in the sense of a "core organic taste", which differ from the "mainstream-preferences" of consumers who buy and eat organic food less frequently. Also, in terms of general preferences for the five basic tastes, frequent organic consumers show a preference for rather peculiar tastes since they build the majority of the consumer group having the exceptional preference for bitterness. Practitioners should take these distinguishing preferences into consideration in order to design products that match consumers' preferences and to develop marketing strategies in which consumer segments can be specifically targeted. Additionally, practitioners can benefit from consumer segmentation in so far as it can help identifying promising preference patterns that might have been neglected in the past.

Finally, it is worth mentioning consumers' weak sensory skills (Wilton & Greenhoff, 1988; Greenhoff & MacFie, 1994). As stated above, consumers' perception is easily influenced by extrinsic cues. Moreover, based on our findings, we assume that consumers are seemingly used to flavour-enhanced food due to constant exposure, thus they show a preference for it even though they assign a high degree of importance to the naturalness of food. The training of sensory abilities is necessary in order to render consumers capable of relying on their own sensory perceptions instead of being exposed to or reliant on product information. This can be achieved, for example, by means of an early sensory education for children in schools or by offering tastings, which is a common practice in the wine sector. However, this requires consumers to be aware of their poor sensory abilities as well as their desire to learn the "authentic" taste. Certainly, not all consumers are disposed to this matter. However, particularly core organic consumers may be open-minded to such a topic due to their high involvement in food consumption and their presumed desire for a natural and unadulterated nutrition.

## Limitations and further research

### Organic food consumption behaviour

Although the literature review is conducted in a systematic and objective manner, some constraints with regard to the analysis of the studies dealing with sensory perception and preferences exist. Above all, only English research articles published between 2000 and 2011 were included. Hence, previous findings and outcomes in other languages were not considered. However, with regard to studies published before 2000, presumably only little research concerning the sensory of organic food products in relation to marketing and consumer behaviour exists due to the fact that both sensory research and organic food have only recently gained substantial attention in marketing research. Since we did not account for the literature published in other languages, conclusions about the current state of research on sensory preferences among organic consumers should be considered with care.

In addition, the literature research focuses on organic food consumption and not on sensory marketing research. Although this allows for the assessment of the relative relevance of sensory research in

organic food marketing, it does not account for a broader perspective of sensory marketing research. However, this could be useful in order to evaluate findings of bordering topics, such as traditional food specialties, sustainable food or also conventional products, from which implications can be derived for the sensory marketing of organic food.

Sensory preferences

For the studies that build the core of this dissertation, i.e., chapter II, limitations are particularly found with the applied methodology. Above all, the studies show a general conceptual weakness, since the used data set was originally collected in the framework of a project that also focused on sensory properties of organic food, but in a very specific and different context. Therefore, the measurement of certain constructs, such as the attitude towards naturalness, may be incomplete, which in turn most likely reduces the explanatory power of the obtained results. The same is true for the development of the concept of the "core organic taste", which is far from being complete.

Another weakness of these approaches is the lack of representative consumer samples that impedes the generalisation of the findings. Convenience sampling with few quota restrictions were used in all countries in order to enable the comparability of results. However, the structure of the country's population of organic consumers was not considered, which lowers the validity of the outcomes and conclusions, not only with regard to single sub-samples but also with cross-national comparisons. Therefore, results should be viewed as hypotheses that have to be confirmed by representative samples. Also, the fact that only frequent or occasional organic consumers were interviewed somewhat limits the interpretative ability of the outcomes, since no comparisons can be made with consumers who seldom or do not consume organic food at all.

A further source of bias is seen in the applied scales. First, the usage and interpretation of the scales may vary in different countries. What is perceived as "very sweet" in Germany is not necessarily perceived as equally sweet in Italy. Second, the used scales were not validated. Although, we based the design of one part of the questionnaire on the frequently used and validated Food-Related Lifestyle instrument, our modifications were quite substantial and would have required a new validation of the scales. Moreover, the changes and adaptions of the Food-Related Lifestyle instrument hinder possible comparisons of results from other studies using similar approaches.

Also, the sensory testing caused some constraints, on the one hand, because of the usage of only one indicator product, i.e., strawberry yoghurt. Since different results may be obtained for different product categories, similar tests with a greater variety of products should be repeated in order to affirm the obtained findings. The findings presented in chapter I, which stress that the results from sensory studies highly depend on the investigated product-category, underline the importance of this issue. On the other hand, due to resource constraints (e.g., time and costs) the testing procedure was simplified and may not have fully accounted for the standards of sensory analysis. Although the conduction of taste tests was as standardised as possible, the likely existence of measurement errors has to be considered.

Other conceptual constraints have to be accounted for when interpreting the results. One of these is the fact that sensory analysis is product-specific. In the used survey instrument, sensory attributes were exemplified by only one product-category, e.g., bitterness by grapefruit or whole grain by bakery products. However, a person may dislike the bitterness of grapefruit but like the bitterness of coffee. Similarly, a person may like whole grain bread, but dislike whole grain cookies. Therefore, a stronger differentiation within taste characteristics and between product categories is necessary in order to reliably measure sensory preferences. A further aspect is the possible abstractness of used terms. Some sensory attributes might have been too abstract for participants resulting in difficulties to evaluate these, e.g., in the case of intensive aroma. Moreover, since the sensory perception is not only product-specific but also context-specific, the unspecific evaluation may not capture true preferences. With regard to the measurement of sensory preferences, a conflict of objectives between the generalisation of results and the reliable measurement of preferences exists. Finally, the phenomena of social desirability has to be considered in so far as consumers may have responded in a way that they believed to be desirable instead of stating their true sensory preferences (Fisher, 1993), e.g., in the case of the preference for a perfect appearance of fruits and vegetables. Thus, more research using actual preferences instead of stated preferences is recommended.

Finally, with regard to the usage of analytical methods, the studies dealing with sensory preferences mostly employ univariate and bivariate statistics. The application of multivariate methods would enable a more comprehensive analysis of consumer behaviour, taking into account different influencing factors simultaneously, as is the case for multivariate regression or structural equation modelling.

Nevertheless, the proposed approaches should be viewed as convenient methods to explore this area of research and to get some insights into sensory preferences of organic consumers in a cross-national context. More research that accounts for the aforementioned limitations is needed in order to validate the findings reported in this dissertation.

Traditional sensory analysis generates product-specific results without taking into consideration the consumption context. In the future, the integration of sensory analysis and marketing research has to be strengthened, in order to appropriately account for the factors that interplay with sensory perception, providing valuable information about consumers and their food choices. Ideally, the scope should be the establishment of an integrative approach as a standard procedure for comprehensively analysing consumers' food choices.

Excursus

Being one of the first of its kind in the research area of food authenticity, this approach represents a highly innovative and exploratory approach. It brings along some constraints that should be considered for further research aiming at the development of a measurement concept for product authenticity.

A clear weakness of the proposed model is the low explained variance (adjusted $R^2$=0.23) of the ultimate dependent variable, namely the stated intention to purchase. Most likely this is due to the fact that other relevant factors have not been included in the model. For instance, further psychological dimensions should be considered in order to determine which consumers' identities match the image of a product and whether these affect the two dimensions of perceived authenticity and finally food choice.

Moreover, the model development is based on only one product, which in addition was unknown to the survey participants. Future research should aim at the validation of the proposed model using different products and food categories. Due to the small sample size, there is also need to repeat the quantitative measurement with a larger sample of consumers. Also, as this study was conducted only in Germany, it would be interesting to apply the model in a cross-national context that enables cultural comparisons. We finally argue that the use of such a model could better tailor speciality products by linking them to particular consumer typologies.

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# Publications and presentations at scientific events

## Refereed journals

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## Project reports

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## Praxis-oriented journals

Hemmerling, S., Obermowe, T. (2011): Genussmarketing im Naturkostfachhandel – Verbrauchertypologie unterstützt dabei, in: BNN-Nachrichten, 4, 18-19.

## Poster presentations at scientific events

Hemmerling, S., Obermowe, T., Spiller, A. (2011): Consumer oriented sensory marketing for organic products – Insights from the EU-funded project Ecropolis. In 1st International Conference on Organic Food Quality and Health Research, Prag, 18-20 May.

Obermowe, T., Hemmerling, S., Spiller, A. (2011): Sensory oriented target groups – Insights from the EU-funded project Ecropolis. In 9th Pangborn Sensory Science Symposium, Toronto, 4-8 September

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Göttingen, Mai 2014 Sarah Hemmerling

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Thesis: Sensory food preferences – An analysis of consumer behaviour using organic food as an example
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10/2009 – 05/2011 — **Master of Science(M.Sc.) in Marketing and Channel management**
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