

University of Applied Sciences



Consumers' attitudes and expectations concerning Functional Food

Prof. Dr. Klaus Menrad Kai Sparke

University of Applied Sciences of Weihenstephan Science Centre Straubing Schulgasse 18 94315 Straubing Germany

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1 Introduction to consumer behaviour theory

Food choice behaviour is driven by the optimisation of both nutrition and enjoyment derived from food choices. However, food choice is not just one dimensional, but a complex human behaviour influenced by many interrelating factors. Those influences are described in the Universal food choice model (Shepherd 1990). Usually there are three dimensions influencing the consumer's food choice decision-making process. The first one are properties of the food, the second one are person-related factors, and the third one are purchasing environmental factors. They influence the consumer's decision-making process in combination with each other and form the basis of the food choice model. Additionally, the role of communication is integrated in a revised Universal food choice model (figure 1) which is placed in the centre of the food choice model, because communication is related with all three other dimensions.





Source: Shepherd 1990, revised

The person-related factors of the Universal food choice model are of great importance. Perception of the sensory attributes of food, psychological factors, attitudes, acceptance and physiological factors belong to them. Appearance of the product, aroma, taste and texture are examples of the perception of sensory attributes. Satiety, hunger, thirst and appetite are part of the physiological factors which are regarded as being less relevant for the requested analysis of consumers' behaviour related to Functional Food. Personality, experience, mood and beliefs form the psychological factors. Also routine and habits contribute to the choices people make in their diet. Psychological factors like previous experience of the food can have a direct influence on the perception of sensory attributes. Communication through the government, medical doctors, food companies or other sources can influence psychological factors applying to the consumer.

An "attitude" is defined as a kind of psychological tendency that is articulated by assessing a particular entity with some degree of favour or disfavour (Eagly and Chaiken 1993). The affective, cognitive or behavioural responses resulting from the attitude relate to the process of evaluation (Frewer 2003).

Evaluative responses are those which express approval or disapproval, liking or disliking, attraction or aversion. Attitudes exist towards price or value of a food product, health or nutrition. They cannot directly be observed, but can be infered from observable responses to questionnaires or interviewers (MacCorqual and Meehl 1948). A change of attitudes may occur when a respondent receives some additional information that will influence either the extent of the attitude's strength or its direction. The source of such influencing information can be a communicating person or institution such as the government, a food company or a neutral consultant. Psychological factors and attitudes lead to the acceptance of food. A person's attitude has a direct influence on food acceptance and food choice (Poulsen 1999). Food acceptance can be used as a measurable concept closely related to food choice. Acceptance refers to an individual experience, a feeling or an emotion with a hedonic aspect (Cardello and Schutz 2000). Food acceptance can be verbally operationalised as a measure of rated pleasantness or liking (Pilgrim 1957).

A typical buying process leads the consumer through five stages: problem recognition, information search, evaluation of alternatives, purchase decision and post purchase behaviour (Kotler 2000). During the evaluation of alternatives, food selection is not only based on sensory properties of food, but also on verbal information about the food such as description on the packaging, advertisement in the media, advices or recommendations from third persons. Finally, in the case of a purchasing process it is assumed, that a consumer intends maximising his utility from buying and consuming goods given his limited budget (Verbeke and Viaene 2001). The study of consumers' attitudes and expectations regarding Functional Food and their willingness to pay price premia for such products was developed on this theoretical background.

2 Methodology

The following aspects should be analysed in the context of the consumer study:

- The profile of buyers by age, gender, social category and education
- The consumers' understanding of food components and ingestions, nutrition and health
- The consumers' attitudes and perception regarding Functional Food
- The reasons for buying Functional Food products
- The consumers' willingness to pay price premia for Functional Food products
- To identify whether there is mistrust in the communication of persons and institutions concerning Functional Food
- To explore the reasons for existing mistrust
- To find out suitable channels to communicate on Functional Food

These aspects had to be explored for the countries of Germany, Poland, Spain and the United Kingdom. Germany as a continental European country was chosen due to the overall market size, the rather competitive character of the German food market and specific features like the high relevance of functional beverages in this country (Menrad 2003). Consumers in Germany are sceptical e. g. related to the use of biotechnology and genetic engineering approaches in food production and processing (Gaskell et al. 2002, Menrad 2000b) and therefore new data regarding the innovative segment of Functional Food which can be directly compared to other European countries were regarded as being of great interest. Poland reflects the development of Functional Foods in an Eastern European country recently joining the European Union. In Spain as a Mediterranean country there is a high volume food market, interest of consumers in new products, as well as a specific profile of food industry, consumption pattern and consumer perception to food and nutrition which make it interesting to analyse the situation of Functional Food in this country. The United Kingdom is an extra-continental country and interesting because of its high value food market with specific profile of food industry, food retailing and consumption patterns of consumers. It is the most "US" type market in the EU with a specific range of Functional Food products available for a longer time period.

A consumer survey using a standardised questionnaire is a well-suitable methodological tool to work on the requested tasks. For this purpose a questionnaire for face-to-face interviews with consumers in the four countries was developed. The tasks were operationalised into several questions. The complete questionnaire can be found in annex 1. Most of the questions contain given answers and are so called "closed-ended" questions. The interviewees have to mark one or several of the given responding categories. This approach enables a standardised statistical analysis and makes the results of different individuals and subsamples more comparable with each other. Answer proposals for single questions have been worked out with the aid of literature and team workshops using creative techniques. The previously mentioned tasks have been operationalised in the questionnaire as follows. Data for an analysis of the profile of buyers was obtained through a set of sociodemographic questions (compare questions 13 to 16 in annex 1). According to experiences in market and consumer research, respondents are sensitive to give detailed answers to those questions. Therefore the sociodemographic questions have been positioned at the end of the questionnaire. Furthermore, a set of given categories simplified answering these questions. Due to differing education systems and different levels of income and costs in the investigated countries, standardizing the questions and their answer proposals was challenging. Five income categories have been generated, namely "very low", "low", "middle", "high" and "very high". The basic value was calculated from average earning statistics in each country. EU statistical publications (Eurostat 2003) provided data for Germany, Spain and the United Kingdom. Polish data was drawn from the website of the Polish Statistical Office (Central Statistical Office 2004). Using the obtained range of incomes and the household sizes in each country, finally five rational income classes were developed (table 1). All calculations concerning the non-Euro currencies Polish Zloty and British Pound have been done on the currency exchange rates of October 8th, 2004: On that day one Polish Zloty was worth $0.23 \notin$, and one British Pound was worth $1.40 \notin$.

Income category	Germany Euro	Poland Zloty	Spain Euro	United Kingdom British Pound
very low	below 1,000 €	below 1,000 ZI	below 1,000 €	below 750 £
low	1,000 up to 2,000 €	1,000 up to 2,000 ZI	1,000 up to 2,000 €	750 up to 1,500 £
middle	2,000 up to 3,000 €	2,000 up to 3,000 ZI	2,000 up to 3,000 €	1,500 up to 2,250 £
high	3,000 up to 4,000 €	3,000 up to 4,000 ZI	3,000 up to 4,000 €	2,250 up to 3,000 £
very high	4,000 € and more	4,000 ZI and more	4,000 € and more	3,000 £ and more
Currency ex	change rates (08. Oct.	2004): 1 Zloty 0 0.23 €,	1 £ = 1.40 €	

Table 1: Income categories

Source: Own inquiry 2004

Eurydice (2004) databases and publications provided information about structure and organisation of education systems in the four countries. A common pattern was derived from this. The given categories were "no certificate", "secondary school", "secondary school with authorisation for academic education", "professional training certificate", "academic degree" and "other certificate" (see question 15 in annex 1).

The consumers' understanding of food components and intakes, nutrition and health was investigated with the help of question 5. Six functional substances in combination with four answering options each were introduced in this question. Three options contained possible effects of a functional ingredient on different diseases or parameters of consumer's well-being. Only one of these three answering options was correct, the fourth option was "do not know". It was one target when selecting the functional ingredients that the substances might differ in the degree of familiarity among consumers. Calcium was assumed to be well-known among the respondents. Probiotic cultures, dietary fibres and Omega 3 fatty acids have been established in several Functional Food products since almost ten years and therefore should have obtained certain recognition among consumers. Finally, folic acid and especially Lycopene are regarded as relatively new functional components.

Question 6 in the questionnaire (see annex 1) was defined as a filter question. Respondents who agree to the question "Have you already bought Functional Food products" are regarded as buyers, the denying respondents as non-buyers. Questions 7 and 8 were only asked to buyers. Data from question 7 – asking for the purchasing frequency – improves the level of detail concerning consumers' behaviour in relation to Functional Food. The reasons for buying Functional Food products are explored in question 8. The list of ten given answers was developed through creative techniques. The same procedure was carried out for the questions 9 and 10, which had to be answered by the non-buyers. The reasons to refuse Functional Food and the preconditions which have to be fulfilled to eventually buy such products were explored in these questions (see annex 1).

Question 11 was asked to identify if there is mistrust in the communication of persons and institutions concerning Functional Food. The list of persons and institutions was elicited and discussed in the project team and finally contained nine cases. Question 12 was used to explore the reasons for existing mistrust. Suitable channels to communicate on Functional Food should be obtained through question 4 which lists a number of possible information sources and communication partners or media for Functional Food.

Finally the consumers' willingness to pay price premia for Functional Food products was investigated using a so called conjoint analysis design. The respondents had to evaluate different versions of a functional orange juice. A more detailed description of the conjoint design can be found in chapter 6.5.

A first draft of the questionnaire was developed by the University of Applied Sciences of Weihenstephan and sent to the other project partners. Their proposals for improvement were considered as well as a pre-test which was conducted in a German supermarket in June 2004. The pre-test was conducted to obtain information about time length, adequacy to guide the respondents through the interview, comprehensibility and process of the conjoint analysis. After all the final version of the questionnaire was completed and translated into the different languages. The University of Applied Sciences of Weihenstephan carried out the translation into German and organised the translation into Polish. The translation into Spanish was carried out by IPTS.

The University of Applied Sciences of Weihenstephan organised the survey in Germany, Poland and the United Kingdom, IPTS did so in Spain. In Germany the interviews were conducted by associates of the University Weihenstephan in two supermarkets both in a Bavarian town and rural village. The supermarkets belong to one of the most important food retail chains in Germany. The owner of the stores agreed to carry out the survey in their markets. 116 interviews were conducted in July and August 2004, and flowering pot plants were given to the interviewees as incentives to participate. The survey in Poland was conducted in September 2004 by a partner of the University of Weihenstephan in front of supermarkets in the city and vicinity of Szczecin (Northwest of Poland). 110 filled-in questionnaires were obtained. A store of a co-operative supermarket company, situated in a town in Somerset County (Southwest of England) was found for the survey in the University of Weihenstephan and awarded with tea gift packages and touristy brochures about Bavaria for their participation. IPTS commissioned a market research company to conduct the survey in Spain. 279 interviews were conducted in front of supermarkets in eight different areas in Spain in November 2004.

The time needed for one interview was about 10 to 15 minutes, but was very dependant on the interviewee's performance during answering the questions and assessing differing product profiles of a functional orange juice during the conjoint measurement. The people's willingness to take part in the survey was fortunately high. The answered questionnaires were checked by members of the University of Weihenstephan concerning possible mistakes, misinterpretations, missing values and consistency of the data. Afterwards data was fed into a database file of SPSS statistical software. Due to illogical, missing or not readable answers several questionnaires or single answers had to be abolished, and thus the number of respondents for statistical analysis of the questionnaire and conjoint measurement is reduced and differing between questions. The used number of respondents is declared in the respective result table or figure in each case. Details of performing the statistical analyses are given in the context of the differing questions in the subsequent chapters.

In addition to the consumer survey in the four countries, an extensive literature review was conducted by the team of the University of Applied Sciences of Weihenstephan in order to integrate existing knowledge and to compare the results of the current survey with previous research. A special focus was on Scandinavian countries like Denmark or Finland. Internet databases and institutions' websites were browsed as well as scientific articles, manuals and books were identified and evaluated for this purpose. The survey's results were compared to insights from literature with regard to the differing aspects requested in the study. The results and conclusions of these analyses are presented in the subsequent chapters.

3 Consumer information behaviour

3.1 Cognition of the term "Functional Food"

An important prerequisite for consumers' interest in a specific group of foods as well as the buying and consumption of such foods is the identification of different groups of food. In this sense it is important to know whether consumers are aware of the concept of Functional Food and what consumers have in mind in case they know this type of food.

Only a small proportion of respondents of the survey (question 2 to 4) answer the question "Do you know the term Functional Food?" with yes. In Germany 20.7 % have heard the term, in Poland it is known by 19.1 %, in Spain by 33 %, whereas in the United Kingdom only 10.7 % of the respondents know the term "Functional Food". In addition, not even all those respondents saying they knew the term "Functional Food" could give correct examples or name important brands in the Functional Food segment. In Germany only around 10 % of the respondents can give correct answers to the respective question compared to around 16 % of the respondents in Poland and 29 % in Spain. This figure significantly decreases further when the United Kingdom is concerned since the share of correct examples makes only 1.7 % in this country.

Thus, the term "Functional Food" is only known by a relatively small minority of the consumers in the analysed countries. But after being given a definition of "Functional Food" by the interviewers and naming some products or brands most interviewees are aware of the concept of Functional Food. The proportion of persons who still do not know about this type of food, stating "I have never known of these products" is only 5.2 % in Germany, 2.2 % in Spain and 2.5 % in the United Kingdom. The Polish consumers diverge from these figures with 47.3 % of them having never heard about Functional Foods (figure 2).

Concerning the design of the figures it should be taken into account that mean values are shown in most of the figures that are obtained by own investigation. Those mean values result from the statistical analysis of empirical data, conducted with SPSS statistical software, and they are exact and not rounded. In the figures, the mean values are shown without indication of standard deviations. This is due to the size of the samples which is about N=115 in three of the four countries. Additionally, some variables do not have a normal distribution, i.e. standard deviations of means score extended values. Therefore plotting error bars which indicate standard deviations would lead to complex figures. However, the reader should have in mind that the figures in this report show empirical results and thus the indicated mean values are afflicted with certain statistical errors.

The results of the survey conducted within this project are supported by recent studies which are cited in scientific literature. A study in Germany (Schölzel 1998) brought the result that only 12 % of the respondents knew the term "Functional Food". Jonas and Beckmann (1998) found out through a comparative study in Denmark and the United Kingdom that English respondents are more familiar with Functional Foods and their characteristics than the Danish consumers. In contrast to other food products and technologies used for food production and processing, the knowledge of Danish respondents about Functional Food is very limited although it is not clear how Jonas and Beckmann (1998) asked about the understanding and if they used the term "Functional Food" in their study. During another survey in Denmark, Poulsen (1999) found out that attitudes to concrete examples of Functional Foods were much more positive than attitudes to the general concept of Functional Food. However, this author also stated that the term "Functional Food" caused negative consumer associations.

Altogether it can be stated that the results found in literature correspond to the survey's findings, i. e. the term "Functional Food" is hardly known in the population in most European countries, but single products or brands following this concept are much more frequently in the mind of consumers.

3.2 Information sources on Functional Food

Since the health effects of specific Functional Food products often are not known by the consumers and thus must be communicated to them after market introduction it is important to know in which ways consumers get information about Functional Food. Therefore the interviewees were asked to name the information sources for this type of food. The results are shown in figure 2 whereas multiple answers were possible in this question. The information sources most frequently mentioned are by far product advertisements via multiple communication channels, like e.g. television, newspapers or internet. Product advertisements reached 75 % in Germany, 83 % in Spain and 77 % in the United Kingdom. In Poland only 42 % of the respondents acquire their knowledge from that source, but it is still the most important one (figure 2).

Other important information sources on Functional Food are reports in several media and the description on the product packaging. Despite reports which get only a proportion of 14 % in Poland, these information sources are noted by around 30 % of the respondents in all countries. While product advertisements, reports in different media and information provided on the product packaging are relatively often mentioned by the respondents as an important information source referring to Functional Food products, other possibilities to inform consumers are of minor relevance. Only 10 % of the consumers get some information about Functional Food from doctors or pharmacies, fitness centres or cosmeticians. The opinion of friends and relatives is important in Germany, Spain and the United Kingdom since around 20 % of the respondents mention to receive and appreciate information from them.

With 47 % of the respondents of the survey, there is a high number of Polish consumers who have never known of Functional Food products, even after having heard a description. However, no other study published in English language could be identified in scientific literature which would have proven data to compare this result with. Since the food market and media structure in Poland do not differ that much from the other countries' under investigation, this figure is rather surprising, but a reason for that wide deviation cannot be stated.

Hilliam (1996) presents some additional insights to information sources from a study in Germany and the United Kingdom. The most important source is the product label with 55 % in the United Kingdom and 79 % in Germany. Television with 52 %, women's magazines with 47 % and national papers with 18 % in the United Kingdom and with 54 %, 26 % and 40 % in Germany respectively follow. In the total sum, the different media exceed the percentage for product label and this is consistent with the survey's results in the current project, but Hilliam (1996) made no differentiation between product advertisements and journalists' reports. Family and friends are mentioned by 27 % in the United Kingdom and 44 % in Germany as an information source for Functional Food while physicians and health professionals receive 17 % in the United Kingdom and 25 % in Germany and thus are at the end of Hilliam's listing of information sources (Hilliam 1996). The latter result is in accordance to the survey's findings of this project.



Figure 2: Information sources about Functional Food

Source: Own inquiry 2004

In combination with the findings about trustworthiness of persons and institutions (see chapter 6.3), the cognition about main information sources regarding Functional Food seems to be a suitable starting point for promising communication strategies.

Advertisement seems to be the most useful way to communicate a topic to consumers, but at the same time it is most expensive. Non-commercial institutions could use media reports. Persons like friends, relatives, doctors and other consultants are important communication channels. But using them to affect consumers is difficult, because the original messages will be interpreted and modified by the transmitting persons.

3.3 Understanding of Functional Food ingredients, nutrition and health

Functional Foods are intended to influence the health and well-being of consumers through specific functional ingredients which are specifically added or concentrated in the respective food products. Therefore it is relevant that consumers understand the basic relationship between specific food ingredients and their health status or the prevention of a specific nutrition-related disease. However, it is also known from previous research that European consumers only have limited knowledge concerning the interaction of specific food components, nutrition and health (Hilliam 1996). Therefore it is of interest for public authorities (in order to independently inform consumers about the health effects of specific Functional Food products) and private companies (in order to explain the specific health of their products as a main argument for buying decisions to consumers) to know more about the understanding of the consumers in the countries under investigation concerning specific functional ingredients.

To evaluate the consumers' understanding of the relationship between nutrition and health and the efficiencies of specific functional ingredients which can be used to design fortified Functional Foods, the respondents were asked to answer questions arranged for this purpose. They were given six multiple choice questions in which they were asked to identify the health effect of specific functional components. There were four options for each ingredient: one with the correct answer, tow erroneous ones and one "Do not know" column. Figure 3 shows the results of this knowledge query in the four countries.



Figure 3: Knowledge about functional ingredients and their health effects

Source: Own inquiry 2004

When evaluating the findings of figure 3 it should be taken into account that the answers given by the respondents are based on "aided knowledge" as there have been given answering options in the questionnaire. Therefore it cannot be excluded that the "reported knowledge" of the consumers is generally higher than the "actual knowledge" (i. e. without supporting the "knowledge" of consumers with different answering options in the questionnaire). However, due to the fact that the same methodology has been applied in all four countries, the differences among the functional ingredients and between the countries will not strongly be affected by this methodological speciality, but the overall level of knowledge of the consumers might be overestimated.

As already reported in previous research, there are strong differences related to the knowledge of consumers on the health effects of differing functional ingredients. These differences are also found in

the current survey. The effect of Calcium onto bone health and for the prevention of osteoporosis is best known in all four countries. At least 80 % of the respondents have marked the correct answer in each country. In a "consumer hitlist" of known health effects of functional ingredients, probiotic cultures, dietary fibres and Omega 3 fatty acids follow. The health effect of folic acid is only known by less than half of the respondents – with the exception of Great Britain – and only a small minority of 10 % up to 20 % of the interviewees know the effect of Lycopene (figure 3).

In addition to the differences related to consumers' knowledge about specific functional ingredients, we also find differences in consumers' knowledge between the analysed countries. Germans reach the best result with Calcium, since 99 % of the respondents in this country have marked the correct answer. The corresponding value in Poland is 81 %, in Spain 95 % and 94 % in the United Kingdom (figure 3). It is obvious that the Polish answers mostly lie below the values of the other countries. While Germany and the United Kingdom have quite similar results for probiotic cultures with 85 % and 83 % respectively, only 55 % of the Polish and Spanish respondents know the correct answer for this functional component. 79 % of the British and German and 68 % of the Spanish consumers know the effect of dietary fibres related to colon cancer, while just 55 % of the Poles make the correct association.

The effect of Omega 3 fatty acids on blood cholesterol level is known by 81 % of the German and Spanish respondents and 67 % of the British participants, but only by 30 % of the Polish consumers. In contrast to the general pattern, 42 % of the Poles know the effect of folic acid on prevention of the neuronal tube defect of unborn children while in Germany only 29 % of the respondents and 36 % in Spain have marked the correct answer. On the other hand British respondents obviously have more knowledge about the health effects of folic acid than respondents in the other countries, since 67 % of them give the correct answer. This result may be influenced by recent information and communication campaigns of public institutions in the United Kingdom in order to inform the public about the health effects of folic acid and to recommend it to women during pregnancy.

In conclusion, the results of the consumer survey show that consumers' knowledge about the health effects of functional ingredients that have been established and introduced in the market for a long time (like e. g. Calcium) is quite high in all countries and by far outreaches consumers' knowledge concerning health effects of functional ingredients of products which have been launched in recent ten years (like e. g. Lycopene). However, examples of functional ingredients like probiotic cultures, Omega 3 fatty acids or dietary fibres (which are relatively "new" compared e. g. to Calcium) also show that a relatively high level of consumers' knowledge can be established within a foreseeable timeframe in case competent private or public actors initiate and organize specific information campaigns since these ingredients have been strongly advertised by private food manufacturers – as in the case of probiotic cultures or promoted in the scope of public health campaigns and in the case of dietary fibres – in recent years.

The survey's findings of the current project correspond to results of previous research. Hilliam (1996) states the awareness of respondents about health effects of Calcium in Germany and the United Kingdom with 100 % and 94 % respectively and thus reports almost the same percentages like in the current survey. According to Hilliam (1996) only 7 % of German and 15 % of U.K. interviewees have heard about the health effects of Bifidus and Acidophilus bacteria which both are specific microorganisms with probiotic properties. In addition, the awareness of health effects of oligosaccharides was constituted in Germany with 9 % and in the United Kingdom with 3 % (Hilliam 1996). These values of the study of Hilliam (1996) are significantly below the results obtained in the current survey, but the difference can be explained by the fact that Hilliam (1996) did not ask consumers' knowledge for the generic terms "probiotic cultures" or "dietary fibres" but used specific organisms or subgroups of the ingredient category which only a small minority of consumers is aware of. This high consumer acceptance and knowledge concerning ingredients like Calcium and probiotic cultures is also found in a representative population survey of the commercial market research institute GfK AG, Nuremberg, in 1998 (figure 4), while "new" groups of functional ingredients (like e.g. carotinoids of flavonoids) are regarded more critically by German consumers (figure 4) mainly due to lack of knowledge of the health effects and efficiencies of such ingredients (GfK Market Research 1998).



Figure 4: Consumer acceptance of functional ingredients in Germany 1998

Source: GfK Market Research 1998

An additional study can be cited for Denmark and Finland which clarifies the situation in the Scandinavian countries. According to Bech-Larsen et al. (2001) the awareness of Danish consumers about the health effects of Calcium amount to 88 % and those of fibres to 71 %. In contrast, 48 % of the Danes correctly know the health impacts of probiotic cultures and 43 % those of Omega 3 fatty acids while only 35 % of the Danish population are aware of health benefits of anti-oxidants (figure 5). The results of the Danish study partly correspond to the survey's findings of the current project. The lower knowledge values e. g. for probiotic cultures and Omega 3 fatty acids in Denmark might be explained by the fact that the study has been carried out around five to six years ago and products with these ingredients have not been well-known in the general public. Furthermore, additional information campaigns during recent years might have contributed to increase consumers' knowledge about the health effects of these ingredients as well.



Figure 5: Consumer awareness of health effects of various functional ingredients in Finland and Denmark

In addition to analysing consumers' knowledge of the health effect of single functional ingredients, the "overall knowledge" of consumers in this field is investigated as well. For this purpose the results of all six sub-questions of question 5 of the questionnaire (see annex 1) were accumulated for each respondent in order to obtain a kind of "aggregated knowledge value". In this context every correct answer counted with one from six points, and afterwards a percentage of correct answers was calculated: Answering all six sub-questions of question 5 correctly resulted in an aggregated knowledge value of 100 %.

Using this methodological approach, the mean percentage of correct answers in Germany is 65 %, in Poland 47 %, in Spain 53 % and 66 % in the United Kingdom. These findings point out that consumers' overall knowledge about the health effects of functional ingredients is similar in Germany and the United Kingdom, while the knowledge of Spanish and Polish respondents is below this level. A corresponding study for the USA revealed that around 45 % of the North American consumers were not aware of the links between specific food components and health effects (Childs and Poryzees 1998), thus being in the range of "knowledge values" which were found in the current project in the four EU countries.

An IEFS (Institute of European Food Studies) study (Martinez-Gonzalez et al. 1998) analysed consumers' attitudes towards food, nutrition and health in several European countries – among them Germany, Spain and the United Kingdom. For this purpose the interviewees were asked "What means healthy eating to you?". 70 % of the German and 60 % of the U.K. respondents answered that "less fat" would fit in this category, whereas only 27 % of the Spanish were of this opinion. 46 % of them named "more vegetables" as being more important regarding healthy eating. These findings document different attitudes to specific foods and cultural differences between those countries. However, the concept of "balance and variety" was mentioned to be important by about 40 % of the interviewees in all countries. In contrast, only 3 % of the Spanish respondents mentioned "more fibres" and no one named a "low cholesterol diet" as being important for healthy eating. Even if the results of the IFES study cannot be directly compared to the survey's outcome in the current project because of differently phrased questions – an open question in the IEFS study and a multiple choice question in the survey – these findings underline a deficiency of knowledge of the Spanish consumers in this field, as already stated by Martinez-Gonzalez et al. (1998).

4 Sociodemographic characteristics

The most important sociodemographic characteristics of buyers and non-buyers of Functional Food in the different countries were analysed, although again it has to be taken into account that sociodemographic characteristics of consumers do not explain their consumption behaviour related to Functional Food per se but still these characteristics give some hints concerning the interesting target-groups for these products. It was tested whether specific interdependencies could be identified between sociodemographic characteristics of the respondents and their level of knowledge concerning the health effects of functional ingredients. For this purpose specific subgroups of the respondents in the different countries were analysed with respect to their knowledge in this field.

4.1 Education

In Poland there is a slight tendency that people with authorisation for academic education or with an academic degree have more knowledge about functional ingredients and their effects onto health than those respondents with secondary school or without a university education. The same interrelation can be observed for Spain. However, neither in Germany nor in the United Kingdom is there evidence for an interrelationship between level of education and knowledge about functional ingredients. Altogether, other factors seem to influence consumers' knowledge in this field more significantly than the educational level of the people, although Fullmer et al. (1991) reported that consumers with higher education levels in the USA had a better understanding of diet-disease related messages.

This attribute ex post turned out to have an influence on a positive purchase decision towards Functional Food.

4.2 Age

The age of the respondents represents a second sociodemographic parameter which shows some interrelationship to consumers' knowledge in the Functional Food field. The mean age of buyers and non buyers is illustrated in table 2.

4.3 Buyers versus non-buyers

One main objective of the survey was to explore the motives, attitudes and behaviour of buyers and non-buyers of Functional Food. Thus those were the target groups of the survey. But there seems to be no possibility to define the characteristics of these target groups ex ante not least since they are rarely characterised by sociodemographic criteria (Rogdaki 2003). Therefore a rational approach to meet with buyers and non-buyers of Functional Food is to watch them at the point of sale. For this reason the survey was conducted in supermarkets in the four selected countries. As a result, the obtained sample cannot be assumed as representative concerning attributes like age group, education or income. The influencing factors for being a buyer of functional food were presumed to be not exactly known before the survey. With this presumption it is not possible to "arrange" a sample of interviewees which is representative for the basic population of buyers and deniers of Functional Food. Nevertheless, there still is the possibility to compare the sociodemographic characteristics of the sample used in the survey with population data of the selected countries. The German sub-sample has been compared to census data in order to acquire an impression of how distinctive the survey' sample is. Whereas the census (Bayerisches Landesamt für Statistik und Datenverarbeitung 2005) counts 49.5 % male and 51.5 % female inhabitants for the region the interviews were conducted in, there are 63.8 % female and 36 % male respondents. This deviation can be traced back to the fact that women in majority are responsible for the daily purchases in particular of families. Divergences can be found with respect to other sociodemographic attributes as well. They were limited with concerning the age structure, because the choice of interviewees during the survey had been masterminded by a balanced allocation of age groups.

The sample of respondents in this survey cannot be regarded being representative for the whole population in the four countries. But this kind of representativeness was not the primary goal of the survey. Otherwise a larger sample would have been required which could not have been realised given the limited financial resources and time restrictions. Given the fact that there was only limited knowledge ex ante available about the basic population of buyers and non-buyers of Functional Food in the selected countries, the obtained sample and the corresponding results of the survey can be taken as a starting point to create comparable knowledge concerning the motives, attitudes and behaviour of buyers and non-buyers of Functional Food in the EU.

To obtain some background information of buyers and non-buyers of Functional Food, a comparison between those two groups has been conducted regarding their sociodemographic characteristics. For this purpose each country sample has been divided into two sub-samples, using the response to the

question "Have you already bought Functional Food products?" as a filter. This process results in 73.3 % buyers and 26.7 % non-buyers in Germany and 70.9 % buyers and 29.1 % non-buyers in Poland. In Spain there are 77.1 % buyers and 22.9 % non-buyers, and in the United Kingdom 66.1 % of the respondents are buyers and 33.9 % are non-buyers. In a condensed form it means that about two of three respondents in all countries have already bought Functional Food products.

Results from Böhm (2000), who found about 80 % of the German interviewees to be buyers of Functional Food, and Müller and Güllner (1997), who state that more than 50 % of the Germans have bought Functional Food or are planning to do, accord to the survey's findings.

The results for the most meaningful attributes of respondents are shown in table 2. Other sociodemographic criteria besides those in table 2 like number of persons in the household or number of children in a household generate no clear tendencies.

	T						[]			1		
	Germany		у	Poland		Spain			United Kingdom			
	Total	Buyers	Non- buyers	Total	Buyers	Non- buyers	Total	Buyers	Non- buyers	Total	Buyers	Non- buyers
						9	6					
		73.3	26.7		70.9	29.1		77.1	22.9		66.1	33.9
Gender												
Female	63.8	68.2	51.6	55.5	59.0	46.9	48.0	52.1	34.4	63.6	66.3	58.5
Male	36.2	31.8	48.4	44.5	41.0	53.1	52.0	47.9	65.6	36.4	33.8	41.5
Highest educ	ation ce	ertificate										
No certificate	0.0	0.0	0.0	0.9	0.0	0.0	8.3	5.2	18.8	1.7	1.3	2.4
Secondary school	10.3	8.2	16.1	6.4	1.3	18.8	27.2	31.1	14.1	13.2	12.5	14.6
Secondary school with authorisation for academic education	7.8	7.1	9.7	41.8	48.7	25.0	7.2	6.6	9.4	9.1	11.3	4.9
Professional training certificate	67.2	70.6	58.1	27.3	20.5	43.8	19.6	18.9	21.9	33.9	30.0	41.5
College or University degree	13.8	12.9	16.1	23.6	29.5	9.4	32.6	33.0	31.3	42.1	45.0	36.6
Other	0.9	1.2	0.0	0.0	0.0	0.0	5.1	5.2	4.7	0.0	0.0	0.0
Age						Ye	ars					
Mean	46.6	45.1	50.5	41.7	37.2	52.7	40.9	40.3	43.0	48.3	49.2	46.5
Income						(E					
Mean	2490	2560	2240	390	380	400	1690	1760	1410	3060	3170	2870

 Table 2:
 Sociodemography of buyers and non-buyers of functional food

Source: Own inquiry 2004

In Poland, women are found to be overrepresented among buyers with 59.0 % compared to the whole sample with a share of 55.5 %. In contrast, only 46.9 % of non-buyers are women. According to the survey's results, it is obvious that Polish people with academic degree or authorisation for academic education are more likely to buy Functional Food. In a sum those two groups make up 78.2 % of the buyers whereas they have only a share of 34.4 % among the non-buyers. With a mean age of 37.2 years Polish buyers are much younger than non-buyers, who are at average 52.7 years old. Finally, the income of buyers is with a mean of 380 Euros slightly lower than the non-buyers' average household income with 400 Euros.

In Spain women are slightly overrepresented among buyers with 52.1 %. In the whole sample they have a share of 48.0 %. Respondents without any education certificate have a share of 8.3 % of all respondents, but they have a much bigger share among non-buyers with 18.8 %. People with secondary school education are overrepresented among buyers of Functional Food. They have a share of 27.2 % among all respondents and make up 31.1 % of the buyers' subgroup. There are no striking differences for the other education categories. With a mean age of 40.3 years Spanish buyers

are younger than non-buyers, who are at average 43 years old. The mean income of buyers makes 1760 Euros, and this is higher than the non-buyers' mean income which makes 1410 Euros.

In the United Kingdom more women intend to buy Functional Food than men. Women have a share of 66.3 % among buyers, 63.6 % in the whole sample, and 58.5 % among non-buyers. British people with higher education – authorisation for academic education or academic degree – are more likely to buy Functional Food than others. These educational groups have a summed-up share of 56.3 % among buyers and 41.5 % among non-buyers. Buyers are slightly older than non-buyers: Buyers have an averaged age of 49.2 years, whereas non-buyers are in average 46.5 years old. Lastly, with 3,170 Euros buyers in the United Kingdom have a higher mean household income than non-buyers who earn 2,870 Euros in average.

Combining the results of the current survey and the findings of previous studies in the analysed countries and elsewhere, it can be stated that the likelihood to buy Functional Food increases with an increasing household income and an increasing level of education. In addition, women are more likely to buy Functional Food products than men and – at least for the overall category of Functional Food products- it seems that the likelihood to buy Functional Food decreases in higher age groups. However, the latter result has to be interpreted against the fact that hardly any Functional Food products have been launched specifically for elderly people (Menrad et al. 2000).

Previous research also supports the conclusion, that the evidence characterising "the typical consumer of Functional Food" is superficial (Menrad 2003, Rogdaki 2003). Regarding the aspect that a widespread assortment of Functional Food products is offered to many target-groups like e.g. fortified beverages for young and sportive persons or cholesterol lowering spreads for elderly people (who have more problems with the coronary system than younger people), it seems quite obvious that for different groups of Functional Food products, there should exist differing types of buyers, but – however – they do only partly differ in their sociodemograhic characteristics. In this sense the "multi-niche-market" of Functional Food as characterised by Menrad (2003) serves differing consumer needs in multiple target-groups which only can be analysed in detail in more specific consumer interviews in larger samples than it was feasible in the current project.

In Germany more women intend to buy Functional Food than men. Among buyers there are 68.2 % women, whereas there are only 51.6 % women among non-buyers. The women's share in the whole sample is 63.8 %. Buyers have a mean age of 45.1 years and are younger than non-buyers who have an averaged age of 51.6 years. Regarding the high share of buyers with a professional training certificate – 70.6 % compared to 58.1 % among non-buyers – in Germany, there is evidence that people with further education after school are more likely to buy Functional Food. With 2,560 Euros in mean, German buyers have a higher household income than non-buyers, who have a mean income of 2,240 Euros.

Previous research results support the findings of the current survey for Germany. A study conducted by the IFAV Institute (Institut für angewandte Verbraucherforschung, 1998) in Germany pointed out that younger people intend to buy Functional Food more regularly. According to this study the purchasing frequency of Functional Food or even the likelihood to buy Functional Food for the first time decreases with an increasing age of consumers (IFAV 1998). Birnbaum (2001) characterised typical customers of health food as employed and better paid persons. According to this study two-thirds of the buyers of Functional Food are women (Birnbaum 2001) and thus the same proportion as in the current survey has been generated.

Rogdaki (2003) found out that cholesterol level lowering spread is bought mainly by elderly people in Germany. The share of buyers is below 20 % in the segment of respondents who are younger than 40 years. In contrast to this, there are between 30 to 40 % of buyers among respondents older than 40 years.

The study of Rogdaki (2003) also revealed that there are differences in the purchasing probabilities of German consumers for different Functional Food products. While around half of the respondents of this survey had already bought probiotic dairy products or Functional drinks enriched with the vitamins A, C and E before 2001, only 11 % of the respondents stated that they have bought cholesterol lowering margarine in recent years. Furthermore, the latter product is preferred by consumers in higher age groups since around half of the buyers are 50 years and older (figure 6). In contrast, probiotic yoghurts or dairy drinks are preferred by younger consumers since almost 60 % of the buyers in each product category are 40 years or younger (figure 6).



Figure 6: Age distribution of buyers of Functional Food products in Germany 2001

For this purpose correlations were calculated between the age of a respondent and his percentage of correct answers. Using this methodological approach, there is a low but significant negative correlation between age and the percentage of correct answers (Pearson correlation = -0.2, significant at the 0.05 level) in Germany, which means that with increasing age of a respondent the percentage of correct answers slightly decreases. This interrelation is stronger in Poland (Pearson correlation -0.5, significant at the 0.01 level). There is a slight negative correlation of -0.2 between knowledge and age in Spain (significant at the 0.01 level). In contrast to these countries, no interdependencies between age and consumers' knowledge can be found in the U.K. In a previous study Bech-Larsen et al. (2001) stated, that the younger the Danish consumers are, the larger is their knowledge with respect to health effects of functional ingredients.

Other sociodemograhic parameters, such as income, family size or gender reveal no clear results to explain differences concerning knowledge about functional substances.

Taken all these results together, it can be concluded that sociodemographic parameters can only partly explain the knowledge generation in this field. In addition, there seems to be a strong national influence on the understanding of "healthy eating". The survey results of examples of functional ingredients in which private or public institutions have significantly invested in consumer information activities in recent years indicate that most of the European consumers are willing and able to understand basic interrelationships between a specific functional component and its health effect. However, it seems to take at least ten years and high investments in information and communication activities until a big majority of the population has acquired such knowledge related to a specific ingredient.

5 Behaviour and motives of buyers of Functional Food

Bearing in mind the idea of a multi target-group demand for Functional Food one can say that the buyers of these products are in tendency younger and more educated than the whole sample of consumers. They have a higher household income, and the share of women is larger among buyers than among non-buyers. This chapter deals with the purchasing behaviour of the buyers – as identified in the survey according to the methodology described above – investigating buying frequencies for selected product groups, and searches for their motives to buy Functional Food.

5.1 Purchasing behaviour

To obtain information about the consumption of Functional Food in detail, concerning preferred product groups and purchase patterns, a question about the buying frequency was developed. Those consumers who declared themselves as buyers of Functional Food were asked to rate how often they buy some defined product categories like milk and dairy products, bakery products, confectionery, beverages and cereals (see question 7 in the questionnaire in annex 1). According to previous market

Source: Rogdaki 2003

research studies of Functional Food (Euromonitor 2004, Datamonitor 2003a, b, Menrad 2003, 2000 a, CMA 2002, Hemmelmann 2002, AC Nielsen 2001, Biester 2001, Soßna 2001, Hilliam 2000 a, b, c, Menrad et al. 2000) and preliminary findings, these products are among the most important product categories of the Functional Food market in the analysed countries. Additionally, consumers were asked about their consumption patterns in the group of "other Functional Food products" as well. A time horizon of six months was assumed for the respondents' statements. The answering categories concerning the purchasing frequency of the different Functional Food products were "every week or more often", "every two weeks", "once a month", "less than once a month" and "never".

For performing the statistical analysis, the textual answering categories of question 7 of the questionnaire were converted into numerical values trying to consider the number of weeks in which the consumers have bought Functional Food products in the previous six months. Following this general principle, the answering category "every week or more often" received the numerical value 26, i. e. the respondent buys a Functional Food product 26 times in half a year, which consists of 26 weeks. According to this principle, the answering category "every two weeks" obtained the value 13, and the answering category "once a month" received the value 6. The value 3 was given to the answering category "less than once a month", while "never" received the value 0. Figure 7 shows the results for mean purchasing frequencies for the different product categories under investigation in the four countries.





Milk and dairy products are the most frequently bought group of Functional Food (figure 7). They are bought at least every two weeks and nearly every ten days, the frequency is even higher in Poland. This high purchasing frequency of functional milk and dairy products stated by the respondents of the survey corresponds to the relative high market volume of functional dairy products and the increasing consumer demand in recent years, e. g. in Germany (figure 8). According to a study of Frost & Sullivan, the European market for probiotic dairy products was worth about \in 3.54 billion in retail prices. More than two thirds of this are sold as yoghurts, and nearly one third as dairy drinks (Frost & Sullivan 2003).

Source: Own inquiry 2004



Figure 8: Market development of functional dairy products in Germany

Bakery products are purchased less than once a month in Germany, every two weeks in Poland, and nearly every two weeks in Spain and in the United Kingdom. The respondents buy beverages approximately every two weeks in Germany, Spain and in the United Kingdom, in Poland the purchase frequency is higher. Germans buy cereals about once a month, Poles and Spaniards circa every three weeks, and U.K. respondents buy them every two weeks. Consumers in all countries buy confectionery less than once a month. Other Functional Foods are bought frequently in the United Kingdom. The respondents mainly stated cholesterol lowering spread in this context, of which a purchasing frequency of around three weeks could be estimated (figure 7).

In Germany the buying frequency for functional bakery products is clearly lower compared to the other countries. A reason for this could be the broad assortment of bread in Germany which is estimated to more than 400 different varieties, among them all kinds of wholegrain and other wholesome bread, leaving no additional niche for functional bakery products. In addition, several German bakery and bakery ingredient producing companies tried to introduce functional bread and bakery products since the mid 90s in Germany but they have not achieved significant market shares so far (Menrad 2003). A higher purchase frequency for functional beverages was expected in Germany due to the rapidly growing market value during the 1990s (figure 9) and the significant market share of new and functional products in the assortment of beverages. In the year 2000 it counted for 8.2 % of all nonalcoholic beverages and was rapidly growing (Von Pilar 2001). In addition, a broad assortment of functional drinks is available in Germany ranging from non-alcoholic beverages fortified with vitamins (like vitamins A, B, C, E), minerals, fibres and secondary plant ingredients to specific mineral waters with fortification. The often small and medium-sized German beverage industry companies try to get a competitive advantage by launching frequently new drink varieties which fulfil changing consumer expectations at least for a certain time period. These activities are supported by specific drink ingredient suppliers which often deliver specific mixtures to the non-alcoholic beverage industry (Menrad 2000a).

Sources: Hilliam 2000a, Biester 2001, Hemmelmann 2002



Figure 9: Market development of functional beverages in Germany

An IFAV (Institut für angewandte Verbraucherforschung) study in 1998 revealed that 17 % of the consumers in Germany buy Functional Food daily or regularly and are called "heavy users" (IFAV 1998). This proportion cannot directly be compared to the survey's results, which deal with single product groups regarding the buying frequency, but not with Functional Food in general. As an example, 56 % of the Germans, who declared themselves as buyers, buy milk and dairy products every week or more often. Referring to the entire sample of German respondents, there would be about 41 % so called "heavy users" in Functional dairy products. The number of "heavy users" of functional beverages is estimated to 15 %, the number of "heavy users" of cereals is calculated to 9 % of all consumers. It is not possible to calculate a proportion of "heavy users" concerning the whole group of Functional Food, since the purchasing frequencies were asked for single categories but not for Functional Food products in total due to expected difficulties that consumers can estimate such a value correctly. However, the percentages for all Functional Food obtained in the IFAV studies fall in the range of the survey's results of single product groups.

In Poland a contradiction between purchasing behaviour and knowledge about Functional Food was observed during the statistical analysis: 47 % of the Polish respondents mention that they have never known of Functional Food, but on the other hand 71 % say that they have bought or do buy Functional Food. Maybe at least parts of the interviewees in Poland do not regard Functional Food as a special group of food, enriched with special ingredients, but as naturally wholesome food in general. In this sense the Polish purchasing frequencies of Functional Food product categories should be interpreted with care and cannot directly be compared to the results in the other countries.

Cereals are bought comparatively often in the United Kingdom. This result corresponds to the English diet with cereals being an important component of the breakfast.

A kind of sequence concerning purchasing frequency of Functional Food product categories can be determined when summarizing the results of all countries. Functional milk and dairy products are the most frequently bought product group, followed by functional bakery products, functional beverages, functional cereals; confectionery and other products have to be put at the end of this sequence. Deviations from this scheme represent the cases of functional bakery products in Germany, which are bought very infrequently compared to the other countries and functional beverages with high purchasing frequency in Poland. In addition, functional cereals are bought very often in the United Kingdom and rarely in Germany.

The observed sequences of purchasing frequencies of different Functional Food segments are in line with the supply structure of Functional Food products in Europe. Dairy products have the largest market share of the Functional Food market in Europe and a wide and diverse product assortment. Functional beverages account for another third of the identified products while all other segments of the Functional Food market (i.e. cereals, confectionery and bakery products etc) have only a minor relevance concerning product supply. Taking these results into consideration, the defined order in consumers' purchasing frequencies of Functional Food product categories is not surprising. A further

Sources: Hilliam 2000b, Vossen 2002

reason explaining this order may be the different relevancies in diet. Milk, yogurt and bread have a bigger importance in people's everyday diet than cereals or confectionery. Thirdly, milk, yogurt and bread are fresh products and have a limited shelf life compared e. g. to cereals, and thus dairy products have to be bought more often.

5.2 Purchasing reasons

To obtain information about what induces consumers to buy Functional Food, the respondents who declared themselves to be buyers were asked about their purchasing reasons. For this purpose a statement battery of possible reasons to buy these products was developed (see question 8 of the questionnaire in annex 1), and respondents had to benchmark each single reason on an assessment chart. The scaling of this chart contained five gradations and ranged from "not important" via "less important", "neutral" and "important" to "very important". For the statistical analysis these five gradations were transferred in numerical figures ranging from 1 (= not important) to 5 (= very important) and mean values as well as distributions were calculated for each potential reason. The mean results for the four countries are shown in figure 10.



Figure 10: Reasons for buying Functional Food

Source: Own inquiry 2004

Regarding the assessment of the purchasing reasons in the four analysed countries it can be observed that the buyers of Functional Food show a quite similar evaluation of purchasing motives (figure 10) despite the differences in the sociodemographic characteristics of the buyers and cultural differences in food consumption within the EU which has been stated in previous research (Hilliam 1996; Bech-Larsen et al. 2001) and can be observed in quite differing per capita consumption levels of many food products in the member countries of the EU as well (Eurostat 2003).

The most relevant reason to buy Functional Food is to stay healthy which is regarded by the respondents at least as "important". "To do myself good" follows quite closely in a hitlist of purchasing reasons of Functional Food, and respondents regard this intention almost as important as to stay healthy (figure 10). Several other reasons are assessed by the respondents of the four countries in average in the range between "neutral" and "important". These are the motives "to avoid medical treatment", "for my child or children" and a good taste of a Functional Food product (figure 10). Only few reasons are assessed lower than "neutral" in single countries: these are in particular "to salve my consciences", "because it is recommended by medical doctor or nutritional consultant" and "interest and curiosity".

Conclusive, there is not just one single important motive that makes consumers buy Functional Food. There are multiple reasons with high relevance for purchasing Functional Food like the health motive, to do something good to myself, a good taste of the products as well as a proven effect onto health of the products. In this sense the consumer expectations related to Functional Food products outrange those of other innovative food products which e. g. have to taste good, be convenient, show a reasonable price-benefit ratio, have a practical and attractive design and packaging (Menrad 2004). As the current survey clearly indicates in all four analysed countries, Functional Food products have to have a proven efficacy and a clear effect on the health or well-being of consumers. In addition, consumers expect that the characteristics of other innovative food products are fulfilled by Functional Food products also fit in the "emotional" expectations of the consumers related to healthy nutrition.

Hilliam (1996) gave several reasons that led consumers in Germany and the United Kingdom towards purchasing Functional Food: Functional Food will help consumers to live longer and avoid particular diseases. Consumers believe that this type of food can influence their health. According to this study Functional Food is regarded as a more natural way to achieve health benefits than traditional medicine, and there is a belief that consuming Functional Food may provide a psychological benefit arising from the belief of doing something for oneself (Hilliam 1996). Jonas and Beckmann (1998) collected reasons to buy Functional Food for U.K. consumers. They regard Functional Food as a means to secure a better state of health and a longer life. Another motive is that the respondents themselves, or their relatives, have been exposed to nutrition related diseases. Furthermore, the respondents of this study stated their positive attitude related to recommendation of Functional Food products from relatives or medical doctors' order (Jonas and Beckmann 1998). However, there is no information about the detailed consumer' assessments related to single purchasing reasons of Functional Food in the studies of Hilliam (1996) or Jonas and Beckmann (1998). In this sense the results of the current survey add to scientific knowledge in this field, even when the motives mentioned by the latter studies correspond to the list of reasons in the current survey. Also from the results of the cited studies the conclusion can be drawn that the decision of consumers to buy and to consume Functional Food is driven by multiple reasons which pose high requirements to the development, market introduction and information activities related to such products.

6 Motives of non-buyers of Functional Food

Although the idea of a multi target-group demand for Functional Food applies to the non-buyers of these products in an opposite sense as well, it can be stated, that in average the non-buyers are older than the average in the entire sample, and that they have a lower education level as well as a lower household net income. In addition, men are overrepresented in the group of non-buyers. This chapter deals with the reasons that prevent consumers from purchasing Functional Food, and searches for reasons that could lead actual non-buyers to change their behaviour.

6.1 Refusal reasons towards Functional Food

The respondents, who declared themselves as non-buyers, were asked about their reasons for not purchasing Functional Food. In analogy to the procedure for the purchasing reasons, a list of statements was compiled, containing several possible reasons for refusing Functional Food. The respondents were asked to evaluate the reasons using an assessment chart equal to that of the purchasing reasons (see question 9 of the questionnaire in the annex). Figure 11 shows the mean results of the consumer assessments in the four analysed countries.

Figure 11: Reasons for refusing Functional Food



Source: Own inquiry 2004

In contrast to the consumer evaluation of potential reasons for buying Functional Food products (figure 10), the nine potential reasons for refusing Functional Food are all assessed nearly similar from the respondents in the four analysed countries. In addition, none of the refusal reasons is assessed in average as being "very important" or "important". There is a slight tendency that the survey respondents emphasize the reasons "fear of artificial additives", "not effective" and "I do not feel ill" slightly stronger than other reasons (figure 11). There is also a group of respondents stating their refusal of Functional Food with their preference for organic food. Polish non-buyers evaluate the different reasons for not buying Functional Food as being more important than non-buyers in the other countries. This relates in particular to the reasons "fear of side effects" and "too expensive". While non-buyers in Germany and the United Kingdom rate the price as nearly "less important", Spaniards and Poles regard the high prices of most Functional Food products as an important reason for refusing those products, what is clearly linked to the relatively low income level in Poland and – in a lesser extent – in Spain.

In a comprising view, it becomes apparent, that – in analogy to the purchasing motives (figure 10) – there are many reasons that hinder people from buying Functional Food. Thus, the food industry and other stakeholders of the value chain have to work on different factors in order to eventually make deniers buy Functional Food. Interestingly the relatively high prices of Functional Foods are not regarded as the most important hindering motive by the non-buyers (with a certain exception in Poland) nor do the respondents of the survey give the price a prominent role as a buying motive. In this sense it is not only a question of prices of Functional Food, but also concerns about novel food (e. g. in the context of the use of genetically modified ingredients), about the efficacy of Functional Food and about side effects of functional ingredients that have to be counteracted by the food industry and other stakeholders.

Several other studies dealt with the consumers' concerns and beliefs about Functional Food and hindering factors for purchasing them. Frewer et al. (2003) reported that 80 % of the respondents in Western Europe believe that they already eat a healthy diet. Thus there would be no need for them to buy Functional Food. Furthermore, Frewer et al. (2003) spoke about a kind of "optimistic bias", which means that if people do not regard themselves as fitting the stereotype of a risk group member, they will not perceive Functional Food as a valuable option for them.

According to a recent consumer survey in Germany, consumers in this country are mentioned not to believe that Functional Food is health improving (Potratz and Wildner, 2000) and they stated that Functional Food has not been proved to be effective yet (Potratz and Wildner, 2000). Hilliam (1996) named refusal reasons for German and British consumers. There are numerous drawbacks, but the

most important questions are about the efficacy of Functional Food and how this could be valuated. Other concerns are related to the necessity of Functional Food: If somebody is already living a healthy diet, why should he or she buy Functional Food (Hilliam 1996)? Jonas and Beckmann (1998) showed that consumers in the United Kingdom are sceptical about Functional Food, because they prefer to eat a varied diet as well as they regard the higher prices as not justified and additionally, they consider the claims about health benefits to be untrue.

In reference to Martinez-Gonzalez et al. (1998), about 80 % of the Spanish consumers consider themselves as already living a healthy diet, therefore changes in the food variety are not necessary. The fact that the Polish non-buyers attribute importance to the refusal reason "too expensive", is reflected in a study by Pricewaterhouse Coopers (2003), which states that Polish consumers are chiefly price-orientated in their shopping decisions in the food segment.

Consumers in Denmark believe that functional ingredients could lead to changes in taste, and they are uncertain about the efficiencies of these ingredients. They criticise the higher prices of Functional Food and have uncertainty about the manufacturers' knowledge (Poulsen 1999). Jonas and Beckmann (1998) reported the same opinion of Danish consumers, who think that an additional price for an alleged health effect is not justified. Comparable to the findings of Frewer et al. (2003) in the United Kingdom, many of the Danish respondents do not regard themselves as being affected by nutrition-related diseases. They suppose to get enough vitamins and minerals from eating a varied diet (Jonas and Beckmann 1998). Additionally, Jonas and Beckmann (1998) reported that Danes distrust Functional Food because of the products' unnaturalness. They regard the production of Functional Food as a process where the nutritional value of the original ingredients is reduced, and therefore Functional Food is not healthier than conventional food (Jonas and Beckmann 1998).

These findings show – according to the survey's results – that there is more than just one reason that prevents deniers from purchasing Functional Food. Besides particularities in single countries – e. g. the strong price orientation in Poland or a kind of fundamental scepticism in Denmark – there is a bundle of motives to be found in a similar way in all investigated countries mainly concerned to the efficacy of functional ingredients, the fear of side effects as well as a general scepticism against novel food.

As already shortly stated, the refusal reasons do not reach the importance level of the purchasing motives in figure 10. While the reasons to buy Functional Food mostly obtain ratings in the range between "neutral" and "important", non-buyers mostly assess the refusal reasons in the categories between "less important" and "neutral", except from the Poles, who rate the reasons into the range between "neutral" and "important". These findings could lead to the conclusion that buyers are more involved in a process of thinking about Functional Food, balancing advantages and disadvantages and then making a decision. Buyers are more concerned about the subject of Functional Food than non-buyers. However, this is comprehensible. Buyers have at least once been thinking about Functional Food, while non-buyers deal less with that subject, because they do not buy such products, or even have not heard about it. Therefore, they do not evaluate statements concerning Functional Food as affected as buyers do.

6.2 **Preconditions for a favourable buying decision**

Building on the reasons of non-buyers to refuse Functional Food, the next step is to investigate under which preconditions these consumers are willing to change their behaviour. This information can be used e. g. to develop strategies in order to provide suitable information to the consumers and thus expand the potential demand for Functional Food. Therefore the non-buyers were asked which preconditions have to be fulfilled so that they might buy Functional Food (see question 10 of the questionnaire in the annex). A compilation of possible answers was presented, and respondents could choose several statements. The consumers' evaluation of preconditions which have to be fulfilled for a potential purchase of Functional Food in the analysed countries is shown in figure 12.



Figure 12: Preconditions for a favourable buying decision

Source: Own inquiry 2004

The most mentioned precondition is "if recommended by medical doctor or nutritional consultant": 45 % of the German, 59 % of the Polish, 56 % of the Spanish and 71 % of the U.K. respondents name this statement. In addition, German non-buyers focus more upon the evidence of the efficacy of Functional Food (39 %) and upon the certainty of no side effects (45 %) (figure 12). The most important preconditions for respondents in the United Kingdom are – next to the recommendation of a medical doctor or nutritional consultant – the occurrence of health problems and the disposition of specific diseases with 49 % each. "Lower prices" are an important precondition for Polish and Spanish consumers. 53 % of the Poles and 41 % of the Spaniards name this statement, whereas only 10 to 20 % of the respondents in Germany and the United Kingdom do so. Furthermore, the share of consequential deniers is highest in Poland with 38 %. Only about 10 % of the respondents in other countries state that they will not buy Functional Food anyway.

Summarising the results of this analysis, there are two main motives that could lead consumers currently refusing Functional Food to purchase this type of food in future. The first factor relates to the "own individual health constitution" of the consumer and contains statements like "if recommended by medical doctor or nutritional consultant", "occurrence of health problems" and "disposition of specific diseases". These consumers potentially would buy Functional Food if there was a personal and health-related need. The second factor is product-related and affects specific characteristics of Functional Food products which can be described in statements like "clear evidence of efficacy of Functional Food" and "certainty of no side effects". These two factors go in line with the survey's results and findings in literature concerning the purchasing motives of consumers related to Functional Food and again underline the high requirements which have to be fulfilled by food industry companies that intend to develop and launch Functional Food products.

6.3 Consumers' trust in stakeholders

For the big majority of consumers in the EU, the development and health properties claimed to specific Functional Food products as well as the technologies involved are not part of their everyday personal experience. As already indicated in the current survey, people come to know about new Functional Food products through product advertisements or journalists' reports in different media. In this sense the consumers' understanding of Functional Food at least partly draws on "second hand" or mediated information.

Exposed to mediated information, the question of the credibility of the source of information arises in the mind of consumers (Barber 1983). Additional questions are related to the competence of the institutions involved in development and information about a specific issue as well as their motivation, i.e. are they motivated by sectional interests or do they have a more neutral, public interest in mind (Barber 1983). Such questions related to the trust and confidence in institutions involved in the

development of science and technology has been researched in the EU for several decades (Gaskell et al. 2002).

6.3.1 Trustworthiness of stakeholders

Since Functional Food at least partly represents new developments for European consumers, the respondents were asked to rate the trustworthiness of several stakeholders and institutions involved in the development, marketing and control of Functional Food in a first step. They were asked to assess how trustworthy the behaviour and statements concerning Functional Food of several institutions were. Afterwards, in a second step, the interviewees were requested to give reasons for their evaluation (see questions 11 and 12 of the questionnaire in annex 1). The evaluation was supported with an assessment chart consisting of five steps ranging from the lowest classification – "not at all trustworthy" – via "little trustworthy", "trustworthy" and "very trustworthy" up to "totally trustworthy". The ratings of the respondents were converted into numeric values from 1 (= totally trustworthy) to 5 (= not at all trustworthy), and an average estimation was calculated. Figure 13 shows the mean results of the trustworthiness of the different institutions for the four analysed countries.

Figure 13: Trustworthiness of persons and institution with regard to Functional Food



Source: Own inquiry 2004

In the view of the consumers, two groups of institutions emerge from the assessment. On the one hand there are persons or institutions who receive a rating between "trustworthy" and "very trustworthy" like nutritional consultants, consumer associations, medical doctors and research institutes and universities. On the other hand, consumers rate several institutions below the level "trustworthy". The food industry, food retailers, health insurance companies and the government fit into this class. Among them the government is assessed worst with a rating close to "little trustworthy" (figure 13).

German and Spanish respondents assess the health insurance companies visibly better than Poles and UK respondents. Germans rate them nearly as "trustworthy", whereas the others make inferior evaluations (figure 13). It attracts attention that in Poland many institutions are assessed as being less trustworthy than in the other countries. Especially the Government and the health insurance obtain a clearly poorer rating. The health insurance is regarded as little trustworthy, while the Government is in the mid between "not at all trustworthy" and "little trustworthy" (figure 13). Medical doctors and nutritional consultants enjoy high confidence in Spain since they both are assessed as "very trustworthy" by the Spanish respondents. In the United Kingdom research institutes and universities obtain an inferior evaluation compared to other countries. British respondents assess them only as trustworthy, while interviewees in the other countries regard them nearly as "very trustworthy". Additionally they distrust the food industry and the food retailers more than consumers in the other countries do – what most probably is linked to the BSE crisis emerging from this country.

Hilliam (1996) made an investigation about the credibility of information sources related to Functional Food in the United Kingdom and Germany. Respondents had to rate the credibility on a five-point scale from 1 = "least credible" to 5 = "very credible". Health professionals and doctors gained mean scores of 4.2 in Germany and 4.4 in the United Kingdom. Company credibility was reported to be well below this value. Frewer et al. (2003) mentioned that the industry is distrusted in the United Kingdom. The results of the current survey on consumers' trustworthiness in different institutions involved in the value chain of Functional Food also correspond to the results of the recent Eurobarometer study on acceptance of Europeans in biotechnology which was conducted in 2002. According to this survey, European doctors, university scientists, consumer organisations and patient's organisations are the most trustworthy sources. On the other hand, EU consumers have less confidence in scientists working in industry, in media, environmental groups, and the European Commission (Gaskell et al. 2002). These findings in literature are accordant to the survey's results, and together they point out, that independent experts enjoy confidence while commercial companies and the national Government are distrusted by consumers.

6.3.2 Reasons for mistrust

Concerning credibility of the institution in the view of consumers, the food industry, food retailers, health insurance companies as well as the national governments in the analysed countries were assessed less than "trustworthy" by the majority of respondents. Since these institutions represent key institutions in the development, marketing and public control and information about Functional Food it would be worthwhile knowing the reasons for that estimation. For this purpose, the respondents were asked to give reasons for their evaluation after having rated the different institutions. They were requested to name the reasons for the inferior ratings, namely if an institution or person was assessed as "little trustworthy" or "not at all trustworthy" (see question 12 of the questionnaire in the annex). This part of the survey was held in an open question, and therefore the answers were analysed qualitatively.

Distrust reasons are named for all institutions, but of course respondents stated more motives for those institutions with an inferior rating. There is a wide variety of differing reasons why consumers do not trust the government, the food industry, the food retailers and the health insurance. This variety results in a good basis to precisely define the reasons to mistrust for those institutions. In contrast, the reasons to distrust related to other institutions like nutritional consultants or universities are comparatively vague.

In Germany the Government is blamed to be inactive: Respondents state that the Government does not protect consumers from harm through food, reacts too lately towards food scandals and does not strictly control the food production and process chain. Further allegations are missing competence, dishonesty and unreliability of the Government. However, the most important reason for distrusting the Government in food-related issues results from a general mistrust in politics and the institutions involved. German respondents do not trust the food manufacturers because of their commercial self interest. This is the most important motive by far. Additional mentioned reasons are a dishonest communication of the food industry and the fact that they are not law-abiding. Commercial self interest is the most stated allegation towards the food retailers as well. Furthermore, the respondents complain about a dishonest communication of food retailing companies and that the personnel is not able to give expert advice about Functional Food products. Regarding medical doctors, mistrust results from the fact that they are influenced by financiers and that a diversity of opinion among the doctors exists. Germans blame the health insurance companies to have commercial self interest and to give a bad performance. Bad service, bad advice and inactiveness fall in this category. In analogy to the national Government, the most important motive is a general mistrust towards health insurances. In contrast, German respondents hardly named any mistrust reasons related to consumer organisations, nutritional consultants and universities.

In Poland respondents mention the highest number of mistrust reasons related to the Government, which is accordant to the bad rating for this institution. The most stated reason is general mistrust. Furthermore, the Polish respondents name that the Government does not take a clear standpoint and has no expert knowledge and no competence in the field of Functional Food. Food retailers and the food industry are blamed to have commercial self interest and to practise a dishonest communication. An additional allegation to the manufacturers is that they have insufficient quality tests for their products. Regarding the health insurance, Poles mention that this institution has no competence and does not take a stand. Contrariwise it is considered to have no responsibility for this subject, and therefore its statements are distrusted. Those respondents who assessed the consumer organisations negatively, state this with the low name recognition of this institution. They do not know the consumer

organisation, and that is why they cannot trust them. The other institutions in Poland obtain nearly no specification of mistrust reason.

Spanish respondents distrust their Government because of several reasons. Their mistrust results from disappointments in other political areas and from recent food scandals. The Government is blamed to be uninformed and incompetent. It does not care about food-related issues and does not exercise resolute and effective control in this area. In addition, respondents accuse the Spanish Government of dishonesty and self interest. In Spain, the industry is regarded to have a strong commercial interest. Furthermore, its low credibility results from bad products with too many artificial ingredients and insufficient product development, efficacy and quality. The retailers are accused of strong financial self interest. Respondents blame the health insurance to increase only their own benefit and profits. Scepticism about experts like researchers, doctors or nutritional consultants is lead by the question who funds these institutions. In this context respondents do not want these institutions to be dependent on the Government.

General mistrust is the most stated reason for mistrust towards the Government in the United Kingdom. Further allegations are, that with regard to Functional Food the Government does not care about the people, that it bares incompetence and a dishonest communication. The Government is assumed to be under lobby influence and to run an inconstant policy. It becomes very apparent that British consumers still remember the BSE crisis and the governments' failure in managing this food crisis properly. UK food manufacturers and food retailers are generally mistrusted by British respondents and blamed to have commercial self interest. The respondents state that the food industry practises a feeble communication and that the retailers have no knowledge about the Functional Food products. British consumers mistrust the health insurances because these institutions have a commercial self interest. Additionally food security is not their field of activity, and that is why their credibility is low in the view of British respondents. Research institutes and universities are stated to be influenced by financiers and to have strong self interest. Some of them are regarded to be not reputable. A further allegation is that the diversity of opinions between the universities does not generate much trustworthiness. Medical doctors, consumer organisations and nutritional consultants are blamed to be dependent on financiers as well.

Summarizing the reasons for mistrust in the four investigated countries, it seems that the national Governments are not regarded as agencies with experts for special issues, among others for food, but as politician institutions. This perception results in a general mistrust and other allegations towards the Government. Food manufacturers and food retailers are distrusted because they are alleged to have only strong commercial self interests.

On the first view "neutral" experts like nutritional consultants or medical doctors are also in some degree suspected to be influenced by the commercial food sector. In this context respondents often draw a comparison to the pharmaceutical sector, where strong activities of the industry are also found in financing research in public institutions (e. g. in the context of clinical trials).

6.4 Factors influencing purchasing behaviour

It is shown in chapter 4.3 that sociodemographic characteristics do not entirely explain the differences between buyers and non-buyers of Functional Food. It can be observed that women intend to buy Functional Food more frequently, that buyers are younger and have a higher income than non-buyers, and in some countries buyers seem to have a higher education. Sociodemographic attributes may be enlightening to achieve more detailled information about buyers of Functional Food. But they cannot clarify why somebody is buying Functional Food. This chapter looks for the background of a purchasing decision towards Functional Food and deals with the respondents' inside motivation and outside drives. Firstly the influence of knowledge on a purchasing decision will be investigated, and secondly the influence of trust will be explored.

6.4.1 Knowledge and purchasing behaviour

Chapter 3.3 deals with the respondents' knowledge about several functional ingredients and their effects onto health. In this context differences between the consumers' knowledge of different substances are observable, e. g. the health effects of Calcium are better known than those of folic acid. Additionally, when combining all answers to question 5 of the questionnaire (see annex) of one respondent and calculating a kind of "aggregated knowledge index", variation in the sample becomes apparent. There are people who could answer all six questions correctly, and others are only able to give one exact answer or even none. This variation is used to obtain an independent variable "Percentage of correct answers" with six values from "0 %" up to "100 %". Each respondent can be sorted to one category. This variable is connected to the fact of being a buyer or non-buyer of Functional Food (see question 6 of the questionnaire in the annex). Figure 14 illustrates the

relationship between aggregated knowledge of the health effects of functional ingredients and the percentage of buyers in the four analysed countries.





Source: Own inquiry 2004

A clear trend can be observed for the German, Polish and Spanish sample. With a higher degree of a respondents' knowledge the likelihood to be a buyer of Functional Food increases. Respondents with an aggregated knowledge index below 50 % are buyers of Functional Food on a level of around 50 %, while people with a higher knowledge index have a likelihood of more than 60 % to be a buyer of Functional Food (figure 14). In contrast to the other countries, the U.K. sample shows only a moderate rise of the graph, i. e. the correlation between knowledge of health effects of Functional ingredients and likelihood to purchase Functional Food cannot be observed in the same way in the United Kingdom than in the other three countries analysed. The outliers in the UK graph are due to a small number of respondents belonging to a certain knowledge category (figure 14), e. g. there are only 2 U.K. respondents belonging to the category with a knowledge value of 17 %. As a result of chance, both are buyers of Functional Food, and this makes a share of 100 %.

It may be interesting whether knowledge does not only affect the purchasing decision towards Functional Food itself but as well the decision towards single product categories and the purchasing frequency. For this purpose the knowledge value has been related to the purchase frequency of functional dairy products, beverages and cereals. Those product groups turned out to be the most important ones. Buyers rated their frequency in question 7 of the questionnaire (see annex), whereas non-buyers have been rated with a purchase frequency of zero within this calculation.

Regarding dairy products, figure 15 shows a clear rising tendency for the Polish sample. The purchase frequency of functional milk and dairy products increases with an increasing knowledge index. Poles with a knowledge degree of 17 % or below have a purchase frequency of once a month, while respondents with a knowledge level higher than 50 % buy these products at least every two weeks. The frequency rises up to every week for persons with a knowledge index of 100 %. In contrast to the Polish situation, the other graphs of the German, Spanish and UK sample show an increase up to a knowledge index of 50 %, but the purchasing frequencies of functional dairy products do not substantially rise further with a higher knowledge level of the respondents (figure 15) thereby taking into account that the U.K. sample contains an outlier for the knowledge category of 17 %.



Figure 15: Relationship between knowledge and purchase frequency of functional dairy products

Source: Own inquiry 2004

Concerning functional cereals (figure 16), the German, Polish and Spanish graphs demonstrate a slight but steady rise. Respondents with a low knowledge index hardly buy any functional cereals, while consumers with a higher knowledge have a clearly higher purchase frequency, which increases up to every two weeks for Polish consumers who answered all knowledge questions correctly (figure 16). The U.K. sample's graph has – despite from outliers in the knowledge categories below 33 % - a flat trend, i. e. British respondents buy functional cereals irrespectively from their knowledge index every three weeks averaged.



Figure 16: Relationship between knowledge and purchase frequency of functional cereals

The relationship between knowledge index and purchase frequency of functional beverages (figure 17) shows a similar trend. A rising tendency is observable for the Polish and Spanish sample. The graph regarding Germany shows a flat or slightly increasing trend, while in the United Kingdom there

Source: Own inquiry 2004

seems to be no correlation between overall knowledge of consumers related to the health effect of functional ingredients and the purchasing frequency of functional beverages (figure 17).



Figure 17: Relationship between knowledge and purchase frequency of functional beverages

Source: Own inquiry 2004

Taking together the results of the previous analyses, it becomes apparent that the different products show differing trends and correlations with knowledge which cannot just be explained by the pure level of purchasing frequencies of the products. Different levels of buying frequencies are due to differing relevancies for the diet of consumers and different shelf lives of the different products (see chapter 5). Furthermore, the figures 15 to 17 demonstrate that the different products are situated in diverse stages of a product life cycle in the different countries. Functional milk and dairy products are well introduced to German, Spanish and British consumers and established in the market. Consumers buy them irrespectively from their level of knowledge, while in Poland these products are part of a relatively new dietary concept. Only well informed respondents know their features and therefore tend to buy them regularly. Every new launched product in the first phases of a product life cycle is bought by the so called "early adopters", who seem to be people with higher knowledge related to the health effects of functional ingredients in the case of Functional Food products.

Since cereals traditionally are consumed for breakfast in the United Kingdom, Functional cereals are widely known and consumed. Functional ingredients improve their features, and consumers buy them regularly. In Germany, Poland and Spain functional cereals are not that established as in the United Kingdom. They are relatively new and therefore bought by"early adopters". Concerning functional beverages and their purchasing patterns versus knowledge level of consumers, these products seem to be established in Germany and the United Kingdom and in early phases of their life cycles in Poland and Spain.

Summing up the previous results and figures, the likelihood to buy Functional Food increases in all four countries with an increasing knowledge of a person about functional ingredients and their effects onto health. Secondly, persons with higher knowledge are more likely do be early adopters of a newly launched functional product and to buy them more frequently than people with less knowledge would do. In this sense, knowledge about the relationship between functional ingredients, nutrition and health can be regarded as an important impetus to buy Functional Food.

6.4.2 Trust and purchasing behaviour

In general, numerous people or institutions can be involved in a person's decision making process about Functional Food or even in a concrete purchase decision. Of course, mainly the food retailers – where we buy such products, and the food manufacturers – whose products we buy – are in a kind of communication process with the consumer. Heasman and Mellentin (2001) identified several distinct marketing strategies they could use with respect to Functional Food. But furthermore, there are medical doctors and nutritional consultants who may have given the advice to buy Functional Food. Friends or relatives can recommend an interesting, tasty or useful product or they report their bad

experiences with some products. Researchers publish their insights in scientific articles and reports, and the government initiates information campaigns and sets regulations.

Therefore it should be interesting to analyse the interrelationship of consumers' trust in these institutions and their purchasing behaviour related to Functional Food.

For this purpose the trustworthiness evaluation of all institutions and persons (compare chapter 6.3) has been combined to a "mean trust value", i.e. the single evaluations of a respondent to the different institutions expressed in question 11 of the questionnaire have been aggregated and an average value has been calculated. This value expresses the respondents' trust towards their environment with regard to Functional Food.

Table 3 shows the average trust values of buyers and non-buyers in the different countries. Buyers in all four countries have slightly more trust in the different persons and institutions than non-buyers. Except from the U.K., buyers assess the persons and institutions a little better than "trustworthy", while the non-buyers' evaluation is below this level. But these differences are not significant from a statistical point of view.

	Germany	Poland	Spain	United Kingdom					
Buyers	2.7	2.9	2.6	3.1					
Non-buyers	3.3	3.1	3.0	3.3					
Range from 1 = totally trustworthy to 5 = not at all trustworthy									

Source: Own inquiry 2004

In a following step of the analysis eight different trust categories of the respondents have been designed. The first category contains respondents with a mean trust value between 5.0 and 4.5, which means that these respondents have no trust at all in the persons and institutions with regard to Functional Food. The last category encloses respondents who totally trust the persons and institutions and have a mean trust value between 1.5 and 1.0. Then the average trust value was correlated with the share of buyers among all respondents in a specific category. Figure 18 illustrates the results.





Source: Own inquiry 2004

The charts of all countries – despite from an outlier in the Polish sample – show a clear rising trend, i.e. the more a respondent trusts in the persons and institutions involved in the development, marketing and control of Functional Food, the more likely she or he is to be a buyer of such products in all analysed countries. The share of buyers is below 60 % for people with an average trust value of

worse than 3.5. The likelihood to be a buyer of Functional Food increases up to 100 % with increasing trust values (mean trust above 2.0).

Trust seems to be an important precondition for people to buy Functional Food. But trust is a complex structure and consists of many facets in the field of Functional Food. It does not just depend on a special institution whether consumers have trust in the concept of Functional Food and buy and consume the products, but many efforts have to be done to improve the consumers' perception of participated persons and institutions as trustworthy partners. Szmigin (2003) argues that these efforts are worthwhile from the perspective of business institutions, because if the consumers are positively involved with a company they will stay with it and be ready and able to receive new offers, product line extensions and other innovations. In this sense the key element of positive involvement of consumers is trust (Szmigin 2003).

6.5 Consumer preferences with functional orange juice

Due to the strong competition on the almost stagnating and saturated food markets in most member countries of the EU, many food companies try to gain a competitive advantage by developing and launching innovative and new food products. When developing such products, companies are interested in information concerning changes in consumer behaviour and attitudes in an early phase or even before starting the development activities as well as an early proof of concept of the new products by consumers. However, in these development phases most food products are not ready to the market, i. e. their consumer acceptance cannot be tested by direct sales in supermarkets.

6.5.1 Theory background and methodologies for analysing consumer preferences

In order to overcome the named problem, different concepts of analysing consumer preferences have been developed in market research for which no ready-to-the-market products have to be available. When a consumer favours one product alternative among others, it is an issue of his or her preferences. In this sense consumer preferences have a strong subjective character, and that is why preferences strongly differ between individual persons (Albrecht 2000). Consumer preferences are not directly observable, but they are in connection with observable behaviour. Therefore, statements and activities of persons are used as indicators for their preferences. When analysing consumer preferences towards a specific product, several alternatives are generally evaluated during the analysis. Preferring one alternative does not mean that this alternative is regarded as good, but only as better than the other alternatives. For this reason preference values have to be considered in relationship with several alternatives (Hammann and Erichson 2000).

Consumer preferences are regarded as an important factor for the decision-making process of consumers with respect to fast moving consumer goods (Kotler et al. 2003, Kroeber-Riel and Weinberg 2002, Trommsdorff 2002, Meffert 2000). Already from the beginning of the development of methodologies aiming to explain and analyse consumer behaviour in this field, preferences have been regarded as an essential part of the whole purchase decision-making process of consumers. This can already be demonstrated at one of the first models developed in this context: This so-called S-O-R model of buying behaviour consists of stimuli (S), an organism (O) and a response (R) (Trommsdorff 2002). A product can be a stimulus for the buyer. This stimulus affects the so called organism, which encloses a cognition process, a preference generating process and a process to make up a purchase intention. These processes proceed in a buyer's "black box", the hidden inside of the person. Finally the person responds to the stimulus with a purchase (Trommsdorff 2002).

To make consumers prefer one product alternative to another, this specific alternative has to offer some benefits to the consumer which cannot be offered in the same way by the other alternative. In this sense, consumer preferences reveal benefits or utilities. Utility is a crucial criterion for every rational decision (Krelle 1968). Having regard to financial restrictions and to their necessity structure, consumers try to maximise their benefit when purchasing a product. Investigating and analysing the consumers' preferences and the extent products of avail to them, is important for the explanation of consumer behaviour and for marketing efforts.

Two basic approaches to measure consumer preferences are existing. The first one is the compositional approach in which the consumer's preference structure is directly surveyed, i.e. the consumers are asked to evaluate single product attributes and their specific shaping using a rating scale. Afterwards, the values for the single attributes are being combined to an overall preference value (Henze 1994). Although often used in marked research due to the easy handling of this approach, it has to be said that this method does not reproduce real purchasing situations of consumers. Therefore decompositional approaches have been developed in which all product attributes are considered at the same time. The preference values of single product attributes are concluded from the total value of the product (Henze 1994, Green and Tull 1982). Conjoint-analysis is one of the mostly used decompositional methods for testing new product concepts and alternatives.

In conjoint analysis studies it is assumed that the product being assessed can be defined in terms of few important characteristics. Furthermore, it is assumed that the consumer decision related to such a product is based on tradeoffs among these characteristics. The purpose of conjoint analysis is to estimate utility scores, called part-worths, for these characteristics. Utility scores are measures of the importance of each single characteristic to the interviewee's overall preference of a product (SPSS 1997). The characteristics of a product are explained in terms of its factor and factor levels. The factors are the general attribute categories of a product, for example its shape, colour or price. The factor levels – features – are the specific values of the factors, such as round, red or $1.50 \in$ (SPSS 1997).

6.5. Design of the conjoint study on Functional Food

In order to simulate a potential purchasing situation as realistic as possible, a specific product had to be defined for the analysis of consumer preferences related to Functional Food since the general concept of Functional Food is regarded as being too "abstract" for consumers. For this purpose orange juice was chosen as a basic product for several reasons. Except Germany, all countries have about the same per capita consumption of juice and nectar in a year. In the year 2002, Germans consumed 40.2 litres, Poles 18.0 litres, Spaniards 17.6 litres and Brits 21.3 litres (LZ Report 2003). Next to apple juice, orange juice belongs to the most important fruit juices in all four analysed countries. Orange juice is available in nearly every food store in the investigated countries and therefore common to consumers. In addition, it seems to be a suitable basic product for enrichment with differing functional ingredients and food processing technologies are conceivable with functional orange juice. Taken all together, it seems realistic that the interviewed consumers in the different countries could imagine that it is possible to produce a functional orange juice.

After screening studies on consumer behaviour and preferences with respect to non-alcoholic beverages, fruit content, packaging, colour, price and enrichment with two functional ingredients were chosen as basic characteristics (= factors) for this functional orange juice. Table 4 gives a set-up overlook of the conjoint design used in the survey.

Factor	Factor levels
Packaging	Glass bottle
	Plastic bottle
	Tetra Pak carton
Colour	Normal (yellow)
	Discoloured (red-brown)
Lycopene	No enrichment
	Enrichment ("Contains Lycopene") and claim "Lycopene improves the skin's protection against ultraviolet radiation"
	Enrichment ("Contains Lycopene") and claim "Lycopene reduces the risk of prostate cancer"
Dietary fibres	No enrichment
	Enrichment ("Contains dietary fibres") and claim "Dietary fibres ease digestion"
	Enrichment ("Contains dietary fibres") and claim "Dietary fibres reduce the risk of colon cancer"
Fruit content	20%
	50%
	100%
Price	Cheap (-30%)
	Normal
	Expensive (+30%)
Country	Basic price
Germany	1.29€
Poland	2.99 Złoty (=0.69 €)
Spain	1.29€
United Kingdom	1.29 £ (=1.81 €)

Table 4:	Set-up of the conjoint study on functional	orange juice

Source: Own inquiry 2004

The fruit content highly influences the quality and taste of the orange juice. Three kinds of packaging (glass, plastic, Tetra Pak) were chosen with respect to different frameworks of product packaging in the single countries. Price is an important factor of consumer acceptance for every product. Additionally, it can be used to calculate utility values into monetary values and to estimate the respondents' willingness to pay for special factors or specially designed products. Lycopene and dietary fibres were selected as functional ingredients. The latter is well established in food production and already accumulated or enriched to several Functional Food products. Positive effects on consumers' health are expected in the sense that dietary fibres ease digestion and it is assumed that they reduce the risk of colon cancer (Menrad et al. 2000). The carotinoid Lycopene is a relatively new ingredient in the field of food processing, but significant research in public and commercial institutions has been devoted to this functional ingredient in recent years. Positive effects of this ingredient are expected to skin and eye health, prostate cancer and other diseases (Menrad et al. 2000). To examine to which extent health claims affect consumer preferences, two different claims were developed for each ingredient. One claim of each ingredient represents a soft functional claim, i.e. that the stated effect of the ingredient is on the level of improving well-being and body function. The second claim can be regarded as a kind of prevention claim and it points out medical advantages. Furthermore, two colours were chosen as factor levels. The usual colour of orange juice ("yellow") is one level in contrast to a discoloured red-brown orange juice since enrichment with Lycopene causes this kind of discolouration. Except of the price, all factor levels were equal in the four countries. Regarding price. only the added or subtracted percentages were equal, but there were different basic prices in order to anticipate the different price levels of food in general and orange juice in particular in the analysed countries. The basic price in each country was in the range of brand orange juices with 100 % fruit content being offered in food stores. In Germany, the basic price was 1.29 €, in Poland 2.99 Złoty, in Spain 1.29 € and in the United Kingdom 1.29 £.

The total number of possible cases, i.e. the total number of differently designed orange juices resulting from the chosen product attributes and factor levels, can be calculated by multiplying the factor levels. There are 486 different cases. To reduce this to a rational number of cases that can be assessed by the respondents, a procedure of the statistical software SPSS was used and a so-called "orthogonal design" of 20 products was generated and then used in the survey. This manageable number of product alternatives is sufficient to calculate utility values from the respondents' ratings.

Using the Adobe Photo Shop software, the 20 different product cases were graphically illustrated. Some examples of product cards can be found in annex 2. The product cards were translated into German, Polish and Spanish and were presented to the respondents after having finished the questionnaire interview. The respondents were asked to arrange the cards in an order from 1 to 20, with the most preferred product being number 1 and the least preferred product being number 20. SPSS statistical software was used to calculate the importance of each factor and the utility values for the factor levels. The sum of importance of all factors is 100 %. For the factor fruit content a positive linearity was implied, because fruit content was regarded to be an indicator for quality. Therefore an increasing fruit content or quality respectively should result in increasing utility values. Price was assumed to have a negative linearity, because reasonably a product with a higher price leads to a lower benefit to the consumer.

6.5.3 Preferences of all respondents in the analysed countries

This chapter deals with the aggregated results of the conjoint analysis for each country. For this purpose the results of single respondents of one country were summarised in a country outcome. Figure 19 shows the importance values of the different product attributes to the overall consumer preference, the utility values of the different factors can be found in table 5.







Source: Own inquiry 2004

Variables	Values		Utility scores							
		Germany	Poland	Spain	United Kingdom					
		n = 115	n = 111	n = 255	n = 113					
Constant		6.0323	4.6359	5.9929	3.3498					
Packaging	Glass bottle	0.8093	1.3333	-0.0597	-0.7510					
	Plastic bottle	-0.3498	-1.6667	-0.8898	-0.4264					
	Tetra Pak carton	-0.4595	0.3333	0.9495	0.5015					
Colour	Normal (yellow)	-0.1644	-0.1554	-0.0103	0.3153					
	Discoloured (red- brown)	0.1644	0.1554	0.0103	-0.3153					
Lycopene	No enrichment	-0.2072	-0.5916	-0.4902	-0.3679					
	Enrichment + claim UV protection	-0.2447	0.4595	0.3051	0.1637					
	Enrichment + claim prostate cancer	0.4520	0.1321	0.1850	0.2042					
Dietary fibres	No enrichment	-0.6937	-0.7913	-0.5164	-0.5045					
	Enrichment + claim digestion	-0.1517	0.4429	0.1890	-0.0270					
	Enrichment + claim colon cancer	0.8453	0.3483	0.3274	0.5315					
Fruit content	20 %	2.4017	3.6847	2.5003	3.4047					
	50 %	4.8033	7.3694	5.0007	6.8093					
	100 %	7.2050	11.0541	7.5010	10.2140					
Price	Cheap (-30%)	-0.6404	-1.2267	-0.7451	-0.3821					
	Normal	-1.2808	-2.4535	-1.4902	-0.7643					
	Expensive(+30%)	-1.9212	-3.6802	-2.2352	-1.1464					

|--|

Source: Own inquiry 2004

Fruit content is the most important factor for consumer preferences in Germany. It has an importance of 24 % and is followed by packaging with 20 %. Enrichment with dietary fibres and Lycopene has an importance of 17 % and 16 % respectively. The importance of price is 12 %, and colour has the least importance with 10 % (figure 19). The presumption of linearity is corroborated clearly for fruit content

and slightly for price. In Germany, the highest utility values by far can be found for fruit content. 100% fruit content are appreciated with 7.2 utility points, but even only 20 % fruit content get 2.4 utility points (table 5). In general, price has negative utility values, and for the expensive price the extent is -1.9 utility points (table 5). German consumers seem to like added functional ingredients combined with prevention claims as they obtain positive utility values. The enrichments in combination with soft functional claims receive negative part-worths. Glass bottle is the preferred packaging of functional orange juice in Germany. Altogether, German consumers want an orange juice with high fruit content since this criterion is much more important than others. Even the highest price does not constrain this, when the utility values are being compared.

In analogy to Germany, fruit content is by far the most important factor with an importance of 38 % in Poland. Packaging with an importance of 23 % and price with 18 % follow, while enrichment with Lycopene and dietary fibres have little importance with 10 % or 9 % respectively (figure 19). Colour is nearly unimportant in the view of Polish consumers. The presumption of positive linearity for fruit content and negative linearity for price is verified. In Poland, price is more important for consumer preferences than in other countries. The utility values are accordant with this finding since the highest price results in a negative utility value of -3.7, and even the low price has a negative part worth of -1.2 utility points (table 5). Functional enrichments obtain low positive utility values, whereas non-enrichments are assessed negatively. Polish consumers would prefer glass bottles as packaging, they dislike plastic bottles.

The importance of the functional orange juice packaging to Spanish consumers is relatively high compared to the other countries. The value of 24 % represents rank 2 next to fruit content with 30 % (figure 19). Enrichment with Lycopene or dietary fibres as well as price follow with importance values of around 13 % each. Colour is least important with a value of 6 % (figure 19). The assumption of positive linearity for fruit content and of negative linearity for price is verified for Spain. Spaniards prefer Tetra Pak carton as packaging and like to have functional ingredients added to the orange juice (table 5). Regarding Lycopene, they prefer the soft functional claim targeting to protection of the skin against ultraviolet light, whereas the Spanish respondents favour the prevention claim for dietary fibres which deals with prevention of colon cancer (table 5).

British consumers by far give the highest importance with around 35 % to the fruit content of the functional orange juice (figure 19). The following factors are enrichment with Lycopene or dietary fibres with 16 % or 15 % respectively. Packaging has an importance of 15 % and price of 10 % in the view of UK consumers. Colour has the lowest importance with 8 % (figure 19). Regarding fruit content, the utility values increase with rising fruit content, the assumption of positive linearity is verified. A negative linearity for the price can be observed in the United Kingdom as well (table 5).

The importance of the variable "fruit content" as influencing factor of consumer preferences matches well with the observed utility part worths for its factor values. Utility values for this factor can be observed ranging from 3.4 points for 20 % fruit content up to 10.2 points for 100 % fruit content (table 5). In all four analysed countries there is a wide difference between the utility values of fruit content and those of the other factors, which mostly do not exceed 1 utility point. Lycopene enrichment in combination with both claims results in low positive utility part worths. Adding dietary fibres achieve a positive utility value only in combination with the prevention claim dealing with the prevention of colon cancer (table 5), i. e. consumers do not see a real benefit in the enrichment with dietary fibres aiming solely to ease digestion. Regarding packaging of functional orange juice national differences can be observed in the preferences of consumers: While the German and Polish respondents prefer glass bottles, Spanish and UK consumers are in favour of Tetra Pak cartons (table 4).

Summarizing the findings of the conjoint experiments with all respondents, it can be stated that fruit content of the functional orange juice is the most important factor in all countries. Taking fruit content as a parameter for product quality and taste, the respondents want to have a product of high quality and good taste. The colour of the orange juice has only a low importance, and positive and negative part-worths of the different colours are in a small range. Possibly, the consumers do not mind the discoloured juice. Furthermore this fact could result from the experimental set-up: There is one product card – No. 17 – that is often top ranked because of its high fruit content, two added ingredients and a low price. But this juice was also discoloured. Respondents assessed colour as less important than other factors, and therefore the red-brown colour is better perceived than one would expect. According to the survey results the price of the functional orange juice is rather unimportant compared to other factors. Although conjoint measurements studies are one of the most reliable ways to test consumer preferences, the interviewees still handle virtual products. During the study they had no real purchase decision to make, and they had no consequences to bear in the sense of paying the prices requested for the functional orange juice so that the importance of price and the willingness to pay of consumers might be tested with alternative approaches as well.

Enrichment with the two tested functional ingredients (Lycopene, dietary fibres) mostly obtains positive utility part-worths in all four analysed countries. There is evidence that prevention claims are more

positively assessed by the respondents than soft functional claims. National differences between the countries become apparent with regard to packaging of the functional orange juice. A deposit system for packaging of beverages exists in Germany, so that it is quite common to buy juices in glass bottles and to bring those bottles back to the supermarket after having consumed the juice. Such deposit systems do not exist in the United Kingdom and Spain. Tetra Pak cartons seem to be most convenient as a one-way packaging considering transport weight and waste volume in the views of consumers of these countries.

Bech-Larsen et al. (2001) as well studied orange juice as a basic product in a conjoint study in Denmark aiming to analyse consumer preferences of Functional Food. The orange juice had three enrichment features, namely no enrichment, enrichment with Omega 3 fatty acids and enrichment with oligosaccharides. Furthermore, there were three factor levels for the claim – no claim, functional claim and prevention claim – and two different prices, a normal price and a price increased by 20 %. According to this study the Danish consumers had a negative buying intention towards Functional Food and in general preferred the non-enriched basic product (Bech-Larsen et al. 2001). They attach relatively high importance to the factor enrichment of which oligosaccharides were less preferred than Omega 3 fatty acids. Both kinds of health claims had a positive influence on respondents' buying intention towards the enriched products, but the prevention claim was slightly favoured. The Danes preferred the lowest price, but the importance of price was relatively small when being compared to other factors (Bech-Larsen et al. 2001).

In addition, Poulsen (1999) conducted a study about Functional Food in Denmark and enclosed a conjoint analysis as well. Respondents had to evaluate a functional dairy product which differed in the factors packaging, enrichment, type and price. According to this study, the price was the main factor with an importance of 38 % for Danish interviewees, followed by enrichment with functional ingredients with an importance of 30 %. Omega 3 fatty acids, fibres and Calcium plus vitamin D were the different levels of added substances. Packaging obtained an importance of 19 %, and type was least important with 12 % (Poulsen 1999). However, the high relevance of the price of Functional Food products reported by Poulsen (1999) could not be verified for Denmark in the study of Bech-Larsen et al. (2001).

Although it is difficult to compare the results of the study of Poulsen (1999) with the current survey's findings for Germany, Poland, Spain and the United Kingdom because of different experimental setups and product designs, the high importance Danes attach to price cannot be found in the other countries. In the current survey, the factor price obtains the highest importance in Poland with 18 % (figure 19), which is clearly below the value for Denmark in the Poulsen (1999) study. According to this study price had a negative linearity as well. The factor enrichment had four factor levels, namely no enrichment, enrichment with Omega 3 fatty acids, enrichment with dietary fibres as well as enrichment with Calcium plus vitamin D. The feature no enrichment obtained a positive utility score with 1.1 points. Calcium and vitamin D are assessed positively with 10.8 utility points, whereas enrichment with fibres or Omega 3 fatty acids get negative evaluation with -0.7 or -1.2 utility points respectively (Poulsen 1999). In this sense one can conclude that Danish respondents prefer products without enrichment or functional ingredients which are well known.

In a study carried out in Germany 2001 with almost 600 interviewees, Rogdaki (2003) conducted a conjoint experiment for cholesterol lowering spread and probiotic dairy products. For both products Rogdaki (2003) reported a relevance of the price of the Functional Food products of around 20 % (figure 20). Enrichment with functional ingredients (plant sterols and vitamins in the case of spreads and probiotic cultures in the case of yoghurt) achieve importance values of around 20 % as well, while the basic characteristics of the food products (represented by the fat content in the case of spreads as well as the taste and fat content of yoghurt) have been reported as being more relevant for consumer preferences in Germany (figure 20).





Source: Rogdaki 2003

Taste is an important determinant for the food choice (Shepherd 2001), and Lähteenmäki (2000) stated that taste is as well of great importance for Functional Food. Two studies in Germany asked for the importance of different criteria when purchasing functional yogurt. Taste was the most important criterion and reached a 1.5 score on a five-point scale from 1 = very important to 5 = completelyunimportant in both studies (Huttanus 1999, Hellinger 2001). The survey's findings about the reasons for buying Functional Food underline the importance of taste for consumer acceptance of a food product (see chapter 5). Regarding the factor enrichment, the studies of Huttanus (1999) and Hellinger (2001) named scores of 2.9 and 3.1 respectively for the enhancement of food with functional ingredients. This is clearly below the value of the factor taste and accordant with the survey's findings. Declarations of content of food ingredients on the packaging are an important information source for consumers when making a decision about food (De Almeida et al. 1997). In a study within several European countries 83 % of the respondents stated that they want to be informed on the packaging if the food reduces a disease risk with proven scientific evidence (IRB Europe, no year declaration). An investigation in the United Kingdom about health claims came to the result that claims with short and concise claims and those with well known substances attract the most attention (National Consumer Council 1997). Regarding enrichments with functional ingredients. Frewer et al. (2003) pointed out that ingredients which are known by consumers obtain a higher acceptance. Hilliam (1996) stated that the consumers' interest in health claims is likely to be higher when the claims generate a high degree of concern and when they name conditions over which consumers feel to have a fair degree of influence. The three top health claims in Germany are "increases resistance to diseases", "promotes healthy teeth and bones" and "improves athletic performance". The U.K. respondents named "reduces risk of heart disease", "promotes healthy teeth and bones" and "prevents cancer" as top claims (Hilliam 1996).

The Ohio State University studied consumers' understanding of health claims in Ohio (USA): A wheat cracker containing soy bean proteins was used as a Functional Food product in connection with five different levels of health claims. Beside the factor feature "no claim", there were four claims with differently phrased statements in an order of increasing scientific evidence. The first claim was expressed with very little scientific proof, whereas the last claim had very strong scientific evidence. The respondents showed an increasing trend in attitude and purchase intention from the weakest to the strongest claim (Teratanavat et al. 2004). Best placement for claims is the front of the packaging (National Consumer Council 1997). Another US study about the relationship between nutrition, health claims and consumers' purchase intentions came to the result that health claims on the front of a packaging are beneficial, but favourable nutrition information has stronger effects on attitudes and purchase intentions than health claims. Consumers are fairly sophisticated in their ability to use information provided by the nutrition fact panel to formulate appropriate conclusions (Kozup et al. 2003). This implies that numbers, for example on a nutrition fact panel, have a better information content than texts have, e.g. in health claims. The latter finding probably is in analogy to the result of the current survey showing the very high importance of the factor fruit content for consumer preferences. The fruit content was declared as a number in the survey design, and thus respondents can understand this factor better than phrases with health claims resulting in better evaluations for this

factor. Additionally, Frewer et al. (2003) stated that health claims are benefits that cannot directly be experienced by consumers – what again might support the hypothesis above.

6.5.4 Preferences of subgroups

The options of a conjoint analysis and the calculation of willingness to pay price premia reach further than just looking at the whole sample. Segmentation enables to obtain detailed and target grouporientated information since the utility scores of each individual respondent are calculated during the statistical analysis. Therefore market segmentation according to consumer preferences is one of the most important application fields of conjoint-based market research studies in science and industry in addition to development of product concepts and analysing pricing strategies of products (Hartmann and Sattler 2002, Voeth 1999, Melles and Holling 1998, Wittink et al. 1994). Consumer segmentation aims at segregating a heterogenic consumer sample into homogenous subgroups on the basis of suitable segmentation criteria (Freter 1983). For this purpose, two principle approaches exist: The "a priori-segmentation" divides a consumer sample into different subgroups by defining specific segmentation criteria based on general knowledge or theoretical evidence. Examples for such criteria are sociodemographic characteristics of consumers or parameters measuring their observable knowledge or behaviour (Freter 1983). The second approach - the "a posteriori-segmentation" builds up subgroups of consumers based on the results of a specific statistical analysis. Number, size and structure of such sub samples are not known until the analysis has been conducted (Green 1977). Cluster analysis is one of the mostly used statistical methodologies to perform such an a posteriorisegmentation.

An a priori- segmentation was carried out using the survey's data concerning consumer preferences of the functional orange juice. In this context the asked purchasing behaviour with regard to Functional Food was selected as segmentation criterion and two groups of respondents were generated, persons who buy Functional Food and those who refuse it. The conjoint analysis was repeated for these subgroups. The product card rankings of buyers and non-buyers were analysed separately. Table 6 and figure 21 show the results of the subgroup analysis.



Figure 21: Relative importance of the different product attributes (subgroups)

Variables	Values		Utility scores							
		Ger	many	Pol	and	Sp	ain	United K	(ingdom	
		Buyers	Non-	Buyers	Non-	Buyers	Non-	Buyers	Non-	
		of FF	buyers of	of FF	buyers	of FF	buyers	of FF	buyers	
		n = 84	+F n = 31	n - 78	01 FF	n - 200	01 FF	n - 75	01 FF	
Constant		5.3210	8.0431	2.2484	10.2790	6.7791	3.1485	3.7387	2.5721	
Packaging	Glass bottle	0.8435	0.7126	1.4017	1.1717	-0.1725	0.3485	-0.2050	0.1847	
	Plastic bottle	-0.2317	-0.6839	-2.1218	-0.5909	-0.9296	-0.7455	-0.4572	-0.3649	
	Tetra Pak carton	-0.6118	-0.0287	0.7201	-0.5808	1.1022	0.3970	0.6622	0.1802	
Colour	Normal (yellow)	-0.2317	0.0259	-0.1747	-0.1098	-0.0107	-0.0091	0.1959	0.5541	
	Discoloured (orange- brown)	0.2317	-0.0259	0.1747	0.1098	0.0107	0.0091	-0.1959	-0.5541	
Lycopene	No enrichment	-0.1646	-0.3276	-0.7735	-0.1616	-0.5134	-0.4061	-0.6374	0.1712	
	Enrichment + claim UV protection	-0.1118	-0.6207	0.5983	0.1313	0.3384	0.1848	0.4122	-0.3333	
	Enrichment + claim prostate cancer	0.2764	0.9483	0.1752	0.0303	0.1750	0.2212	0.2252	0.1622	
Dietary fibres	No enrichment	-0.6931	-0.6954	-0.9145	-0.5000	-0.5276	-0.4758	-0.5541	-0.4054	
	Enrichment + claim digestion	-0.2073	0.0057	0.5235	0.2525	0.2353	0.0212	-0.0563	0.0315	
	Enrichment + claim colon cancer	0.9004	0.6897	0.3910	0.2475	0.2923	0.4545	0.6104	0.3739	
Fruit content	20 %	2.7541	1.4052	4.2788	2.2803	2.2035	3.5742	3.3851	3.4437	
	50 %	5.5081	2.8103	8.5577	4.5606	4.4070	7.1485	6.7703	6.8874	
	100 %	8.2622	4.2155	12.8365	6.8409	6.6106	10.7227	10.1554	10.3311	
Price	Cheap (-30%)	-0.6260	-0.6810	-0,6239	-2.6515	-0.8413	-0.3970	-0.5372	-0.0721	
	Normal	-1.2520	-1.3621	-1.2479	-5.3030	-1.6826	-0.7939	-1.0743	-0.1441	
	Expensive (+30%)	-1.8780	-2.0431	-1.8718	-7.9545	-2.5239	-1.1909	-1.6115	-0.2162	

 Table 6:
 Utility values of the different factor levels (subgroups)

Source: Own inquiry 2004

German buyers of Functional Food attach 28 % importance to the fruit content, whereas this factor obtains only 19 % importance with non-buyers (figure 21). Accordant to this, the different levels of fruit content have about twice as many utility points with the buyers compared to the non-buyers (table 6). With an importance value of 25 %, packaging is the most relevant factor for preferences of non-buyers of Functional Food in Germany (figure 21). There are no major differences with respect to importance of other factors between buyer and non-buyers of Functional Food (figure 6).

Buyers of Functional Food in Poland rate fruit content of the functional orange juice as much more important influential factor for consumer preferences than non buyers: The importance values for these factors are 43 % for buyers and only 24 % for non-buyers (figure 21). In analogy to the findings in Germany, the different levels of fruit content have about twice as many utility points with the Polish buyers compared to the non-buyers. For the latter group price is the most important criterion for their

preferences achieving an importance value of 31 % with non-buyers compared to 12 % with buyers (figure 21). Accordant to this, the negative utility part-worths of the different analysed price levels are three times higher with non-buyers than with buyers (table 6). For the importance of the other product criteria, no major differences can be observed between buyers and non-buyers in Poland (figure 21).

In Spain, fruit content is much more important for consumer preferences of non-buyers compared to buyers of Functional Food: The importance value for non-buyers is 41 % versus 27 % for buyers (figure 21). In contrast Spanish buyers attach more importance towards packaging than non-buyers do: The buyers' importance value for this factor is 25 % in comparison to 19 % of non-buyers (figure 21). Interestingly the extent of negative linearity regarding price is lower for non-buyers. While the high price obtains a utility value of -2.5 within the buyers' subgroup, it achieves only -1.2 within the non-buyers' segment (table 6).

In contrast to the results of other countries, no differences can be found between buyers and nonbuyers in the United Kingdom regarding importance of the analysed product characteristics of functional orange juice in the conjoint study (figure 21).

In all analysed countries the subgroup analysis of preferences of buyers and non-buyers of Functional Food generates no significant differences in importance of enrichment with the two analysed functional ingredients (Lycopene, dietary fibres) (figure 21). However, variations between the subgroups can be observed with respect to the utility values of the differing enrichment features (table 6). Concerning Lycopene, in Germany both buyers and non-buyers of Functional Food have only positive utility scores for the prevention claim (with non-buyers having a higher part worth utility than buyers) (table 6). This implies that German consumers do not seem to positively evaluate enrichment with Lycopene just for the purpose of limited UV protection. The utility score of the enrichment with dietary fibres combined with a prevention claim is nearly equally positively assessed in both subgroups of the German sample (table 6).

In Poland both subgroups show positive utility part-worths for enrichment with both ingredients and all claims. But it is evident that buyers appreciate enrichment with functional ingredients more than nonbuyers as the buyers' utility scores are clearly higher except for dietary fibres and the functional claim (table 6).

Only one difference between buyers and non-buyers of Functional Food can be found for the Spanish sample. Both subgroups prefer enrichment with functional ingredients, but buyers prefer the functional claim, while non-buyers favour the prevention claim related to enrichment with Lycopene (table 6).

Comparison of British subgroups of buyers and non-buyers bears a difference concerning enrichment with Lycopene. Buyers of Functional Food assess enrichment positively while non-buyers accept this ingredient only in combination with a prevention claim.

Taken all together, it is interesting to observe that in most analysed cases non-buyers evaluate the juice concepts without enrichment of functional ingredients also negatively while they give relatively positive assessments to enrichment with functional ingredients in particular in relation with the prevention claims. This result supports the high acceptance of consumers to the concept of Functional Food found in the current survey as well as in previous studies. This topic has already been discussed in chapter 3.3.

Rogdaki (2003) carried out both approaches of consumer segmentation within her conjoint study in Germany. The a priori- segmentation concerning attributes like age, income and purchasing behaviour of respondents revealed some difference between the defined subgroups. Buyers of cholesterol lowering margarine and probiotic milk products had a significant higher part worth utility with regard to the enrichment of the margarine with plant sterols (figure 22) and regarding the enrichment of yogurt with probiotic bacteria than non-buyers (figure 23). In this context the regular buyers of cholesterol lowering margarine had a significant higher part worth utility regarding the enrichment than occasional buyers and consumers who have bought the product only once. The regular buyers of probiotic dairy products had a significantly higher utility with regard to the enrichment than other respondents (Rogdaki 2003). These results are not accordant to the current survey's findings in Germany, but this might be due to the differing products and functional ingredients analysed in the current survey and the study of Rogdaki (2003).

In addition, Rogdaki (2003) observed that consumers elder than 70 years show the lowest part worth utility with regard to the enrichment of margarine and yogurt compared to younger consumers. Up to a monthly household income of about 3,000 to 4,000 € there was a positive linear relationship between the household's income and the value of the part worth utility regarding the enrichment of yogurt with probiotic bacteria, but this could not be found for cholesterol lowering margarine (Rogdaki 2003). The a posteriori- segmentation of Rogdaki (2003) within her study in Germany generated six clusters of respondents for both products and their enrichments with functional ingredients. These consumer clusters differed in their utility scores with regard to the analysed factor levels of probiotic yoghurt and cholesterol lowering spread, but they could not be retrieved within any sociodemographic segmentation (Rogdaki 2003).



Figure 22: Evaluation of cholesterol lowering spread in Germany 2001

Source: Rogdaki 2003





Source: Rogdaki 2003

6.5.5 Willingness to pay price premia for functional orange juice

Another aspect of the consumer study was to analyse the customers' willingness to pay price premia for Functional Food products. The results of the conjoint study which was included in the survey delivered data for that analysis. In chapter 6.5.1 the methodology of a conjoint analysis is described. Price was taken as one factor characterising the products in the conjoint analysis. Thus it is possible to conduct a monetary evaluation of differences in utilities between diverse product profiles: For example one difference in the product profiles may be the enrichment or non-enrichment with functional ingredients. These two characteristics obtain different so called utility part worths as a result of the consumers' evaluation. And those part-worths can be monetarily assessed.

If price is taken as a factor, the different price levels have utilities as well. If there is linearity between the price levels, the same linearity is assumed for the utility values which correspond to the price levels. The range of prices divided over the range between the related utility values defines the variable "price per utility unit". As utility values are metric variables, the prices for all other differences between utility values of factor levels can be concluded from the price for one utility unit. With this method differences in consumer preferences between products or product levels can be transferred into monetary values. Such or similar methods to estimate the willingness to pay for single product features have been used in previous research for differing purposes (e. g. Müller 2002, Hermann et al. 2000, Simon and Kucher 1988 Sattler and Nitschke 2001).

The starting points for estimating the consumers' willingness to pay for the analysed functional orange juice are the utility part-worths for all factor levels in the four countries. These data are shown in chapter 6.5 in table 5 for all respondents and in table 6 divided by buyers and non-buyers of Functional Food. The first step in the willingness to pay-analysis is to calculate the price for one utility unit. To take Germany as an example for this step: The utility value of the low price level is -0.64, the utility value of the high price counts 1.92 (table 5) resulting in a utility difference of 1.28 utility points. The analysed prices of the functional orange juice range between 0.89 € and 1.69 € resulting in a price difference of $0.8 \in$. Thus the variable "price per utility unit" is estimated to $0.8 \in$ / 1.28 utility units = 0.63 €/utility unit in Germany. This variable can be used for monetary assessments of preferences to other product characteristics. Having interest in the respondents' willingness to pay for functional ingredients, the differences in utility values between the features "non-enrichment" and "enrichment" (in combination with differing claims) have to be regarded. For example, concerning Lycopene the feature "no enrichment" has a negative utility value of -0.21, and the utility value of the feature "enrichment and claimed prevention of prostate cancer" counts 0.45 in Germany (table 5). Using the above calculated price per utility unit of 0.63 €/utility unit in the country, the monetary value of the difference in consumer preferences regarding the enrichment with Lycopene combined with a prevention claim is estimated to 0.41 €. In Germany, the enrichment with Lycopene in connection with a functional claim (UV protection) has no positive utility value (table 5), i.e. German respondents do not prefer this feature. Though a monetary value of this factor level could be theoretically calculated, it seems nonsensical to do so since this will result in negative values of consumers' willingness to pay. For this reason the monetary value is determined as zero in this case.

The monetary value of enrichment with a functional ingredient in combination claim features can be regarded as a consumer's willingness to pay for this factor. If an orange juice contains a certain functional ingredient which is advertised with a health claim compared to an orange juice with no enrichment, the consumers might be willing to pay higher prices for this product. Table 7 shows the results of the willingness to pay price premia for the analysed functional ingredients in the four countries.

Variable value	Germany	Poland	Spain	United Kingdom
Price per utility unit	0.63 € / utility unit	0.73 Zł / utility unit	0.54 € / utility unit	1.05 £ / utility unit
Price range for the product	0.89 € - 1.89 €	2.09 Zł – 3.89 Zł	0.89€-1.89€	0.89 £ - 1.89 £
Lycopene + claim UV protection	0 (no positive utility score)	0.77 Złoty (0.18 €)	0.16€	0,56 £ (0.78 €)
Lycopene + claim prostate cancer	0.41€	0.53 Złoty (0.12 €)	0.10€	0.60 £ (0.84 €)
Dietary fibres + claim digestion	0 (no positive utility score)	0.91 Złoty (0.21 €)	0.10€	0 (no positive utility score)
Dietary fibres + claim colon cancer	0.96€	0.84 Złoty (0.19 €)	0.18€	1.08 £ (1.51 €)
Currency exchange rat	tes (08.Oct.2004): 1	Złoty = 0.23 €, 1 £ = 1.	40€	

Table 7:	Willingness to p	av for functional	ingredients ((all respondents)
rubic r.	v minigricoo to p	ay for furfolional	ingreatente ((un respondente)

Source: Own inquiry 2004

In Germany only the enrichments combined with prevention claims get a positive price premium, namely $0.41 \in$ for Lycopene and $0.96 \in$ for dietary fibres (table 7). The willingness to pay of the Polish

respondents is estimated to about $0.18 \in$ extra for a juice with added Lycopene and the functional claim and around $0.12 \in$ extra for Lycopene in connection with the prevention claim. Enrichment with dietary fibres obtains a price premium of $0.21 \in$ when combined with the functional claim and of $0.19 \in$ in connection with the prevention claim in Poland (table 7). Respondents in Spain would pay $0.16 \in$ extra for Lycopene combined with a functional claim and $0.10 \in$ in connection with a prevention claim. Dietary fibres obtain a willingness to pay of $0.10 \in$ when combined with a functional claim and of $0.18 \in$ when combined with a prevention claim in Spain (table 7). Respondents in the United Kingdom would pay about $0.78 \in$ extra for added Lycopene that is advertised with the functional claim and approximately $0.84 \in$ for Lycopene in connection with the prevention claim. Dietary fibres obtain a price premium of $1.51 \in$ when combined with the prevention claim (table 7).

The willingness to pay for enrichment with the analysed functional ingredients is lowest in Poland and Spain. This is due to the lower level of prices and the lower income level. In addition, it is a result of the high price sensitivity of Polish consumers. Utility values of enrichment features show that Poles and Spaniards are interested in functional additives, both with the functional claim and with the prevention claim. But they are not willing to pay as high price premia as consumers in the other two countries. The calculated price premia are neither absolute values nor relative values. They are very dependent on the given level of prices obtained in the conjoint design (Müller 2002). In Germany for example the prices range between $0.89 \in$ and $1.89 \in$. The methodology to calculate such price premia does not allow to exactly define whether a price premium of $0.41 \in$ for enriched Lycopene combined with the prevention claim (table 7) can be referred to the low price level as well as to the high price level. In the first case the price premium would count for 46 % of the (low) basic price and in the second case only for 22 % of the (high) basic price.

For this reason the price premium should not be interpreted as a relative surcharge to a basic price, but they give a first insight what consumers might be willing to accept for a specific variation of the product design. Furthermore, the linearity assumption for prices (which is the underlying hypotheses in the conjoint design of the current survey) does only exist in the given price range. A price below the lowest price or above the highest price is not covered with the coherence of price linearity and utility linearity. And of course it is possible that consumer demand for functional orange juice is not linear dependant to the price but in another mathematical relationship. For these reasons the price premia should not be seen as absolute values as well not least due to limitations in considering too high numbers of product characteristics and factor levels in a conjoint design (Klein 2002, Gustafsson et al. 2000, Green and Srinivasan 1990, 1978). Taking all the discussed limitations into account, the estimated values of price premia indicate that consumers are willing to pay extra for orange juice which is enriched with functional substances in connection with certain health claims. But the level of the calculated values of consumers' willingness to pay (table 7) leads to the conclusion that it seems not likely that European consumers are willing to accept price premia of 100 % or more just for enriching food with functional ingredients.

The findings of the current survey are in line with results from previous studies. Müller and Güllner (1997) revealed that two third of German respondents were willing to pay a higher price for food improving health. A significant number of consumers in Germany and the United Kingdom would buy Functional Food, even if it were more expensive than conventional products (Hilliam 1999). Hellinger (2001) calculated a mean price premium of 43 % for a yogurt in Germany enriched with Omega 3 fatty acids. Rogdaki (2003) calculated the willingness to pay price premia for functional spread and functional yogurt. The German respondents would pay about $0.34 \in$ more for spread if enriched with plant sterols, thereby being the price range for the spread between $0.91 \in$ and $1.42 \in$. In contrast there was no attainable price premium for yogurt that is enriched with probiotic cultures (Rogdaki 2003).

For Denmark Poulsen (1999) stated that Danish consumers with a positive attitude towards concrete enriched products are willing to pay extra for them. This means that one cannot generally assume consumers' willingness to pay price premia towards all Functional Food products, but this is dependant on the nature of each single product, the character of the functional ingredient, the information provided to consumers via health claims or in other ways, the characteristics of the basic food product as well as the cultural and traditional food consumption patterns in a specific country. However, the results of the survey and previous studies imply that Functional Food products can obtain a certain price premium, but that it is limited and should exceed 50 % only for Functional Food products with a scientifically (in human intervention studies) proven efficacy of the functional ingredient, an effect on diseases which influence consumers health in the near future as well as other product characteristics which totally fulfil the expectations of consumers in relation to the basic food product. Otherwise high price premia for Functional Food are one major reason for product failure in this segment of the highly competitive European food market (Menrad 2003).

6.5.6 Subgroups of consumers and their willingness to pay price premia

In analogy to other analyses of this study, the two groups of persons, who stated to buy Functional Food products or to refuse it respectively, were analysed with respect to pay price premia for the considered functional ingredients. Their utility scores presented in table 6 were taken as starting point to estimate the price premia for these two groups in the four countries. The results are shown in table 8.

	Germ	nany	Pol	and	Sp	ain	United Kingdom	
Variable value	Buyers of FF	Non- buyers of FF	Buyers of FF	Non- buyers of FF	Buyers of FF	Non- buyers of FF	Buyers of FF	Non- buyers of FF
Price per utility unit	0.63 € / utility unit	0.63 € / utility unit	0.73 Zł / utility unit	0.73 Zł / utility unit	0.48 € / utility unit	1.0 € / utility unit	1.05 £ / utility unit	1.05 £ / utility unit
Price range for the product	0.89 € - 1.89 €	0.89 € - 1.89 €	2.09 Zł – 3.89 Zł	2.09 Zł – 3.89 Zł	0.89 € - 1.89 €	0.89 € - 1.89 €	0.89£- 1.89£	0.89 £ - 1.89 £
Lycopene + claim UV protection	0 (no positive utility score)	0 (no positive utility score)	0.99 Złoty (0,.23 €)	0.10 Złoty (0.02€)	0.16€	0.18€	0.78 £ (1.09 €)	
Lycopene + claim prostate cancer	0.28€	0.75€	0.68 Złoty (0.16 €)	0.07 Złoty (0.02 €)	0.08€	0.22€	0.64 £ (0.90 €)	No reasonable
Dietary fibres + claim digestion	0 (no positive utility score)	0.41€	1.04 Złoty (0.24 €)	0.26 Złoty (0.06 €)	0.11€	0.02€	0 (no positive utility score)	(little price elasticity of non-buyers)
Dietary fibres + claim colon cancer	1.02€	0.81€	0.94 Złoty (0.22 €)	0.25 Złoty (0.06 €)	0.14€	0.45€	0.87 £ (1.22 €)	
Currency exchange rates (08.Oct.2004.): 1 Złoty = 0.23 €, 1 £ = 1.40 €								

 Table 8:
 Willingness to pay for functional ingredients (subgroups)

Source: Own inquiry 2004

In Germany both subgroups have no willingness to pay extra for Lycopene enrichment combined with the functional claim. In connection with the prevention claim buyers would pay 0.28 € and non-buyers would pay 0.75 € extra. Buyers show no willingness to pay extra for dietary fibres and the functional claim, while non-buyers would pay 0.41 €. The calculated price premium for dietary fibres and the prevention claim is 1.02 € for buyers and 0.81 € for non-buyers (table 8). Due to the reasons mentioned above, those values cannot be taken as axiomatic. There is a clear tendency that Polish buyers show a higher willingness to pay price premia for enrichment with functional ingredients compared to non-buyers. While non-buyers would pay nearly nothing extra for added Lycopene and a maximum of 0.06 € for enrichment with dietary fibres, buyers show a willingness to pay price premia in the range between 0.16 € and 0.24 € in Poland (table 8). According to the survey results, Spanish non-buyers would pay higher price premia for added functional ingredients combined with prevention claims than buyers. The willingness to pay of non-buyers is 0.22 € regarding Lycopene and 0.45 € regarding dietary fibres, while buyers would only pay extra 0.08 € and 0.14 € respectively in Spain (table 8). Calculation brought no reasonable results for non-buyers in the United Kingdom. This subgroup has only small negative utility scores for the different price levels, resulting in extreme values for the variable "price per utility unit": Using these variables to calculate a willingness to pay extra for e.g. enrichment with dietary fibres in combination with the prevention claim would generate a (very unrealistic) value of 6.05 € for non-buyers in the UK.

An obvious difference between buyers and non-buyers of Functional Food regarding their willingness to pay is stated for German consumers by the IFAV institute (1998 RAMS 82) and for Danish consumers by Poulsen (1999). Non-buyers were clearly more price sensitive than buyers of Functional

Food. The results of Poulsen's study indicated that consumers with a positive attitude towards concrete enriched products are willing to pay extra for them.

A significant positive correlation between income and willingness to pay was observed for functional bread in Denmark (Poulsen 1999). Huttanus (1999) could not find any significance in the relationship between sociodemographic attributes like age, gender or income and the willingness to pay price premia for functional ingredients.

To sum up the previous findings, the Polish sample reveals the biggest differences between the subgroups. It is apparent that Polish buyers of Functional Food products would pay higher price premia for enrichment with functional ingredients than non-buyers. Neither the results from the German, the Spanish nor the British samples show this explicit tendency. According to the results of the survey, it could be interpreted that non-buyers in these countries reveal a higher willingness to pay price premia than buyers, i. e. this would mean that there is a potential of new customer segments with high willingness to pay. However, such a conclusion should be handled with care: Besides the methodological limitations mentioned above concerning the estimation of willingness to pay values it should be taken into account that the segmentation of subgroups is based on the general purchasing behaviour related to Functional Food and not specifically to functional orange juice (what might lead to differences in the composition of the subgroups) and that the analysed functional orange juice is not available on the market so far so that consumers have no direct experience with this type of product.

7 Summary and Conclusions

The target of this part of the study is the analysis of consumer attitudes and behaviour with respect to Functional Food in four selected European countries. This relates to the sociodemographic characteristics of consumers of Functional Food, their attitudes and perception regarding this food concept, their knowledge about the relationship between nutrition and health, their trust in stakeholders and their willingness to pay price premia for Functional Food products. These aspects were analysed through a standardized consumer survey including an oral interview and a product card assessment in Germany, Poland, Spain and the United Kingdom.

The term "Functional Food" is hardly known in the population of most European countries, but single products or brands following this concept are much more frequently in the mind of consumers. Advertisement seems to be the most suitable way to communicate a topic to consumers, but at the same time it is the most expensive option. Non-commercial institutions could use media reports. Persons like friends, relatives, doctors and other consultants are additional important communication channels related to Functional Food. But using them to influence consumers is difficult, because the original messages will be interpreted and modified by the transmitting persons.

In the EU consumers' knowledge about the health effects of functional ingredients which are established and introduced in the market for a long time (like e. g. Calcium) is quite high and by far outreaches consumers' knowledge of health effects of functional ingredients of which products have been launched in recent ten years (like e. g. Lycopene). Examples of functional ingredients like probiotic cultures, Omega 3 fatty acids or dietary fibres (which are relatively "new" compared e. g. to Calcium) also show that a relatively high level of consumers' knowledge can be established within a foreseeable timeframe in case competent private or public actors initiate and organize specific information campaigns. Sociodemographic parameters can only partly explain the differences between differing age-groups regarding knowledge in this field. In addition, there seems to be a strong national influence on the understanding of "healthy eating". The European consumers are willing and able to understand basic interrelationships between a specific functional component and its health effect. However, it seems to take at least ten years and high investments in information and communication activities until a majority of the population has acquired such knowledge related to a specific ingredient.

About two of three respondents in all four analysed countries have already bought Functional Food products. The likelihood to buy Functional Food increases with an increasing household income and an increasing level of education. In addition, women are more likely to buy Functional Food products than men and – at least for the overall category of Functional Food products – it seems that the likelihood to buy Functional Food decreases in higher age groups. A kind of sequence concerning purchasing frequency of Functional Food product categories can be determined: Functional milk and dairy products are the most frequently bought product groups, followed by functional bakery products, functional beverages and functional cereals. The observed sequences of purchasing frequencies of different Functional Food segments are in line with the supply structure of Functional Food products in Europe. A further reason explaining this sequence may be the different relevancies in diet. Milk, yogurt and bread have a bigger importance in people's everyday diet than cereals or confectionary.

There is not just one single important motive that makes consumers buy Functional Food, but there are multiple reasons with high relevance for purchasing Functional Food like the health motive, to do

something good to oneself, a good taste of the products as well as a proven health effect and no negative side-effects of the products. Functional Food products have to show a proven efficacy and a clear effect on the health or well-being of consumers. In addition, consumers expect that the quality characteristics of the "matrix food products" are fulfilled by Functional Food products as well and that these products also fit in the "emotional" expectations of the consumers related to healthy nutrition.

In analogy to the buyers of Functional Food there are a bundle of reasons which prevent non-buyers from purchasing this type of food. Besides particularities in single countries – like e. g. a strong price orientation in Poland – there are two main factors to be found in a similar way in all investigated countries. The first factor relates to the "own individual health constitution" of the consumer, i. e. the consumer does not regard himself as being a person belonging to the target group of Functional Food since he is not affected by the respective health problems so far. The second factor is product-related and affects specific characteristics of Functional Food products like e. g. the health effect and efficacy of functional ingredients or the fear of side effects.

In the view or the consumers, two groups of institutions emerge from the assessment of trustworthiness. Independent experts enjoy confidence while commercial companies and the national Governments are distrusted by consumers. The national Governments are not regarded as agencies with expertise for special issues, among others for food, but as politician institutions. This perception results in a general mistrust and other allegations towards the Governments. Food manufacturers and food retailers are distrusted because they are alleged to have only strong commercial self interests.

An exploration of the background of a purchasing decision towards Functional Food and the respondents' inside motivation and outside drives leads to the factors knowledge and trust. The likelihood to buy Functional Food increases in all four countries with an increasing knowledge of a person about functional ingredients and their effects onto health. Secondly, persons with higher knowledge are more likely do be early adopters of a newly launched Functional Food product and to buy them more frequently than people with lower knowledge levels. In this sense, knowledge about the relationship between functional ingredients, nutrition and health can be regarded as an important impetus to buy Functional Food. Furthermore, the likelihood to be a buyer of Functional Food arises with an increasing trust in persons and institutions concerned with Functional Food so that building of trust in such institutions seems to be an important precondition in order to convince additional people to buy Functional Food.

The results of the product card assessment and the related conjoint analysis of a functional orange juice brought insights about the consumers' preferences regarding a functional orange juice and their willingness to pay price premia for such products. Fruit content is the most important factor influencing consumers' preferences in all countries. Taking fruit content as a parameter for product quality and taste of orange juice in general, the respondents want a product of high quality and good taste in the functional version as well. The price of the functional orange juice is rather unimportant compared to other factors for consumers' preferences. Both buyers and non-buyers of Functional Food evaluate the juice concepts without enrichment of functional ingredients negatively while they give relatively positive assessments to enrichment with functional ingredients in particular in relation with the prevention claims. This result supports the high acceptance of consumers to the concept of Functional Food found in the current survey as well as in previous studies.

The estimated values of price premia indicate that consumers are willing to pay extra for orange juice which is enriched with functional substances in connection with certain health claims. But the level of the calculated values of consumers' willingness to pay leads to the conclusion that it seems not likely that European consumers are willing to accept price premia of 100 % or more just for enriching food with functional ingredients. Enrichment with the two tested functional ingredients Lycopene and dietary fibres mostly obtains positive utility part-worths in all four analysed countries. There is evidence that prevention claims are more positively assessed by the respondents than relatively soft functional claims often connected to the well-being of consumers.

A short comparison of all four countries indicates that the German and British consumers show the biggest similarity concerning consumption patterns, motives and attitudes related to Functional Food. At the same time the Functional Food market in those countries has reached the highest volumes and maturity stage (Euromonitor 2004, Menrad 2003). In recent years the situation in Spain is converting to that in UK and Germany. Six years ago Laajini et al. (1997) characterized Spain as a country, where consumers are moving away from the typical healthy Mediterranean diet and are adopting the consumption structure of the Northern diet.

Poland represents a country with a differing situation: Pricewaterhouse Coopers (2003) described the Polish consumers both continuing to be highly price-oriented in their shopping decisions and tending to follow the Western consumption pattern. The Polish food market is faced to changes in lifestyles and living patterns and a continuous decrease of household expenditures for food. The survey's results, like e. g. the significantly lower willingness to pay for enrichment with functional ingredients, the lower knowledge about functional ingredients and their effects onto health and the slightly lower

buying frequency of Functional Food products, are concordant with the previous description. The changes outlined in the study of Pricewaterhouse Coopers (2003) are still continuing, however and these developments do not proceed at the same time and intensity in the whole country and the whole society. There are inequalities in income, lifestyle etc. between the large conglomeratic cities and rural regions as well as the Western part of the country and the Eastern regions of Poland. Especially young people are more consumption-oriented and influenced by "Western" fashion styles (Pricewaterhouse Coopers 2003). Therefore, while interpreting the results of the consumer survey in Poland, it should be taken into account that social and economic transformation proceed only since 15 years in Poland.

Some more future research efforts should be taken to clarify the market situation and consumers' point of view and motives with respect to Functional Food in the Eastern European countries as they still differ from West Europe and have their own country-specific characteristics so that results cannot just be transferred from one country to another. Facing problems concerning language and information availability, national partners in these countries are a suitable way to obtain more insights in these areas.

Another issue is the aspect of health claims for Functional Food, their regulation and communication. The survey brought the result that enrichment with functional ingredients in combination with hard prevention claims are preferred by consumers in comparison to enrichments combined with soft functional claim. But while the latter claims like "eases digestion" or "improves well-being" can be used by European food manufacturers, the use of prevention claims are still under discussion in the EU. The survey's findings indicate that consumers could be attached to those kinds of health claims.

The wide-spread distrust of consumers in persons and institutions dealing with food is a serious problem in the EU. As shown in chapter 6.4.1 trust is crucial for a positive attitude towards Functional Food. In this respect the stakeholders (inter)national governments, food industry and food retailers have a crucial relevance. They adopt different strategies of communication with the consumers – the business expends huge amounts of money whereas the government uses its rhetoric (Lang and Heasman 2004)–, but all show low trust values in the eye of consumers. On the other hand, it seems to be in the own (economic) interest of food industry and food retail companies to enjoy consumer confidence, however it seems that not enough or unsuitable activities have been carried out in the past in this area.

Furthermore the results of the consumer survey also indicate that sufficient knowledge is an important key factor to lead consumers towards Functional Food and maybe to healthy diet in general. A suitable strategy could be to use independent experts as transmitters, because they enjoy high confidence. However, imparting profound knowledge about the relationship between nutrition and health to consumers takes a long time and even more financial resources. Therefore, a long-term strategy is needed to build-up such knowledge in the population, which is lacking both for national governments and private companies.

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9 Annex

Annex 1: Questionnaire

Annex 2: Examples of product cards of functional orange juice



Consumer perception of Functional Food within the EU

Do not read out *italicised* comments

1. Who is responsible for the food purchase in your household?

Myself	
Partner	
Parents	
Children	
Other Person:	

- 2. Do you know the term "Functional Food"?
 - Yes \rightarrow Continue with Question 3 \square No \rightarrow Continue with Definition of Functional Food
- 3. Do you know some foods or brands, which in your opinion belong to the "Functional Foods"?

Definition: Within this interview we define Functional Food as...

Food that are enriched with specific ingredients and to which one can ascribe special health benefits.

Examples for Functional Food Products are:

- Probiotic yoghurts or milk drinks
- Spread that lowers cholesterol level

Examples for brands are:

- Danone Actimel, Nestlé LC 1
- Becel pro activ (D) / Flora pro activ (PL, UK, E)

4. Now having heard the description of Functional Food, how did you get to know about such products? (Several answers possible)

Provide list Question 4; Ask: "Anything else?"

Product advertisement in newspapers, on TV, on the internet or in other media

Reports in newspapers, on TV, on the internet or in other media

Product description on the packaging

Tasting in the supermarket

Medical doctor, pharmacy

 \Box Fitness centre, cosmetician

Friends, relatives

Other:_____

 \Box I have never known of these products

5. I would like to announce some functional substances and their possible efficacies onto health. Please name the statement which is correct in your opinion. (Only 1 correct answer)

Calcium...

Abates rheumatism

Enhances strong bones

Encourages the growth of beneficial bacteria in the gut

Do not know

Probiotic cultures...

Encourage the growth of beneficial bacteria in the gut

Improve sight

Enhance the body's capacity to absorb calcium

Do not know

Omega 3 fatty acids...

Improve mental balance

Prevent anaemia

Lower the cholesterol level in the blood

Do not know

Folic acid...

Eases digestion

Reduces the risk of neural tube defects with unborn children

 \Box Improves the power of concentration

Do not know

Lycopene...

Prevents thyroid gland diseases

Abates headaches

Improves the skin's protection against ultraviolet radiation

Do not know

Dietary Fibres...

Improve sight

 \Box Reduce the risk of heart diseases

 \Box Reduce the risk of colon cancer

Do not know

6. Have you already bought Functional Food Products?

Yes	ightarrow Continue with Question 7
No	ightarrow Continue with Question 9

7. How often have you bought Functional Food Products belonging to the following categories within the past six months?

Provide list purchase frequency

rom		Every Week	Every two weeks	Once a month	Less than once a month	Never
ts t		1	2	3	4	5
oduc	Milk and dairy products					
	Bakery products					
000	Confectionery					
al F	Beverages					
CTIO	Cereals					
ùn-	Other					

Why do you buy_

Most frequently bought product from previous question will be selected for this question.

?

Please assess the importance of the following possible reasons.

Provide list assessment

	Very importa nt	Importa nt 2	Neutral	Less importa nt	Not importa nt	Do not know
To stay healthy						
To stay attractive						
To retard aging						
For my child / children						
To avoid medical treatment						
Good taste						
Interest, curiosity						
Recommended by medical doctor or nutritional consultant						
To do myself good						
To salve my consciences						

 \rightarrow Continue with Question 11

9. What are your reasons for not buying Functional Food products?

Please assess the importance of the following possible reasons.

vers		Very importa nt	Importa nt	Neutral	Less importa nt	Not importa nt	Do not know
nq		1	2	3	4	5	
μ	Too expensive						
ž	Not effective						
foi	Fear of artificial additives						
Ś	Fear of side effects						
0 0	I do not feel ill						
stio	I focus more upon presence than upon future						
anl	I prefer organic food						
is c	Bad taste						
ЧЧ Ч	Concerns about novel food						

Provide list Assessment

10. Which preconditions have to be fulfilled that you might buy Functional Food products? (Several answers possible)

Provide list Question 10; Ask: "Anything else?"

If recommended by medical doctor or nutritional consultant
Lower prices
If recommended by friends or relatives
Occurrence of health problems
Disposition of specific diseases (e.g. high cholesterol level)
Clear evidence of efficacy of such products
Certainty of no side effects
Other:
I will not buy Functional Food products anyway

11. I would like to announce some persons and institutions which can be associated to Functional Foods through their action or statements. Please assess their trustability.

	Totally trustable	Very trustable	Trustable	Little trustable	Not at all trustable	Do not know
	1	2	3	4	5	
Government						
Food Industry						
Research Institutes						
Food Retailers						
Medical Doctors						
Consumer associations						
Nutritional consultants						
Health insurance						
Other:						

Provide list Trustability

12. In the previous question you assessed the _____ as little trustable or not at all trustable.

Those persons or institutions will be selected which have been assessed as "little trustable" or "not at all trustable" by the interviewee.

What are the reasons for your estimation?

Government	
Food Industry	
Research Institutes	
Food Retailers	
Medical Doctors	
Consumer associations	
Nutritional consultants	
Health insurance	
Other:	

13. To which age category do you belong?

Provide list Age

< 21
21-30
31-40
41-50
51-60
61-70
> 70

14. How many persons live continuously in your household?

_____ Persons, thereof are _____children under 18 years

15. Which is your highest education certificate?

Provide list Education

No certificate

Secondary school (e.g. High school)

 \Box Secondary school with authorisation for academic education

Professional training certificate (Diploma or other certificate)

College or University degree

Other: _____

16. In which category falls your monthly net income (after tax and social insurance deduction)?

Provide list Income

Below 750 GBP

750 up to 1500 GBP

1500 up to 2250 GBP

2250 up to 3000 GBP

3000 GBP and more

No statement

At the ending I would like to show you some product cards. The product is an orange juice in diverse alternatives.

Please arrange the cards in an order. The product you like most should be the first card, the product you like least should be the last card.

First let the interviewee divide the cards into two groups of the same size: "favourite products" and "less good products".

Order	Card No.
1 (best product)	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20 (worst product)	

Afterwards the interviewee should arrange the cards within each group

Thank you for your cooperation!!!

Gender

Female

Male

Annex 2: Examples of product cards of functional orange juice

