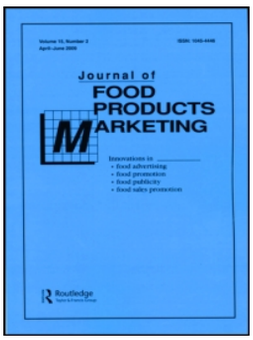

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Core Organic Taste: Preferences for Naturalness-Related Sensory Attributes of Organic Food Among European Consumers

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ABSTRACT

Consumers' preferences for organic food have evolved in recent years, moving from altruistic values to more egoistic buying motivations, such as health promoting or nutritional aspects and sensory properties. Hypothesizing that organic consumers have peculiar preferences for naturalness-related sensory attributes, we developed the concept of the "core organic taste" based on the principles of a wholesome nutrition. This article investigates to what extent the "core organic taste" is relevant across different European countries and its potential relevance for food marketing. A sample of 1,798 organic food consumers was interviewed during 2010–2011 in six European countries. Explorative factor analysis, correlation analysis, ANOVA, and post hoc tests were applied to analyze the data. Results show that the "core organic taste" is not applicable for all countries. Indeed, for most countries only single elements seem to be relevant. However, for Germany and Switzerland the "core organic taste"—representing the first "taste style"—has proven its potential value and points at the need for more research in this field. Depending on the country, product developers and marketers could potentially use different elements of the "core organic taste" to better meet organic consumers' wishes and expectations. Finally, recommendations and suggestions for practitioners and academia are provided.

KEYWORDS

Core organic taste; European consumers; marketing; naturalness; organic food; preferences; sensory attributes

Introduction

Naturalness-related sensory qualities of organic food products and their importance for food marketing

During the last decades, there has been a steadily growing interest in organic food consumption among European consumers (Schaack, Lernoud, Padel, & Willer, 2013), which has increased the competition among organic practitioners and has stressed the need to identify new ways to meet consumers' wishes and

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expectations (Asioli, Canavari, & Pignatti, 2012). Strongly related to this, the concept of naturalness has been the subject of renewed interest by businesses and researchers (Binninger, 2015). Indeed, Binninger (2015) found that the perceived naturalness of a food product correlates positively with its attractiveness, quality, credibility, and the intent to purchase it. The term *naturalness* can be defined in general as "the quality or state of being natural," and it has two main dimensions—a more altruistic one linked with environmentally friendly and animal welfare aspects and a more egoistic one related to a balanced diet and health as well as sensory properties (Binninger, 2015). These two dimensions of naturalness are closely linked to the determinants of organic food consumption. Indeed, besides altruistic values that originally drove the organic movement (Ahmad & Juhdi, 2010; Honkanen, Verplanken, & Olsen, 2006; e.g., more environmentally friendly food production), egoistic buying motivations, such as health promoting or nutritional aspects and superior product quality in terms of sensory properties, are increasingly gaining relevance as drivers for organic food consumption (Botonaki, Polymeros, Tsakiridou, & Mattas, 2006; Padel & Foster, 2005; Solheim & Lawless, 1996; Wier, O'Doherty Jensen, Andersen, & Millock, 2008) and have even partly moved ahead of the altruistic drivers.

Several studies reveal that taste is among the most important criteria for organic food purchases (e.g., Aertsens, Verbeke, Mondelaers, & van Huylenbroeck, 2009; Castellini, Berri, Le Bihan-Duval, & Martino, 2008; Cerjak, Mesić, Kopić, Kovačić, & Markovina, 2010; Hamzaoui-Essoussi & Zahaf, 2012; Hughner, McDonagh, Prothero, Shultz, & Stanton, 2007; Padilla Bravo, Cordts, Schulze, & Spiller, 2013). Compared to taste, other sensory properties such as appearance, smell, and texture are less frequently discussed, even if some research clearly indicates that consumers value these sensory characteristics when choosing organic food (e.g., Chang & Zepeda, 2005; Cicia, Del Giudice, & Ramunno, 2009; Costanigro, McFadden, Kroll, & Nurse, 2011; Grebitus, Yue, Bruhn, & Jensen, 2011). However, some studies reveal that, at times, blemishes are a deterrent when choosing organic food (Curtis, 2011; Fotopoulos & Krystallis, 2002; Yue, Alfnes, & Jensen, 2009).

In addition, countries differ in terms of organic food market structures, traditions, cultural environments, and organic food consumption habits (Bourdieu, 2010; Wright, Nancarrow, & Kwok, 2001). These differences may be reflected in the availability and the exposure of organic food and, consequently, in preferences for and expectations of its intrinsic features[1] (Asioli et al., 2014). This leads us to the assumption that consumers from different countries may have different preferences for intrinsic attributes of organic food products.

Given these premises, we can hypothesize that due to the increasing competition in the organic market, the adoption of innovative marketing

[1]Sensory and nutritional qualities of food products are also called "intrinsic" attributes.

approaches that stress the naturalness-related sensory attributes of organic food could potentially become a promising tool for organic practitioners to realize better business performance. More practically, there is a need for an in-depth investigation of the topics of naturalness and sensory marketing of organic food to gather information that can be used for product development and marketing activities. For marketers, it is important to know which sensory or nutritional attributes consumers would expect from a particular organic product in order to design useful differentiation marketing strategies (e.g., advertising, labeling). In addition, this information could be particularly important for organic food practitioners who aim to increase their exports to the European market. Thus it is essential to decide whether to adopt uniform marketing strategies with a standardized product for all countries or a country-specific approach that takes into account the potential diversity of consumers and that adapts to local expectations and preferences (Douglas & Craig, 2011).

However, the aforementioned information does not show a clear pattern for the role played by naturalness-related 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. To the best knowledge of the authors, there is no study that investigates naturalness-related sensory attributes of organic food embedded in a dietary framework and across different European countries. Therefore, rather than determining only whether naturalness-related sensory characteristics motivate the purchase decisions for organic food, this article goes beyond that by addressing the question, what naturalness-related organic food properties are appealing to the organic consumer, to what degree and if different countries show different preference patterns. We approach this objective by hypothesizing that organic consumers have particular preferences with regard to sensory and other intrinsic attributes that can be embraced by means of a framework that we call *core organic taste* (COT).

Objectives

The main goal of this article is to investigate the preferences of European organic consumers for naturalness-related sensory attributes of organic products and to analyze to what extent the concept of COT is relevant across different European countries, which may provide useful information for product developers and marketers. Specifically, we address the following research questions: (1) Which sensory and other intrinsic attributes of organic food do organic consumers currently prefer? (2) Is there a uniform pattern that can be subsumed under the term COT? (3) Are there any differences in consumer preferences (COT-aspects) across European

countries? (4) Do preferences depend on the frequency with which organic food is consumed?

We approach the research questions in an explorative approach by analyzing data that were collected in the framework of an EU-funded research project (ECROPOLIS) in Italy, Germany, Switzerland, Poland, the Netherlands, and France in 2010–2011 by means of a standardized quantitative questionnaire.

Conceptual framework

The core organic taste

The term *core organic taste* (COT) was coined in the framework of the above-mentioned research project, according to the results of preceding focus group discussions (Asioli et al., 2011; Obermowe, Sidali, Hemmerling, Busch, & Spiller, 2011; Stolz, Jahrl, Baumgart, & Schneider, 2010) and organic expert discussions. It is based on the presumption that organic consumers strive for wholesome natural nutrition. The concept of wholesome nutrition has been established by Koerber, Männle, and Leitzmann (1987), who set up principles that merge with the organic production philosophy. Roughly speaking, the concept of a wholesome nutrition claims that a whole, unprocessed and fresh food item is a food product that has not been treated (i.e., industrially) and is, therefore, most likely able to contain all essential nutritional components. According to Koerber et al. (1987), the wholesome nutrition is composed of the following elements:

- Potentially 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

Therefore, we hypothesize that organic consumers have preferences for product attributes that are related to wholesome natural nutrition. This assumption is also backed up by the idea that organic farming promotes respect for nature and stipulates to harmonize with nature instead of exploiting it (Verhoog, Lammerts Van Bueren, Matze, & Baars, 2007). Only a small amout of research is available that deals with this relationship between the adherence to the organic philosophy and a wholesome natural nutrition. For example, Pelletier, Laska, Neumark-Sztainer, and Story (2013) stated that young adults who place higher importance on alternative foods, such as

organic, local, and sustainable products, consume more dietary fiber, fewer added sugars, and less fat. In addition, Wilkins and Hillers (1994) determined a significant positive relationship between the preference for organic food and a wholesome food pattern, though not specifying the elements of the latter.

Bearing in mind the principles of wholesome nutrition and the objectives of organic farming, we infer that consumers who buy organic food value its naturalness and, consequently, have a preference for sensory product attributes that derive from there.

Elements of the core organic taste

The concept of COT represents a preference framework of specific intrinsic product attributes that one could possibly associate with organic food. Not all these attributes are sensory in a strict sense, but some of them are rather intrinsic attributes that derive from certain ways of production that are widely associated with having an impact on sensory food properties, such as a natural fat content or freshness. The COT is composed of the following elements:

- Preference for a natural flavor
- Preference for less sweetness
- Preference for intensive aroma
- Preference for whole grain
- Preference for a natural fat content
- Preference for freshness
- Preference for traditional processing methods
- Preference for variability (diversity) in production

Being the first approach of its kind, we attempted to consider as many relevant aspects as possible. However, the pretest of the questionnaire revealed difficulties in conveying the ideas of some aspects, which also would have limited the comparability of country-specific subsamples. Thus we do not claim the COT to represent a complete concept of natural-related sensory attributes favored by organic consumers.

In the following, we describe in detail the eight attributes that we finally incorporate into the concept of COT.

Preference for whole grain

Cereal grains historically belong to the basic components of human diets for many cultures (Smith, Kuznesof, Richardson, & Seal, 2003) and are nowadays widely consumed in different forms (e.g., bakery products, pasta). In addition to carbohydrates and proteins, whole grains also contain many vitamins and

minerals that are essential to human nutrition (Lang & Jebb, 2003; Smith et al., 2003). However, refined-grain products, which come from whole grains without its perishable and indigestible parts, account for the majority of grains consumed in Western countries (Lang & Jebb, 2003; Richardson, 2003). The perishable and indigestible parts contain fiber, proteins, vitamins, and minerals that have a great nutritional value (Slavin, Jacobgs, & Marquart, 2001; Smith et al., 2003). 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 specialized organic food stores, indicating that retailers considered refined grain as not suitable for organic consumers.

Preference for a natural fat content

Koerber et al. (1987) proposed 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 humans (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 caused by the large amount of bacteria that also reduce its shelf life (Oliver, Boor, Murphy, & Murinda, 2009; West, 2008). Customarily, whole milk has a fat content of about 3.5%, 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 flavor

We define "natural flavor" as the flavor of a food product that is not modified by flavor enhancers or artificial aromas. Even if the principles of wholesome nutrition do not postulate the preference for a natural flavor, we deduce it from the general preference for naturalness. The EU regulation (EC) No 834/2007 for organic food bans the usage of artificial aromas and flavor enhancers and thereby supports the retention of an unadulterated flavor (European Commission, 2007). François and Sylvander (2006) found that organic consumers relate artificial flavoring with a bad taste with regard to yogurt. In addition, 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, Vickers, Marquart, & Sjoberg, 2007; François & Sylvander, 2006; Hamilton, Knox, Hill, & Parr, 2000; Kähkönen & Tuorila, 1999).

Preference for less sweetness

The preference for less sweetness is also directly derived from the principles of 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 to the human health (Koerber et al., 1987). However, consumers should not substitute isolated sugar with artificial sweeteners. Instead, Koerber et al. (1987) recommended to rather get used to the less sweet taste and to satisfy the desire for sweetness by using low amounts of diluted honey, fresh fruits, or dry fruits. Pelletier et al. (2013) revealed a preference for less sweetness among U.S. consumers who value organic, local, and sustainable food products.

Preference for freshness

Koerber et al. (1987) asserted that food in its fresh and non-stored condition provides the highest contents of essential substances, so it can be considered a part of wholesome nutrition. 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 (Koerber et al., 1987). In addition, several studies confirm that freshness is an important purchase criterion for organic consumers (Aguirre González, 2009; Berlin, Lockeretz, & Bell, 2009; Midmore et al., 2005; Piyasiri & Ariyawardana, 2002).

Preference for traditional processing methods

The Food Standards Agency (2008) has recommended 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 use 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 standardization). In line with this, the preference for traditional processing methods is claimed to be driven by the opposition to industrialized agriculture paired with the desire for additional "non-physical" food values and maintaining local customs, traditions, and identity (Inwood, Sharp, Moore, & Stinner, 2009; Vizcarra Bordi, 2006). Autio, Collins, Wahlen, and Anttila (2013) and Murdoch and Miele (1999) asserted that standardized food is equated with unnatural food and, additionally, that the craftsmanship of small producers stands for clean and pure food, an idea that the slow food movement also promotes (Jones, Shears, Hillier, Comfort, & Lowell, 2003). Midmore et al. (2005) argued 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, Kledal, & Sulitang, 2011; Yiridoe, Bonti-Ankomah, & Martin, 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 inferred 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 flavor in 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 is a primary cue used by consumers to judge ripeness, freshness, and overall quality of fruits and vegetables (Abbott, 1999; Huang, 1996). Commonly, consumers associate blemished and misshaped produce with lower quality, representing less value for money and more preparation time (Broad, 2000; Midmore et al., 2005). However, Midmore et al. (2005) and François and Sylvander (2006) revealed 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) revealed a positive relationship between the consumers' willingness to accept blemishes and their purchase behavior toward organic produce. Also, Lin, Payson, and Wertz (1986) constituted 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 pronounced variability in size, color, and shape.

Data and methods

Questionnaire design

We used a standardized quantitative questionnaire that contained the following consumers' information:

(1) organic food consumption frequency;
(2) general preferences for naturalness-related sensory properties of organic food; and
(3) sociodemographic characteristics.

Except for the measurement of organic food consumption frequency, we constructed all of the items. Organic food consumption frequency (OFCF) is measured by means of an index used in the German National Nutritional Survey II (Max-Rubner-Institute, 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, 4 = *always*, 3 = *often*, 2 = *seldom*, 1 = *never*, and 0 = *I do not buy this kind of product*.

The measurement of stated preferences for naturalness-related sensory properties is based on the concept of the COT previously introduced (Table 1). 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

Table 1. "Core organic taste" (COT) aspects.

COT Aspects	Item in the Questionnaire	Measurement
Preference for natural flavor (e.g., real vanilla) and fewer flavor enhancers (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 things 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 favor low fat products*) to +3 (*I favor 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 favor refined products*) to +3 (*I favor 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. (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 flavor 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, do you prefer products that show variation in size and color to products that are constantly identical?	7-point bipolar semantic anchor scale ranging from −3 (*I favor identical products*) to +3 (*I favor variation in products*)
Preference for traditional processing methods (e.g., non-homogenized milk)	I prefer food that tastes artisan/ hand-crafted (e.g., foods that are produced by a small manufacturer.)	7-point bipolar semantic anchor scale ranging from −3 (*I favor industrial production*) to +3 (*I favor artisan production*)

semantic scale, with item-specific anchors. Table 1 provides information about the COT items used, the ways they are operationalized in the questionnaire, and the scale on which they are measured. For most of the COT items, we used examples that were intended to facilitate conceptualization 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.

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

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 their own consumer panels completed the recruitment of survey participants. Data were collected between November 2010 and February 2011. Interviews were conducted using an electronic questionnaire (EyeQuestion) or paper-and-pencil questionnaires, according to consumers' preferences. Tests generally lasted between 30 and 45 minutes, and participants received a monetary participation reward.

We selected consumers who frequently or occasionally consume organic food and who are regularly in charge of doing the grocery shopping in their households. Moreover, we set the following quota restrictions that guaranteed comparable subsamples: two thirds of the sample should be females and one third males; one half of the sample should be between 18 and 45 years old and one half between 46 and 75 years old; two fifths of the sample should be frequent organic food consumers (heavy users) and three fifths 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.

Statistical data analysis

We applied descriptive, bivariate, and multivariate methods to analyze the data set, using SPSS Statistical Software 21.0. First, we analyzed the sociodemographic characteristics, such as gender, age, educational degree, and household situation, for the overall sample and its country samples using univariate statistical methods. Then we 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 (PCA), 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 (Costello & Osborne, 2005). Thereafter, we used correlations between the COT items to reveal if they are related to each other and if they compose one dimension. Subsequently, we explored the eight COT-dimensions by means of an ANOVA to test whether sensory preferences vary across countries. A Tukey post hoc test was used to examine which country-means differ the most.

Finally, we analyzed correlations between the COT items 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 0. A Kolmogorov-Smirnov test did not confirm a normal distribution of either of the two variables. Therefore, we calculated Spearman's correlations.

Results

Sample characteristics

In total, 1,798 consumers were interviewed. The sociodemographic characteristics are presented in Table 2. For the overall sample and for most of the subsamples, the share of women was roughly two thirds. On average, participants were about 45 years old. Considering the degree of education, the majority of the consumers declared to have a college or university degree (43.4%), while about 28% of them have a school education of 12 or 13 years. In total, approximately 27% of the participants revealed that they lived with a partner and one or more children, whereas 17% of the consumers declared themselves to be single.

Dimensionality of the COT

The analysis of correlations between single COT aspects served to find out whether the concept of COT can be viewed as one dimension or if the COT elements represent independent aspects. The correlation matrix displayed in Table 3 shows mainly low correlations with absolute values below 0.3.[2] In addition, an explorative factor analysis confirms that the COT cannot be considered one dimension, since three factors (total explained

[2]Accordingly, the Kaiser-Meyer-Olkin measure of 0.66 indicates a mediocre relationship between the items for the total sample.

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

variance = 48.04%) emerged whose reliabilities were unacceptable low. This result is also consistent in all single countries. 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; Table 4). As a consequence, it cannot be concluded that, in general, organic consumers have a preference for all the proposed food attributes, but rather that these attributes have to be considered one by one.

Cross-national comparison of preferences for the COT aspects and their correlation with organic food consumption frequency (OFCF)

To get insights into the country-specific relevance of product attributes of organic food, in the following section we present and discuss each of the COT aspects, starting with the product attributes that received the highest scores. ANOVA and Tukey post hoc tests reveal significant differences among countries for almost all sensory characteristics, except for the attribute "less sweetness" (Table 4). To the contrary, "whole grain" is the sensory

Table 3. Correlations between COT aspects[1] ($N = 1798$).

	Whole Grain	Variability/Diversity in Production	Natural Flavor	Less Sweetness	Freshness (I)	Freshness (II)	Intense Flavor	Natural Fat Content	Traditional Processing Methods
Whole Grain	1.000								
Variability/ Diversity in Production	0.105***	1.000							
Natural Flavor	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 Flavor	−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 $p < .1$ (two-sided); **Spearman's correlation $p < .05$ (two-sided); ***Spearman's correlation $p < .01$ (two-sided).

Table 4. Comparisons of means of COT aspects between countries.

Core Organic Taste Aspects[1]	F-Values	Italy	Germany	Switzerland	Poland	Netherlands	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, do you 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 flavor and less flavor 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 flavor: *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)

(*Continued*)

Table 4. (Continued).

Core Organic Taste Aspects[1]	F-Values	Italy	Germany	Switzerland	Poland	Netherlands	France	Pooled Sample
Preference for traditional processing methods: *I prefer food that tastes artisan/hand-crafted (e.g., food that is produced by small manufacturers).*	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; a: indicates statistically significant difference from cluster 1 ($p < .05$), according to Tukey post-hoc test; b: indicates statistically significant difference from cluster 2 ($p < .05$), according to Tukey post-hoc test; c: indicates statistically significant difference from cluster 3 ($p < .05$), according to Tukey post-hoc test; d: indicates statistically significant difference from cluster 4 ($p < .05$), according to Tukey post-hoc test; e: indicates statistically significant difference from cluster 5 ($p < .05$), according to Tukey post-hoc test; f: indicates statistically significant difference from cluster 6 ($p < .05$), according to Tukey post-hoc test; *ANOVA $p < .1$; ***ANOVA $p < .01$.

Table 5. Correlations between organic food consumption frequency and COT aspects by country.

Core Organic Taste Aspects	Italy	Germany	Switzerland	Poland	Netherlands	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, do you 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 flavor and less flavor 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 flavor: *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 by small manufacturers).*	0.08	0.26***	0.35***	0.13*	0.26***	0.23***	0.15***

Notes. *Spearman's correlation $p < .1$ (two-sided); **Spearman's correlation $p < .05$ (two-sided); ***Spearman's correlation $p < .01$ (two-sided).

feature that differentiates the most between countries. Results also indicate that preferences for freshness and traditional food processing methods are the COT aspects of common importance throughout all the countries.

We also investigated the relationships among stated preferences and the OFCF for each country. The correlations provide evidence for the rudimentary existence of the COT (Table 5). 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. 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. France shows a mixture, some relatively high and some low correlations. With respect to the interpretation of the correlations coefficients, we have to state 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.

Preference for freshness

Low variances in all subsamples with regard to the absolute freshness (preference for freshness II) of organic food indicate that European organic consumers have a preference for freshness. 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 tradeoff between freshness and convenience. This tradeoff particularly becomes evident in Germany and France, which shows the largest difference between the scores for both items. Both freshness items show correlations with the OFCF index of around $r = 0.2$ for most countries, indicating that freshness tends to be more important to consumers who consume organic food more often. Only in Italy and the Netherlands are there low correlations, leading to the conclusion that in these countries freshness is a product attribute that is of general importance.

Preference for traditional processing methods

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, Wilson, and Murdoch (2002) offered 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 (Parrott et al., 2002). Italy and France are well known for their culinary culture (Renting, Marsden, & Banks, 2003), where they combine a high share of small-scale family-run food businesses (Hingley & Sodano, 2010). Local food production and traditional artisans are staples of these countries and are part of the culture, resulting in stronger preferences for traditionally processed food. This also explains why there is no relationship

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 because in Poland, industrial agriculture is comparatively underdeveloped, and food production is still strongly oriented toward traditional and old-fashioned methods with a low use of fertilizer 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.

Preference for whole-grain products

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 0. 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 revealed that organic consumers from Switzerland, Germany, and France, value wholemeal bread, while Italian consumers value white bread. However, they also find that Italians associate wholemeal bread with organic bread. Additionally, Arvola et al. (2007) showed that Italian consumers perceive fewer differences in benefits between whole-grain and refined-grain food, suggesting that Italians expect whole-grain products to have an inferior taste.

Preference for variations in appearance

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 about Italian and French consumers; 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.

Preference for natural flavor

The preference for natural flavor 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 flavor 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.

Preference for intense flavors

The average preference for intense flavors, 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 flavor to the COT. Despite this, high standard deviations indicate that some segments prefer this taste.

Preference for less sweetness and a natural fat content

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 0 in all countries. Only in Germany is there 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 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 revealed that Swiss organic consumers refuse low-fat yogurt because of its inferior taste.

Discussion and conclusions

The main aim of this article was to investigate the preferences of European organic consumers for naturalness-related sensory attributes of organic products and to analyze to what extent the concept of COT is relevant across different European countries, which may provide useful information for product developers and marketers.

Even if correlation coefficients are rather low, the data indicate some interesting tendencies that need to be validated in future research. First, we can generally state that the COT concept is applicable in Germany and Switzerland, while for the other investigated countries organic consumers prefer only some of the COT aspects. This may be because the concept of wholesome nutrition, which constitutes the basis for the COT concept, has its origin in Germany and Switzerland (Leitzmann, 2005). Second, on average, the interviewed European organic consumers report a preference for organic products that they characterized as fresh, while for all the other COT aspects,

their importance varies between specific countries. Third, for the majority of the COT aspects, there are significant differences among countries. For example, French, Italian, and Polish consumers have a particular preference for organic food produced using traditional processing methods. Regarding the preference for whole-grain products, there is a relatively high variation compared to all the other COT aspects among some countries (i.e., Italy, France, and Switzerland), whereas Dutch, Polish, and German consumers appear to be more attracted to whole-grain products. Variations in appearance are particularly relevant for Italian, Polish, and French consumers. Natural flavor is particulary important for Italian, Polish, and French consumers, while the preference for intense flavor shows small differences among countries. Fourth, the relationship between preferences and OFCF appears to depend on the country and the specific attribute. For example, there is a positive correlation between OFCF and the preference for freshness for all the countries, except for Italy and the Netherlands, for which freshness seems to be of general preference for both frequent and occasional organic consumers. Considering that food preferences are complex and shaped by many factors (Yiridoe et al., 2005), the finding that preferences for naturalness-related sensory food attributes do not always correlate with the OFCF 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). 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).

In summary, we can roughly identify three main groups of countries with some similarities. The first group consists of Germany and Switzerland, for which the COT concept is applicable. Consequently, German and Swiss consumers may be better addressed by stressing a large number of COT aspects, which should be taken into account both for product developers and marketers. Second, Italian, French, and Polish consumers reveal particular preferences for some of the COT aspects, although these preferences may not always be due to high commitment to organic food consumption, since these preferences are also valid for occasional organic consumers. Finally, Dutch consumers cannot be assigned to either of these two groups.

The contribution of this research is twofold. From a marketing perspective, food marketers benefit by improving the understanding of organic consumers' preferences in the European market. Against the notion that food consumption around the globe is converging (Conner, 1994; Craig & Douglas, 2006; Mak, Lumbers, & Eves, 2012), consistent expectations toward

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. For example, France and Italy, on average, show similar preferences for most of the product attributes, while Germany and Switzerland reveal 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 standardization of certain products may be an opportune strategy. Nevertheless, in most cases, differentiation of products is necessary to comply with specific consumer needs and expectations. 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. However, this issue deserves more attention in the future in order to develop organic products and communication strategies that meet differing expectations of different consumer groups.

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

Although there is evidence that the usage of stated preferences better predicts consumer behavior (Tuorila, 1987), others obtain contrary results (Shepherd, Sparks, Bellier, & Raats, 1991/2; Tuorila-Ollikainen, Laahteenmaaki, & Salovaara, 1986). Thus it should be considered that the used stated preferences do not necessarily translate into market behavior. With regard to this, a common difficulty is a possible bias due to the phenomenon 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. The conceptualization of the used items creates another limitation. Some of them (e.g., the preference for intense flavor) are rather abstract and may not have been easily understood. In addition, we assumed that all the respondents, regardless of their country of origin, conceptualized these variables in the same way. In future research, items should be validated before usage. Furthermore, product-specific examples were provided for generic COT aspects to facilitate their conceptualization 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 to comprehensively account for the various facets of a sensory product attribute.

Suggestions and recommendations for organic practitioners may include that European organic consumers can be addressed by stressing naturalness-related sensory attributes (e.g., the freshness or the usage of traditional processing methods in the packaging or in a multisensory context). On the other hand, the importance of other naturalness-related sensory attributes asks for ad hoc product development and marketing strategies that have to be adopted depending on the specific country where the product will be marketed as well as the type of product.

From an academic perspective, this article provides some initial insights into the relevance of consumer preferences and expectations with regard to organic food properties. Literature on the relevance of single product attributes, especially with regard to naturalness-related sensory attributes 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 them and how they influence organic food choices. As the COT summarizes multiple sensory preferences, it can be understood as a "taste style." Such "taste styles" deserve further exploration considering, additionally, specific products and other European countries. This would justify the opening of a new research field, since they may also be reasonable for other consumer segments outside the organic food sector (e.g., for natural or health-oriented consumers). Further research can also investigate the willingness to pay (WTP) for the different COT attributes, using, for example, sensory tests combined with choice experiments or experimental auctions that may provide useful information and insights for marketers before performing real market tests.

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