

Consumers of organic foods – value segments and liking of bread

Iwona Kihlberg^{a,*}, Einar Risvik^b

^a Department of Domestic Sciences, Uppsala University, Dag Hammarskjölds v. 21 SE-752 37 Uppsala, Sweden

^b MATFORSK, Osloveien 1, N-1430 Ås, Norway

Received 9 May 2004; received in revised form 12 November 2005; accepted 3 March 2006

Available online 17 July 2006

Abstract

Five, quite different white pan breads were chosen from twelve samples using Principal Component Analysis. Milling, baking, sensory assessment and sample preparation are described in [Kihlberg, I., Öström, Å., Johansson, L., & Risvik, E. (2006). Sensory qualities of plain white pan bread – influence of farming system, year of harvest and baking technique. *Journal of Cereal Science*, 43(1), 15–30]. A consumer acceptance test was conducted on 184 consumers of organic products in two age groups, ≤30 and >30 years. The selected breads were tasted and scored for liking. Subsequent to the tasting, the consumers responded to a questionnaire including a complete set of the 56 Schwartz values and 10 statements related to issues of specific interest. Results confirmed the main groups of the near universal structure of values suggested by Schwartz and revealed different segments among organic consumers. Consumption frequency was also related to the values. Consumer groups differed significantly in values and in liking of breads. Among the most liked breads were both organic and conventional breads. The majority of consumers considered that organic food tastes better than conventional and that consumption of organic bread should increase. Moreover, about 50% declared that they would not buy an organic food product that was appreciably higher in price than a corresponding conventional food product.

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Keywords: Organic consumers; Values; Food acceptance; Liking of food; Wheat; Bread; Consumer test

1. Introduction

International agreements made during the conference in Rio de Janeiro in 1992 resulted in the action plan Agenda 21, which is aimed at achieving sustainable development and eliminating unsustainable patterns of production and consumption (Agenda, 1992). In line with this, the Swedish government has a political goal to increase ecological agricultural production. Cereals are cultivated on 40% of the arable land in Sweden, and the area for wheat cultivation has increased by 28% since 2002 and covered 32% of all arable land in 2003 (Statistics Sweden, 2004). The proportion of consumers buying organically produced food is relatively low, and bread made with organically grown cereals is among the least frequently purchased organic products,

as compared to milk, meat and potatoes. In total, only 8% of consumers buy organic bread on a regular basis (“very often”, “rather often”) (Magnusson, Arvola, Koivisto Hursti, Åberg, & Sjöden, 2001). In order to fulfil consumer demands for product quality and to meet their purchase criteria (Grankvist & Biel, 2001; Magnusson et al., 2001), extended organic wheat (Council of the European Communities, 2001) production requires not only successful product development, but also knowledge about the factors underlying consumer food choice. Besides sensory qualities, food choice is influenced by non-sensory factors represented on the personal level by values. Schwartz considered that values are criteria – which people use for selection, justification of action and evaluation – rather than qualities inherent in objects (Schwartz, 1992). To better understand the organic market in all its heterogeneity, new methods exploring the roles of moral and emotional factors and beliefs (Shepherd, 2004), lifestyles (Grunert, Brunsø, Bredahl, & Bech, 2001), value-guided consumer

* Corresponding author. Tel.: +46 18 471 63 69; fax: +46 18 471 22 61.
E-mail address: Iwona.Kihlberg@ihv.uu.se (I. Kihlberg).

behaviour (Borch, 1995) and purchase behaviour (Grankvist, 2002) are in focus.

Food appearance, aroma, texture and flavour are directly experienced by our senses as food sensory qualities, but the overall perception of these qualities depends on the mental context represented by, e.g., interactions between these sensory signals and feelings, memory, associations and images (Lyman, 1989a). According to Lyman (1989b), attitudes play a predominating role in food acceptance. Attitudes include the value or feeling component and the belief or cognitive component (Worchel & Cooper, 1979). Values constitute criteria for action or guiding principles in one's life (Schwartz, 1992), and they are much more stable over the time than are attitudes. The rejection of meat by vegetarians, guided by ethical principles, may be an example of how values influence attitudes and food acceptance.

Schwartz identified universal aspects of value content and structure. The value structure suggested by Schwartz (1992) consists of 56 values, which explore the importance of individual and collective interests in relation to one's internal world and the external world. Theoretically, Schwartz's set of values could be used for segmenting people in accordance with their values. Thus, to achieve targeted marketing, identification of the set of values held by different consumer segments should be seen as a main strategy in the successful marketing of organic products. On the whole, consumption is clearly linked to personal values, attitudes and buying intention (Grunert et al., 2001). This should also apply to consumption of organic products. It would seem reasonable, therefore, to claim that "who you are" to some extent describes "what you buy". If consumers of organic products are seen as a group, it should be possible to find commonality in their belief structure. This study was to some extent inspired by a Danish investigation described by Borch (1995), in which values for consumers of organic products in Denmark, Norway and Sweden were compared. The study separated consumption of products by origin, that is milk, meat, vegetables and bread, and documented strikingly similar patterns among the product groups within countries as well as characteristic differences between countries. Briefly, the authors interpreted these differences as follows: the Norwegians are the most "traditional" and "idealists", the Swedes are "modern" and "idealists" and the Danes are the most "modern" and "materialistic/pragmatic". In other words, the Danes are the most trendy, the Norwegians the least and the Swedes somewhere in between, with regard to consumption of organic foods. It may also be possible to anticipate a development over time whereby the values found in Denmark will come to influence Sweden and Norway. In order to follow such a scenario, it is important to determine to what extent the values found to predominate among Danish consumers of organic food are also present in the other countries. As this study was limited to Sweden for practical reasons, this was defined as the target area.

The results of the above-mentioned Danish study described by Stürup (1998) and Borch (1995) were founded

on theories similar to that of Schwartz. Values were self-reported by the subjects by means of a questionnaire, and respondents were asked to report their degree of agreement or disagreement with a set of values. From this, the latent structure in the data was extracted and plotted in fewer dimensions, to make the main tendencies easier to interpret. According to the Danish study (Borch, 1995), age seems to be an important factor, as the archetypical Swedish organic consumer is between 30 and 39 years, while the archetypical Danish organic consumers is younger. In line with this, we selected two age groups to be compared in the present study to see whether there are important differences in values and hedonic evaluation of bread between older organic consumers and younger organic consumers in Sweden.

For marketers, it is of great importance to understand the value structure underlying consumption patterns. When segments change or mature, it is necessary for strategic market communication to be in line with these changes. Communication aimed at emerging and potentially new market segments is especially important, as these segments represent possible growth in the market. Thus, the values communicated should be recognized as important to the targeted segment of consumers, and a good market strategy requires an understanding of value changes. Heterogeneity in the group of consumers may be dependent on the values held by different consumer segments. It was found that sensory-specific liking for apples (Risvik, 2001) and tomatoes (personal communication) could be linked to different consumer groups. Our hypothesis was that age is related to values and that there are different segments of organic food consumers, which differ in their acceptance of bread. The aim of this study was to characterize the main value segments of consumers with special interest in organic products and to investigate possible differences in their sensory-specific liking of white bread.

2. Material and methods

2.1. Experimental overview

Breads baked with wheat grown conventionally and organically in field trials in Bollerup, Scania, Sweden (experiment number: L4-3410) were the focus of the acceptance test. In order to serve a manageable sample set of the processed breads to each consumer, white breads with the largest sensory variation, described by a sensory descriptive test (sensory profiling) (Kihlberg, Öström, Johansson, & Risvik, 2006), were selected using Principal Component Analysis (PCA) (Fig. 1). The selected breads were tasted and scored for liking by 184 consumers in two age groups. Subsequent to the tasting, the consumers filled in a questionnaire including a complete set of the 56 Schwartz values. Consumers also self-reported their degree of agreement or disagreement with 10 statements related to issues of specific interest in this context. The data were analysed

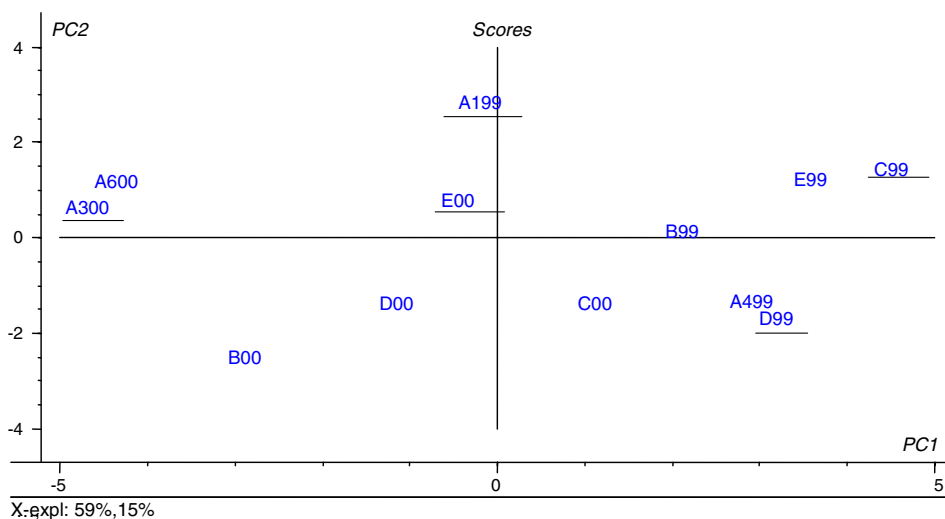


Fig. 1. Distribution of bread samples in the sensory space. The underlined samples were chosen for the acceptance test. The breads were baked with wheat grown in different farming systems (A1–B conventional, C–E organic) and different years (1999 and 2000, e.g., bread A199 was baked with conventional wheat, harvested in 1999. Bread C00 was baked with organic wheat harvested in 2000).

using multivariate methods: Principal Component Analysis (PCA) and Partial Least Squares Regression (PLSR1 and PLSR2).

2.2. Processing of wheat and bread, bread characteristics

Selected breads were baked with flours with fixed ash content, in order to make them comparable. The flours were extracted from wheat grown conventionally (breads A199 and A300) and organically (breads C99, D99 and E00) in established field trials and harvested in 1999 (breads A199, C99 and D99) and 2000 (breads A300 and E00). The recipes for white pan breads were adjusted in accordance with data from the Barbender Farinograph. Milling, baking, sensory assessment and sample preparation are described in Kihlberg et al. (2006).

2.3. Consumer test

Each consumer evaluated five bread samples for liking. The samples were marked with three-digit random numbers and served in Petri dishes. Subsequent to the tasting, the subjects were asked to fill in the questionnaire. The consumer test, an acceptance test (Meilgaard, Civille, & Carr, 1991), was conducted on 184 adults, who were selected in connection with testing in different locations and on the basis of regular consumption frequency of organic products (no less than once every two weeks) and age. There were 92 consumers in the age group ≤ 30 , 30 years and younger (also referred to here as 30–), and 92 consumers in the age group > 30 , older than 30 years (also referred to as 30+). The consumer test was conducted in different locations (three supermarkets and three university campus areas), but on the same day and by the same team. The consumers were informed that the study in which they would participate was part of a larger project evaluating

product and production quality and that the breads were baked with either conventionally or organically grown wheat, but that, when tasting the samples, they would be blind to wheat origin. Together with the questionnaire and bread samples, the consumers received oral information concerning the organization of the acceptance test, and the different parts of the questionnaire were presented to each consumer separately. The consumers were given enough space to handle the samples and the questionnaire, and no time constraints were placed on them.

2.3.1. Sample preparation

The loaves were thawed in sealed polyethylene bags for 2 h at room temperature, sliced (13 mm thick slices) on an industrial slicing machine (Rose Forgrove at Skogaholm Bröd AB, Uppsala, Sweden) and returned immediately to their original bags and sealed. Afterwards, whole slices were placed individually in a Petri dish, labelled with a three-digit random number and then presented to the consumers. The five bread samples were presented in random orders to each consumer. Samples were prepared in the morning and presented to all consumers on the same day.

2.3.2. Questionnaire

The questionnaire consisted of six pages, and the first page contained a description of the study for the consumers. Page two contained liking scales, one for each bread. Each scale had its own three-digit number, identical to the number on the Petri dish containing the bread sample. The scale was unstructured, 150 mm long and had a frowning face on one end (and verbal anchor “I dislike it very much”) and a smiling face on the other (and verbal anchor “I like it very much”) (Risvik, 1996). Consumers were instructed on page two to answer the question “How much do you like these breads?” and to evaluate each bread separately, after tasting, on the scale from “I dislike it very

much” to “I like it very much” by making a mark on the scale. Pages three to four contained the set of 56 Schwartz values (Schwartz, 1992) with a seven-degree scale from 1 (not important at all) to 7 (very important). The consumers were instructed to read the 56 values (Schwartz, 1992) and asked to declare to what degree the values were important as guiding principles in their lives. All values were described with a number, a value name and with an additional explanation, e.g., “1: Equality (equal opportunity for all)”. Page five contained 10 additional statements related to food consumption and environment (Appendix), and consumers were instructed to declare their degree of agreement or disagreement with these statements. Page six collected data concerning sex, age (≤ 30 or > 30 years) and frequency of organic food consumption.

2.4. Statistical evaluation

2.4.1. Principal Component Analysis

Principal Component Analysis (PCA) was performed using the statistical package Unscrambler (1996). PCA was applied to describe the relationships between the consumer values and to see whether the collected information on the Schwartz values provided a representative space. Moreover, a PCA was performed to study which values explained to the highest degree the variation in our data and to revealed patterns in the data.

2.4.2. Partial Least Squares Regression

Partial Least Squares Regression (PLS) was performed using the statistical package Unscrambler (1996), and it was applied in order to understand the relationships between consumers’ acceptance of bread samples. PLS1

was also applied for predictive modelling of the age groups’ (≤ 30 and > 30), lowest versus highest, frequency of buying organic food. PLS2 was applied to study consumers’ responses to the additional statements (Appendix) in relation to the Schwartz values.

3. Results

Principal Components Analysis (PCA) of the Schwartz values as rated by 184 consumers explained 25% of the variance in two principal components PC1 (18%) and PC2 (7%) (Fig. 2a). The largest differences among consumers concerned, on the one hand, values described by PC1: “pleasure”, “enjoying life” and “daring”, versus “respect for tradition”, “devout”, “honouring of parents and elders” and “politeness” and, on the other hand, values described by PC2: “preserving public image” and “social power” versus “spiritual life” and “world of beauty”. The results described below are summarized in Table 1. It seems that, in the loading plot (Fig. 2a), the values found to the right and along PC1, “respect for tradition” and “devout” (according to Schwartz value type “tradition), “honouring of parents and elders” and “politeness” (value type conformity), “national security”, “clean”, “reciprocation of favours” (value type security), are opposite in the loading plot, to the values found to the left and along PC1 “daring”, “exciting life” (value type “stimulation”) as well as to “freedom”, “self-respect”, “sense of belonging” (value type “self-direction”) (Table 1). Similarly, it seems that, in the loading plot (Fig. 2a), the values found below the line parallel to PC1, “intelligent”, “influential, “ambitious”, “successful” (according to Schwartz “achievement”) and “social power”, “wealth”, “preserving public image” (value

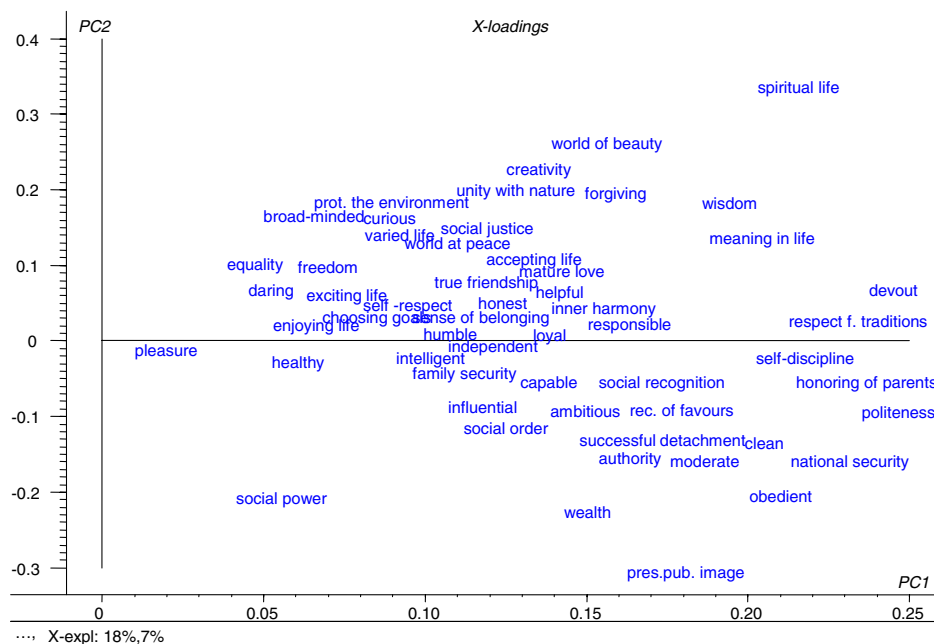


Fig. 2a. Loading plot for the two principal components PC1 and PC2. Relationships between consumers’ values and the set of Schwartz values.

Table 1
Values described by PC1 and PC2 among organic consumers in acceptance test (n = 184) according to Schwartz values set (Schwartz, 1992)

Individual values		Collective values		
<i>Values describing PC1</i>				
Openness to change		Conservation		
Stimulation	Self-direction	Tradition	Conformity	Security
Daring	Freedom	Respect for tradition	Honouring of parents and elders	National security
Exciting life	Self-respect	Devout	Politeness	Clean
	Sense of belonging			Reciprocation of favours
<i>Values describing PC2</i>				
Self-enhancement		Self-transcendence		
Achievement	Power	Benevolence	Universalism	
Intelligent	Social power	Spiritual life	World of beauty	
Influential	Wealth	Meaning in life	Unity with nature	
Ambitious	Preserving public image	Forgiving	Protecting environment	
Successful				

type “power”), are opposite to the values found above the line parallel to PC1, (Fig. 2a) “spiritual life”, “meaning in life”, “forgiving” (value type “benevolence”) as well as to “world of beauty”, “unity with nature”, “protecting environment” (value type “universalism”) (Table 1). In conclusion, the values found below the line parallel to PC1 describe a realm of material values: power and achievement associated with personal success, while the values above the line parallel to PC1 (“benevolence” and “universalism”) represent a realm of ideal values concerning the welfare of friend and family, as well as the welfare of all people and of nature/the environment. The modern values (“exciting life”, “daring”), which represent individual values, versus the traditional values (“respect for tradition”), which represent collective values, explained the largest differences in the data.

Consumers 30– were over-represented in the direction of the modern and materialistic values, while consumers 30+ were over-represented in the direction of the traditional values (Fig. 2a and 2b). Both idealistic and materialistic values are present in both groups, but to a different degree. According to PLS1, significantly different values served as guiding principles in the two age groups. Only the values with a significant contribution to the predicted age groups are shown in Fig. 3. The loading plot in Fig. 3 shows that, for the consumers 30+, “freedom”, “accepting life”, “wisdom”, “meaning in life”, “national security”, “devout” and “spiritual life” are the guiding principles in their lives. Furthermore, “true friendship”, “enjoying life” (hedonism-value type), “exciting life”, “capable”, “reciprocation of favours” and “successful” are the guiding principles in the lives of consumers 30–.

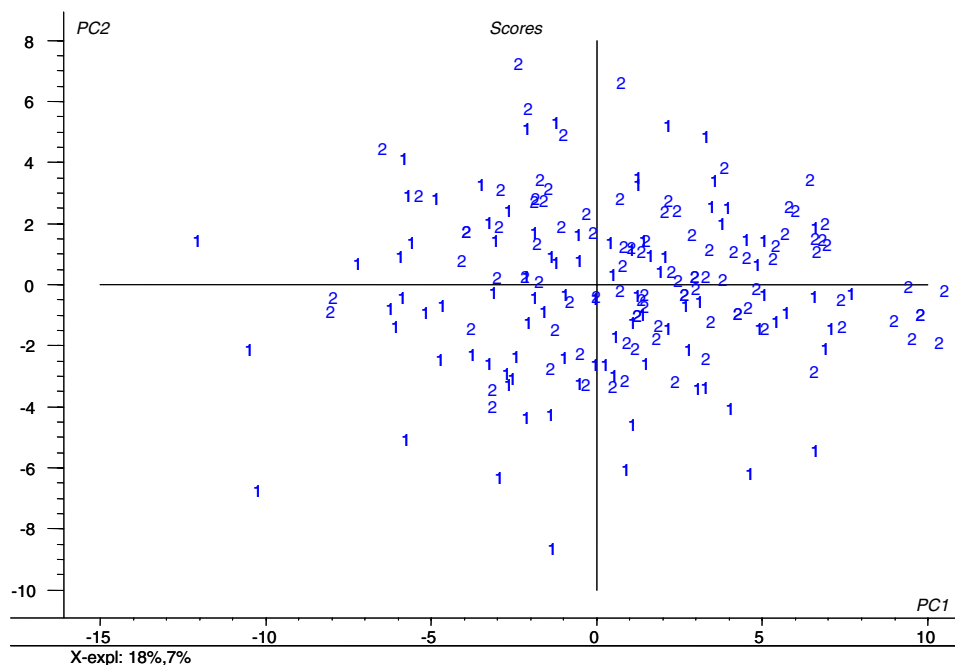


Fig. 2b. Score plot for the two principal components PC1 and PC2. Relationships between consumers, 1 (age ≤30 years), 2 (age >30 years).

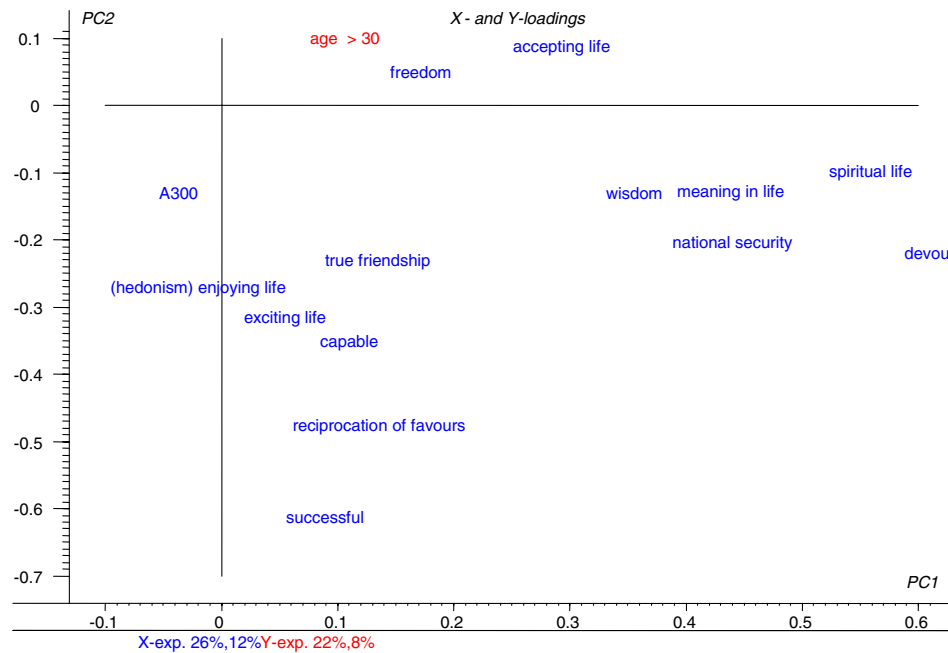


Fig. 3. Significant values important for consumers ≤ 30 years versus > 30 years. Bread sample (A300) liked to a significantly higher degree by consumers ≤ 30 years.

There was also a significant difference in liking of breads between age groups. Bread A300 (conventional) was scored significantly higher on liking by 30– than by 30+ consumers (Fig. 3). The most liked bread among consumers 30+ was A199 (conventional). Highest liking scores among all consumers were given to breads A300 (conventional), A199 (conventional), D99 (organic), while the lowest liking scores were given to breads C99 (organic) and E00 (organic) (Table 2).

Partial Least Squares Regression (PLS1) of the 56 Schwartz values scored by men and women showed significant differences by sex for only three values: “world of beauty”, “world of peace” and “equality”, which were found as

guiding principles in women’s lives. Partial Least Squares Regression (PLS2) revealed a relation between the 10 additional statements and the 56 rated Schwartz values (Fig. 4). Statements with numbers 1–9 were related to food issues, and consumers’ responses to these statements are found close to their responses to the set of Schwartz values, such as “world of peace”, “a world of beauty”, “social justice”, “spiritual life”, “unity with nature”, “equality”, “curious” and “protecting of environment”. The last statement (10) was related to the price of organic versus conventional products, and is located close to the value “wealth” and negative on PC1, opposite to the other statements.

According to PLS1, the lowest frequency of organic products consumption was related to the significant values such as “honouring of parents and elders”, “authority”, “wealth”, “clean”, “ambitious” and “respect for traditions”, while the highest frequency was related to the significant values “spiritual life”, “curious”, “world of beauty”, “unity with nature” (Fig. 5).

The majority of consumers in both groups, 64.1% (30–) and 68.5% (30+), agreed that organic food tastes better than conventional. A positive response to statement number five (“the consumption of organic bread should increase”) was given by 92.4% of consumers 30– and 91.3% of consumers 30+. Slightly less than half (45.6%) of consumers 30– and 46.7% of consumers 30+ declared that they would not buy organic food if the price was notably higher. In conclusion, there were no differences between consumers 30– and 30+ regarding questions of the superiority of the taste of organic food over conventional food, the opinion that consumption of organic bread should increase and the intention to buy organic food when prices are higher than for conventional food.

Table 2

Liking scores in the acceptance test of white breads^a with origin in different farming systems^b among organic consumers ($n = 184$)

Bread	Consumers	Means	Standard deviation
A199	≤ 30	85.8	32.8
	> 30	77.8	32.8
	All	81.8	32.9
C99	≤ 30	65.4	32.5
	> 30	70.8	32.1
	All	68.1	32.3
D99	≤ 30	82.8	32.5
	> 30	75.5	33.9
	All	79.1	33.3
A300	≤ 30	87.4	29.2
	> 30	76.5	33.3
	All	81.9	31.7
E00	≤ 30	73.6	33.5
	> 30	75.5	31.7
	All	74.5	32.6

^a For description of breads, see Section 2.2.

^b For description of farming systems, see Kihlberg et al. (2006).

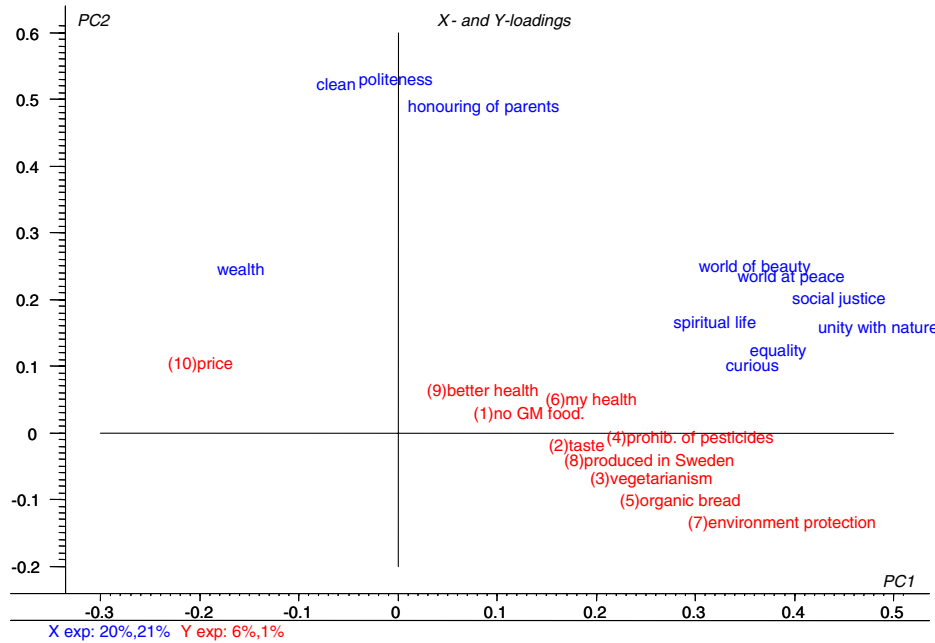


Fig. 4. Relationship between Schwartz values and statements no. 1–10 with keyword: 1–9 (concern food consumption and environment), 10 – concerns price. For statements no. 1–10, see Appendix.

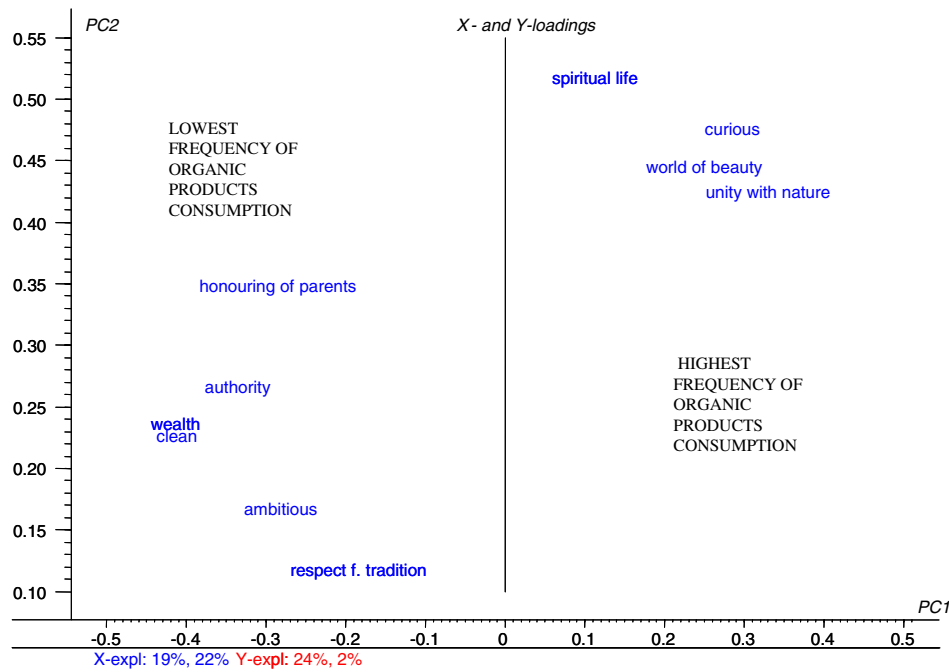


Fig. 5. Values important for the extreme purchase frequency of organic products among participating consumers. Lowest frequency of organic products consumption: less than once a week (but no less than once every two weeks), highest frequency of organic products consumption: every day.

4. Discussion

PCA revealed the relationships between variables and illustrated the patterns found in the data. The values described by PC1 and PC2 explained 25% of the total variation in the data. The explained variance may be quite low on average in cases where the total number of variables is large. The lower explanatory power may also indicate the

complexity and diversity of the value systems found among consumers participating in the present investigation. The higher explanatory power of the values “pleasure”, “enjoying life” and “daring” versus “respect for tradition”, “devout”, “honouring of parents and elders” and “politeness”, described by the PC1, than for the values described by PC2, “preserving public image” and “social power” versus “spiritual life” and “world of beauty”, indicates greater

variation in the realm of modern values (e.g., hedonism) versus traditional values (obligation) than in the realm of material values versus ideal values. The variables that significantly explain the differences between age groups, frequency of organic product consumption or specific sensory liking of bread were related to the predominance of individual and collective values or external and internal values in consumer segments, or to the different sensory perceptions, respectively.

The first and the second principal component, PC1 and PC2, created in a sensory space a structure, which can be compared with the structures of values suggested by Schwartz (1992). According to this, “stimulation” and “self-direction” versus “conformity”/“tradition” describe the first basic dimension of a higher order type of values, which is called “openness to change versus conservation” and explained the largest differences in variation in our data. This first dimension corresponds well to our PC1 dimension described by “daring” and “exciting life” (“stimulation” and “self-direction” according to Schwartz), but also by “pleasure”, “enjoying life” (“hedonism” according to Schwartz) versus “conformity”/“tradition”. The second basic dimension of higher order type values constituted by “power” and “security” versus “benevolence” and “universalism” is called “self-enhancement” versus “self-transcendence”. This dimension was described by the principal component two (PC2) in our data and describes values motivating one’s own personal interests associated with the realm of the material world versus values motivating the welfare of others and of nature/the environment. The consumers 30– were over-represented in the direction of “openness to changes and self-enhancement”, while the consumers 30+ were over-represented in the direction of “conservation” and “self-transcendence”. Values significant for consumers 30+, besides “freedom”, represent “tradition”, “security”, “benevolence” and “universalism”. These values belong to the dimension “conservation” and “self-transcendence” (collective values) (Schwartz, 1992). Values significant for consumers 30–, besides “reciprocation of favours”, represent “hedonism”, “stimulation”, “achievement” (individual values) and “benevolence” (Schwartz, 1992). This indicates the predominance of individual values in the group of consumers 30– and the predominance of collective values in the group of consumers 30+.

In the present paper, “respect for tradition”, “politeness”, “respect for parents” and “devout” are called traditional values, which are associated with obligation (according to Schwartz, conservation), while “pleasure”, “enjoying life” are called modern values and associated with hedonism. Findings in the present study of modern versus traditional values along PC1 and ideal versus pragmatic/materialistic values along PC2 are in line with the results and categorization of values in the Danish study (Borch, 1995). It is not surprising that similar value categories were found in our study, as there are some theoretical similarities between the MINERVA values card (AIM, 1997) and Schwartz’s set of values. The MINERVA values

card clusters people in superior groups with respect to self-reported information, which helps the market reach individuals on a group level in Scandinavian countries and to communicate the values recognized by different segments of the consumer population. In our study, we found consumers 30+ to be traditional idealists and consumers 30– to be more modern and materialistic. Materialistic/pragmatic values are more associated with Danish consumers than with Swedish consumers (Borch, 1995). This may indicate the presence of Danish trends in Sweden, as the values typical of Danish consumers seem to be present among younger organic consumers in Sweden.

The predominance of “individual values” (“self-direction”, “stimulation”, “hedonism”, “achievement”, “power”) among consumers 30– and the predominance of “collective values” (“benevolence”, “conformity”, “tradition”) among consumers 30+ confirm that age is a moderator of values (Schwartz, 1992). In the supermarket, the consumer may experience a conflict between individual and collective values, as these values are opposites. Choosing between organic and conventional products also with respect to the environment, when product assortment and price are not equal, may be difficult. Magnusson, Arvola, Koivisto Hursti, Åberg, and Sjöden (2003) stated that egoistic motives are better predictors of purchase than are altruistic motives. According to Sjöden (2003), collective values have no tradition in the food area, and it is a challenge to make consumers more oriented towards collective values. One may wonder whether the differences between younger and older consumers found in the present study are not an expression of the changes in modern society, e.g., in the Swedish mass media, where hedonism or other individual values are increasingly encouraged at the expense of more traditional, collective values. There are not only conflicts between values, but also compatibility between each pair of value types (Schwartz, 1992) (e.g., “hedonism” – “stimulation”). This is crucial to realize in a society where values may be used as a tool to stimulate sustainable production and consumption.

Notice that there was a relationship between the values “world of beauty” and “world of peace”, “social justice”, “spiritual life”, “curious”, “equality”, and “unity with nature”, “protecting the environment”, “equality”, and statements number one to nine. These specific statements, related to food consumption and the environment, can be also seen as an indicator of consumers’ consistent reporting of values important to them. Contrary to statements no. 1–9, statement no. 10, related to prices, was most associated with the value “wealth” and confirmed, among consumers for whom “wealth” is a guiding principle in their lives, an unwillingness to pay much higher prices for organic food than for conventional. This is an interesting result, as it shows that not even organic consumers are ready to pay more for organic products than for conventional. Higher prices for organic food than for conventional are thought to be an obstacle to choosing organic food (Magnusson et al., 2001; Torjusen, Lieblein, Wandel, & Francis, 2001).

The association between organic products and higher prices, but not higher quality, as compared with conventional products (Magnusson et al., 2001), is a negative factor for the organic product image. In Denmark, consumption of organic food has decreased during recent years (Thøgersen, 2003). Should this pattern emerge among Swedish consumers, the organic market could fail, which would hazard the political goal of increasing organic agricultural production and consumption. When segments change or mature in Sweden, they may become more alike those in Denmark (Borch, 1995; Thøgersen, 2003). This highlights the need for strategic market communication to be in line with these changes. Thus, the values communicated through marketing should be recognized as important for the targeted consumer segment. As shown in the present study, the values were significantly different for the different consumer segments.

It is not surprising that the majority of organic consumers thought that organic food tastes better than conventional, and this finding confirms similar results from other investigations (Arvola et al., 2000; Schifferstein & Oude Ophuis, 1998). People tend to repeat contact with stimuli that give rise to pleasurable sensory sensations. This is a universal human phenomenon (Warburton, 2003). On the other hand, the finding that the majority of organic consumers thought that organic food tastes better than conventional should not only be interpreted as positive. Given that taste is reported to be the most important choice/purchase criteria (Magnusson et al., 2001), one may wonder why the percentage of organic consumers with this opinion was not even higher. In light of the Danish study (Borch, 1995), which describes Swedes as idealists – focused on environmental questions and ethics, one would expect Swedes to make sacrifices. This is different from what one would expect of the prototypical Danish consumer.

The high degree of agreement among consumers in our study concerning statement five (“Consumption of organic bread should increase”) indicates favourable conditions for the consumption trend of organic bread in the future. This is not a predictor per se of increased purchase of organic bread (Arvola et al., 2000), but it is an important factor for choice and an absolute condition for the increased consumption and potential growth of the organic bread market. It is well known that non-sensory factors (e.g., attitudes, information) are of great importance for product acceptance and food choice (Lyman, 1989c; Mialon, Clark, Leppard, & Cox, 2002; Shepherd, 2004; Westcombe & Wardle, 1997). Consumers’ positive attitude towards organic bread is an important factor, but in order to increase organic bread sales, the producer must communicate specific values that the different consumer segments can recognize as their own. In other words, the sensory and non-sensory attributes of organic bread must be attractive to consumers. The organic food market must offer not only food products, but also attractive values attached to the product, as food is essential to achieving important consumer values such as recognition, security, self-fulfilment (Grunert et al., 2001).

Values important for the lowest consumption frequency group, such as “wealth”, “ambitious”, “authority”, can be more clearly linked to the social/political correctness of consuming organic food in Sweden, as such consumption is governed by the individual’s external world. Values such as “spiritual life”, “curious”, “world of beauty”, “unity with nature” were shown to be important for the highest consumption frequency group and can be linked to consumption guided by the consumer’s internal values, which are associated with “universalism” and “self-direction” (Schwartz, 1992). In this group, we can expect to find devoted consumers of organic products (Borch, 1995). In our study, this group consisted predominantly of consumers 30+.

Different liking scores for breads baked with wheat originating from conventional versus organic farming systems with different treatments (Kihlberg et al., 2006) among consumer groups 30– and 30+, who are guided by different values, confirmed our hypothesis that age is related to values and that consumer groups differ in bread acceptance. The white bread A300 (baked with conventional wheat, different treatment) was liked to a significantly greater degree by consumers 30–, but it was also relatively highly accepted by consumers 30+. This bread was found by the trained sensory panel to be significantly different from most of the other breads (Kihlberg et al., 2006). Bread A300, like bread A199 (baked with conventional wheat, different treatment), was characterized by significantly higher intensity of attributes such as smoothness, elasticity and juiciness than was bread sample C99 (baked with biodynamic wheat), D99 (baked with organic wheat, different treatment) and E00 (baked with organic wheat, different treatment). Yet what differentiated bread A300 from bread A199 was degree of mastication resistance, which was lowest for A300. In other words, this bread had the most delicate texture and was easiest to chew. Notice that bread A300 was preferred by a group of consumers for whom “hedonism” was a strongly held value. Both consumers 30– and 30+ agreed in their relatively high acceptance of breads A300, A199 (conventional breads) and D99 (organic bread), but they disagreed concerning their liking of organic breads C99 and E00, as these were most disliked only by consumers 30–. What distinguishes breads C and E from the other breads was the rancid flavour found in the breads by the trained panel (Kihlberg et al., 2006). The rancid flavour is an effect of oxidation of fatty acids and depends on the quality and quantity of lipids. The experimental procedures for bread production in the present study guaranteed that the breads’ sensory attributes were related to the wheat characteristics: in the case of rancidity, to the lipid composition of wheat grown in different farming systems. Rancidity in other food groups, e.g., pork is related to the high amount of polyunsaturated fatty acids in pigs’ diet, and consumers’ liking of pork is highly related to the meat flavour (Bryhni’s, 2002). Bryhni (2002) findings and the present results indicate that flavour is important to consumers and is used by them as a discriminating factor

independent of food type. Flavour is used as an indicator of food safety, while texture is used as an indicator of quality (Lawless & Heyman, 1999). In the present consumer test, the consumer group 30– differed to a high degree from the group 30+ in their rating of samples in relation to taste (flavour). In humans, loss of taste sensation tends to occur gradually and may begin as early as the mid-thirties (Herne, 1995).

Moreover, the three bread types most liked by consumers (A300, A199 and D99) were baked with white flours (ash content 0.48%), which were extracted from wheat with a protein content of 12%, 10.6% and 9.3%, respectively. The protein contents of A199 and D99 were below the required protein content for wheat accepted for bread baking on an industrial scale in Sweden. Despite this, the breads received scores of high acceptability in the consumer test.

5. Conclusions

The consumers in the present study did not constitute a homogeneous group, but formed different segments based on the different values they provided. Results confirmed the main groups of the near universal structure of values suggested by Schwartz.

Age groups had significantly different values. For consumers 30+, “freedom”, “accepting life”, “wisdom”, “meaning in life”, “national security”, “devout” and “spiritual life” were the guiding principles in their lives. “True friendship”, “enjoying life” (hedonism), “exciting life”, “capable”, “reciprocation of favours” and “successful” were guiding principles in the lives of consumers 30–.

Besides “freedom”, values significant for consumers 30+ represent “tradition”, “security”, “benevolence”, and “universalism”. These values belong to the dimension “conservation” and “self-transcendence” (collective values).

Besides “reciprocation of favours”, values significant for the younger group represent “hedonism”, “stimulation”, “achievement” (individual values) and “benevolence” (Schwartz, 1992).

Values associated with openness to change versus conservation explained the largest amount of variation in the data. Consumers 30– were over-represented in the direction of the modern values “openness to changes” and “self-enhancement”, while consumers 30+ were over-represented in the direction of the traditional values “conservation” and “self-transcendence”.

Values and age were linked to bread acceptance such that age groups characterized by significantly different values differed significantly in liking of bread.

Both organic and conventional breads were among the most liked breads.

The majority of consumers thought that the consumption of organic bread should increase, and that organic food tastes better than conventional. Moreover, they would not buy an organic food product that was appreciably higher in price than a corresponding conventional food.

The presence of different consumer segments characterized by different values and liking of bread poses a challenge to the market. This challenge includes offering a product with high sensory acceptance and communicating values recognized as important for the targeted consumer segments.

Acknowledgements

The authors are thankful for the fruitful cooperation and kind help received during the project. This study was part of the FOOD 21 programme (Product Quality Unit) supported by MISTRA, the Foundation for Strategic Environmental Research. The Agricultural Society in Kristianstad (Scania, Sweden) contributed the wheat samples. The Sample Preparation Unit, Swedish Agricultural University, Uppsala, Sweden stored the wheat. Nord Mills AB, Uppsala, Sweden enabled us to carry out the experiment, and through the help of Skogaholms Bröd AB, Uppsala, the quality of the stored and sliced bread samples for the consumer test was guaranteed. Katarina Virhammar MSc, former student Christina Karlsson and Thea Nordström assisted during the consumer test.

Appendix

Additional questions (1–10) posed to consumers in the questionnaire during the acceptance test.

1. GM food is dangerous to eat (keyword: no GM food).
2. Organic food tastes better than conventional (keyword: taste).
3. It would be best if all people became vegetarians (keyword: vegetarianism).
4. The use of pesticides should be forbidden (keyword: no pesticides).
5. Consumption of organic bread should increase (keyword: organic bread).
6. I try to obtain food that is best for my health (keyword: my health).
7. I always choose environmentally friendly detergents (keyword: detergents).
8. Wheat for my bread should be cultivated in Sweden (keyword: Sweden).
9. Swedish wheat is best for my health (keyword: better health).
10. I would never buy organic products that are more expensive than conventional products (keyword: price).

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