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ABSTRACTION AND PRODUCT CATEGORIES AS EXPLANATORY VARIABLES FOR FOOD CONSUMPTION

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Abstract

An understanding of the process by which consumers match consumption choices to personal values is powerful aid to guide strategic market orientation. It is of particular importance in the highly saturated food markets of developed countries, where consumer needs are shifting closer and closer towards the search for quality and emotional benefits. This study sets out to explore variation in the consumer choice structure in relation to three products with different levels of search, experience and credence attributes, using means-end chain theory. The results suggest the presence of an emotional component in foods that increases in complexity (becomes more abstract) with the number of credence attributes associated with the product; a fact worthy of the consideration of product managers when designing marketing strategies.

Keywords: quality, the information economy, search, experience and credence goods, means-end chain, laddering, abstraction

I. INTRODUCTION

Awareness of consumer needs and preferences is crucial to the success of any product on the market, all the more so in these times of intense competition and heightened consumer demand. Matching product supply to consumer needs is an extremely difficult process in any market, and the agrifood market is no exception. Saturated agrifood markets in developed countries need to steer their approach away from the traditional production-orientated methods towards marketing-orientated alternatives. In other words, the production needs of consumers have already been met; and the answer to satisfying their preferences lies in the search for high quality products incorporating emotional benefits [28].

Quality is the key choice-determining factor in relation to food products [21]. At the theoretical level, two key models have been developed to identify custom needs in the food sector: the Quality Guidance Model [58] and the Total Food Quality Model [21]. While the Quality Guidance Model focuses on relating consumer quality judgments to the characteristics of the physical product, the Total Food Quality Model also considers the factors that intervene between purchase behaviour and expected quality and experienced quality.

Based on these models, [21] propose four distinct types of food-specific quality, assuming quality to have both an objective and subjective side: product-oriented quality (which refers to the physical characteristics of the product), process-oriented quality (the characteristics and principles of the production process, including norms), quality control (the extent to which product and process-oriented quality are kept stable at pre-specified levels) and user-oriented quality (the subjective quality perceptions of the user).

One explanation for the relation between the characteristics or attributes of the product and the quality perceived or expected by the consumer is provided by the information economy theory, according to which a product is said to convey three types of cues: search cues, experience cues and credence cues [11, 41], with different levels of abstraction [64]. Search cues are visible before purchase and enable the consumer to judge the quality of the product. Experience cues can only be observed and verified after consuming the product, and credence cues are hidden, that is, they cannot be observed or verified by the consumer at any time, not even after consumption.

Based on this classification, it is possible to divide goods into three classes, search goods, experience goods and credence goods, depending on the nature of their predominant characteristics. Food has been traditionally characterised as an experience good [55], although the crises that have affected the food industry in recent years, together with growing concern over issues such as health, animal welfare, respect for the environment, among others, have resulted in food products gaining more and more credence attributes, requiring higher levels of abstraction in the mind of the consumer [22, 23, 56].

Consumers' perception of these characteristics is based on information processes and the formation of inferred beliefs [14, 31]. The perceived value of a food product leads to a belief in the consequences or benefits to be derived from its

consumption, which vary according to its characteristics. In order to learn how consumers infer subjective quality from objective quality, it is necessary to know how they link the characteristics of the product with the consequences of consuming it [18]. In the last 30 years, the concept linking product characteristics to basic purchase motivation has been examined by using the “means-end chain” theory [26, 43, 70].

This issue provides the main focus of this study, which sets out to analyse how consumers infer subjective quality from objective quality, by exploring the ways in which they link product characteristics with the consequences and values derived from consuming it. At the same time, we will try to analyse whether a consumer’s choice structure differs according to the type of goods with which she is confronted. In more specific terms, the aim is to investigate whether the degree of abstraction in the purchase decision process is higher for products presenting a greater number of hidden cues, that is, those that cannot be directly observed and judged by the consumer. This, if confirmed, will have implications for the marketing of this type of product.

The remainder of this article is structured into his four sections. Section 2 deal describes the underlying concept of the means-end chain theory. Section 3 focuses on the methodology used in the study. Section 4 presents the main findings and section 5 summarises the conclusions and identifies the main limitations and possible extensions of the research.

II. THEORETICAL FRAMEWORK. THE MEANS-END CHAIN THEORY.

The basic tenets of the “means-end chain” theory were put forward by the psychoanalysts Tolman (1932) and Smith (1934) and the economists Abbot (1955) and Norris (1941), but it was Gutman (1982) who introduced this approach to the field of marketing and consumer research. Gutman (1982) oriented the means-end chain towards the exploration of consumer knowledge of consumer behaviour. The means-end chain is therefore a cognitive structure that links the consumer’s knowledge of products to his personal knowledge of certain consequences and values [12, 16, 35, 53, 61, 69]. The fundamental principle of the theory is that the significance of product, service or behavioural patterns is stored in the memory in the form of a chain of hierarchically related elements.

The means-end chain (MEC) approach runs parallel with the origin of attitude research represented by Rosenberg’s expectancy-value theory (1956), which claims that consumer actions have consequences that are subsequently related to certain product attributes [4]. The main premise is that consumers learn to select those products that feature the attributes that allow them to achieve their desired consequences [10, 16, 25, 44, 48, 61, 67]. The MEC theory assumes that people base their purchase decisions not on the products themselves, but on the benefits to be gained from their consumption [36].

Food purchase decisions tend to be influenced by symbolic and emotional factors, [9, 20, 57] and the “means-end chain” theory may be able to shed some light on how automatic, unconscious and/or emotion-based decisions are made [20, 42, 44].

The means-end chain theory suggests that product knowledge in consumers is hierarchically organised by levels of abstraction [26, 29, 50, 68]. The higher the level of abstraction, the stronger and more direct the relationship with the person (Olson & Reynolds, 1983). A product attribute is not important for its own sake, it becomes important from the moment it begins to represent desirable or undesirable consequences, which are then transformed into personal values [42]. A chain begins with a product attribute and establishes a sequence of links with personal values through the consumer's perceptions of the consequences or benefits to be derived from certain attributes of the product, service or behaviour. In that sense, [13] indicate that the hierarchical models demonstrate superior ability to predict behaviours in two food items.

In the analysis of mental images, each basic level of abstraction can be subdivided into sublevels, leading to distinct categories of abstraction. In this respect, [67] proposed six levels in the means-end chain; the three lower levels (concrete attributes, abstract attributes and functional consequences) make up the consumer's product knowledge, while the three upper levels (psychological consequences, instrumental values and terminal values) make up the consumer’s self-knowledge. Concrete attributes are those properties or characteristics of the product, service or behaviour that may be preferred or sought by consumers; abstract attributes are those that cannot be verified without consuming the product and must therefore be inferred from internal or external information sources. Functional consequences are the benefits the customer derives directly from the attributes of the product or service consumed. Psychological consequences are the more personal or social and less tangible consequences. Instrumental values are intangible goals related to the behavioural channels through which terminal values can be satisfied. Finally, terminal values are preferred end states.

This methodology has been used in several studies aimed at analysing the consumer choice structure in a variety of products [15, 25, 32, 34, 37,51, 63, 66, 69], variation in the choice structure in relation to consumption frequency [8, 16], in different countries [5, 42, 61] and using different laddering techniques [53]. There is however no reference in the literature to studies analysing the impact of the relative amount of search, experience and credence cues presented by a product on the degree of abstraction in the choice structure. This is the differentiating feature of the present study.

III. METHODOLOGY.

The data required for the purposes of this research were collected in Navarra (a region in northern Spain that can be considered representative of Spanish average consumption patterns) in March 2006 by means of an ad hoc personal survey of a sample of main household food shoppers. In the first section, respondents were asked about their consumption habits in relation to three products: rice, wine and a functional food¹. They were also presented with different product attributes and asked to indicate the importance they attached to them when shopping for the three products². In part two of the questionnaire, the necessary methodology (laddering interviews) was used to elicit the means-end chains produced by the respondents for each of the products presented to them. The third and final part of the survey dealt with the main socio-demographic characteristics of the respondents.

The means-end chain is usually measured by means of a qualitative interviewing technique known as laddering, initially developed by Hinkle (1965) [19, 47, 48, 49], and later enhanced and refined by several authors. The laddering technique takes the form of a personal, individual, in-depth, semi-structured interview, aimed at detecting the attribute-consequence-value associations made by consumers with respect to a product, as described by a number of authors who have made use of this methodology [6, 7, 10, 12, 26, 42, 46, 48, 61].

There are three stages in the laddering process: the selection of the product attributes relevant to the analysis; the in-depth interviews; and the analysis of findings. In the first stage, various procedures are used to identify the relevant attributes of the product in question. In the second stage, subjects are questioned by means of probing techniques, typified by the question: "Why is it important to you?", in order to elicit from the respondents the reasons why the attributes selected for their relevance in the first stage of the survey are important to them in terms of the associated consequences and values. In the third stage, the concepts identified in the interviews are classified into a few categories, and the linkages between them are entered on an implication matrix from which a hierarchical value map (or HVM) is then constructed [6, 7, 10, 39, 42, 46, 61].

The attributes selected for the attributes-values matrix were drawn from the reviewed literature, and consultation with experts through a pilot survey, which resulted in eighteen concrete and abstract attributes of rice (an experience good), 11 of wine (a search good) and 13 of the functional food (a credence good), all of which are listed in the Appendix (Table 1A). Similarly, drawing on the reviewed literature on the means-end chain and laddering analysis, we extracted the consequences found to be most relevant in prior research, which gave us 19 functional and psychological consequences to be derived from the consumption of rice, 21 for wine and 23 for the functional food (Appendix, Table 1A). Finally, for the values we used in all cases the LOV (list of values) proposed by [33], and later modified to form the Rokeach Value Survey (RVS), which includes nine instrumental and terminal personal values that are relevant to consumer behaviour (shown in Table 1A in the Appendix).

The data in this part of the questionnaire were gathered by means of the "Association Pattern Technique", better known as the APT technique, which was introduced by Ter Hofstede et al. in 1998 and is considered appropriate for samples of more than 50 individuals [2, 27, 54]. This method comprises two independent matrices: an attribute-consequence matrix and a consequence-value matrix.

One of the main issues to be considered when working with hierarchical value maps is the determination of the cut-off point, which marks the number of linkages to be allowed on the map [35]. It is tricky to decide what frequency of linkages or relationships between two levels of abstraction is the most significant or important and therefore worth reflecting on the HVM. A high cut-off level (only high frequency linkages are shown) simplifies the map because it reduces the number of linkages, but it may lead to the loss of important information. A low cut-off level (map also shows low frequency linkages) results in a complicated map that is more difficult to interpret. Most of the various cut-off determination methods put forward in previous research [45], agree that a good cut-off point is one that leads to a solution providing the maximum amount of information together with the optimum degree of readability [1, 49].

The method used to determine the cut-off point in our study is that recommended by [35], known as the "top-down ranking" method and based on the premise that all respondents will not necessarily form the same number of linkages between levels of abstraction (it is commoner to see a larger number of linkages at the lower levels of abstraction than at the higher levels). Hence, it may not be wise to use the same cut-off level when the number of linkages differs across levels of abstraction. The strategy applied in this method is to determine the cut-off point following the notion of the linkage of "importance". The most important linkage is associated with the highest frequency entry. In other words, importance is determined by the order in the ranking of entry cells. In this way, different HVMs are obtained for different orderings. HVM1 shows the most important linkages and is also the simplest and easiest to interpret of all the possible HVMs, the process is then repeated at each level successively. The advantage of this method is that it allows us to observe one by one

¹ A functional dairy product with an immunological effect.

² The importance of the attributes was measured on a five-point Likert scale, where 5 indicated the highest level of importance.

the most important linkages between each two levels, while also allowing us to compare groups at the same cut-off level. The ranking cut-off level method also allowed us to incorporate a reasonable amount of the initial data in the final analysis of variance

The decision to use a convenience sample [27] in this study was due to the fact that [65] considered convenience samples admissible for use with laddering methodology, and also to the complexity of the process and to the fact that the respondents are familiar with the product and therefore able to express more ideas about it. In this case, the sample was made up of 70 individuals contacted by personal invitation through an e-mail. This size of sample is consistent with those observed in most of the previous research in which this technique has been employed.

Table 1 shows the characteristics of the sample and the regional population for purposes of comparison. The sample and the population can be seen to differ in gender distribution, the population of Navarra being made up of almost equal numbers of men and women, while the sample was clearly female-dominated. This was because the survey was conducted on main household shoppers, the majority of whom turned out to be women, as supported by most studies. Average age, meanwhile, can be seen to be similar in both contexts, as is family size. Finally, there are significant differences between the educational level of the respondents and the population of Navarra as a whole, since the highly-educated in the sample outweigh the middle-educated in percentage terms. Nevertheless, prior research on the consumption of the three products in question has not found educational attainment to be a key determining variable, which is why this sample is considered to provide a good approximation of consumer behaviour in the population of Navarra.

Table 1. Characteristics of the sample and the Navarra (Spanish region) population as a whole

	Sample	Spanish region Navarra
Sex		
Male	25.8%	49.77%
Female	74.2%	50.23%
Average age	40.3	40.5
Size of household	2.80	2.90
Level of education		
Elementary	6.5%	18.67%
Intermediate	17.7%	52.24%
Higher	75.8%	29.09%

Source: National Statistics Institute (INE) (Spain) (2007) and authors' own calculations

Interviewing was conducted in groups of approximately 10 people who were given an explanation of the content of the different parts of the questionnaire and instructions for completion. Special emphasis was placed on the laddering methodology; and an example was given of the means-end chain relationship to ensure a fuller understanding of the process. Each interview took from 40 to 60 minutes. MECANALYST PLUS 1.0.8. software was used in the data analysis, the main findings of which are presented below.

IV. RESULTS

As stated earlier, one of the aims of this research was to learn more about variations in the consumer choice structure relating to the relative number of hidden product attributes that can not be directly observed and verified by the consumer. We began by applying the information economy classification to group the attributes of the three sample products to be put to the consumers by type, that is, search, experience and credence. Table 2 shows the average scores assigned to each of the attributes of each product³. The main experience attributes can be seen to be flavour, organoleptic quality, nutritional value and convenience. It is also worth noting that rice has more of this type of attributes than either wine or the functional food. With respect to the search characteristics common to all three products, it is worth noting the importance of price and labelling. Wine clearly dominates both of the other products in terms of its associated search characteristics. Observation shows that the last group, that is, the credence or confidence attributes are more numerous in the functional food, which is consistent with existing research literature on the subject, where functional foods are considered credence products [3, 17, 60, 62]. Based on the predominating characteristics in each case, and with a view to making the sample products more easily identifiable, we decided to classify rice as an experience good, wine as a search good and the functional food as a credence good⁴.

³ Missing scores correspond to attributes that were specific to one or two products.

⁴ The main differences between products revealed by the statistical tests are in search attributes, followed by experience attributes.

Table 2 . Mean scores of product attributes

Attributes	Experience good		Search good		Credence good		Statistical Test of differences	
	Rice	Wine	Wine	Functional	Value	Sig.		
<i>Experience attributes</i>								
Flavour	3.70	3.22		3.94	104.9	0.000		
Organoleptic Quality	4.00	--		3.82	4.180	0.017		
Traditional food	2.75	--		--	--	--		
Nutritional value	3.16	--		3.26	0.657	0.580		
Convenience	2.85	--		3.00	1.557	0.214		
Versatility	2.62	--		--	--	--		
Alcohol content	--	2.00		--	--	--		
Vintage	--	3.78		--	--	--		
Type of wine	--	3.78		--	--	--		
<i>Search attributes</i>								
Price	3.08	3.60		3.41	2.52	0.041		
Quality Label	2.85	4.10		--	22.78	0.000		
Origin	2.26	4.05		--	11.08	0.000		
Label	3.16	3.73		2.60	11.62	0.000		
External appearance	--	--		2.10	--	--		
Convenience	2.85	--		3.00	1.557	0.214		
Prestige	--	2.70		--	--	--		
Image	--	2.65		--	--	--		
Alcohol content	--	2.00		--	--	--		
Vintage	--	3.78		--	--	--		
Type of wine	--	3.78		--	--	--		
Manufacturer's guarantee	--	2.94		--	--	--		
<i>Credence attributes</i>								
Origin	2.26	4.05		--	--	--		
Nutritional value	3.16	--		3.26	0.657	0.580		
Organic	2.15	--		--	--	--		
Low in cholesterol	--	--		2.50	--	--		
Immunological effect	--	--		2.90	--	--		
Positive health benefit	--	--		3.51	--	--		
Health guarantee	--	--		3.94	--	--		

Following this characterisation, hierarchical value maps (HVM) were then constructed for each product. In all cases we present the level 8 HVM, that is, the map showing all the attribute-consequence and consequence-value linkages at and above the frequency of the eighth linkage in order of importance (Table3). The resulting cut-off point, following the methodology proposed by [35], is different for each level of abstraction and product, as shown in Table 3, comparison between maps still being possible. The respondents formed a total of 3,173 linkages for the experience good, 4,415 for the search good and 4,943 for the credence good.

Table3 : Cut-off level at the 8 levels of abstraction and percentage of total cases

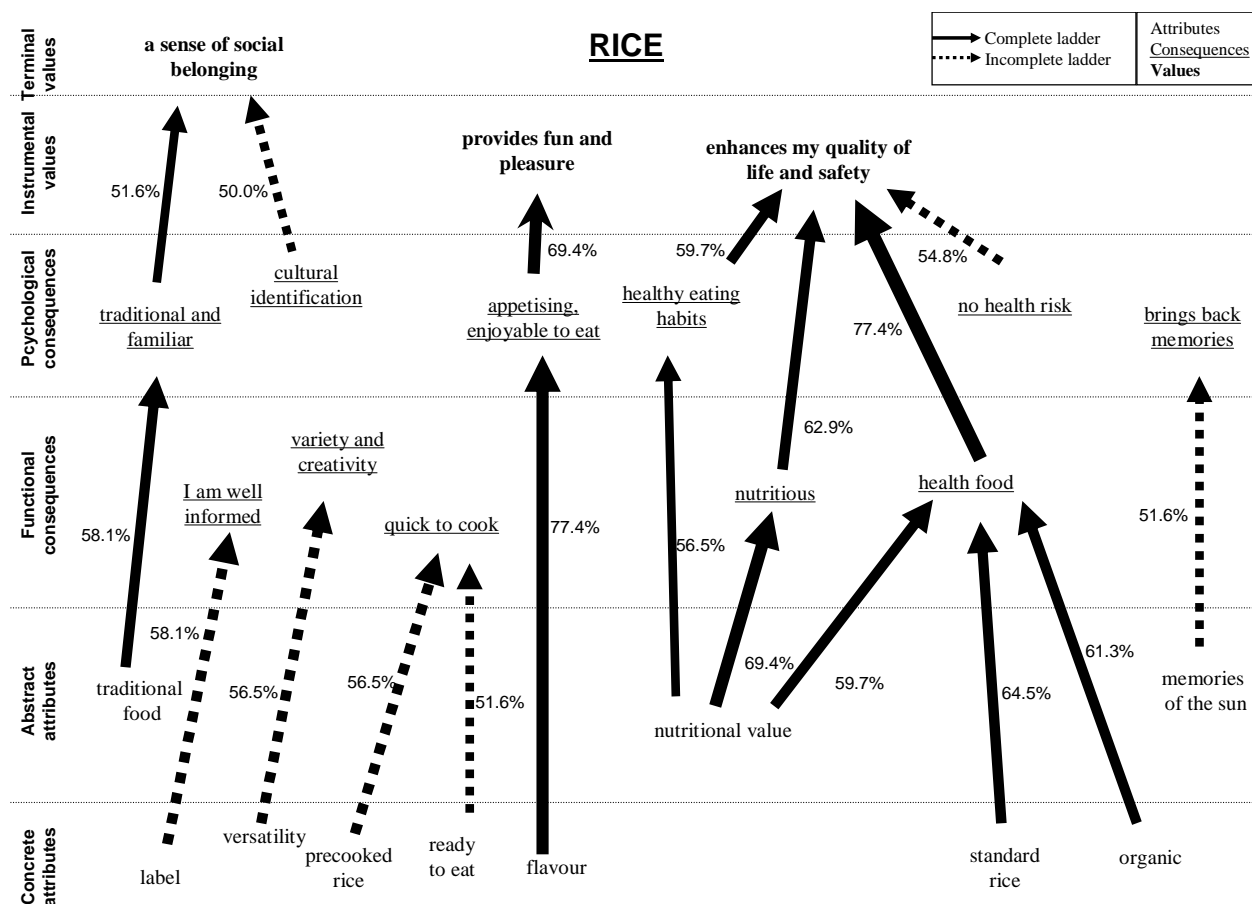
		Experience good		Search good		Credence good	
		Rice	%	Wine	%	Functional	%
Level 1	AC ^a	48	77.4	55	78.6	63	90.0
	CV ^b	48	77.4	54	77.1	61	87.1
Level 2	AC	43	69.3	46	65.7	55	78.6
	CV	43	69.3	52	74.3	56	80.0
Level 3	AC	40	64.5	45	64.3	53	75.7
	CV	39	62.9	49	70.0	53	75.7
Level 4	AC	38	61.3	40	57.1	52	74.3
	CV	37	59.7	45	64.3	49	70.0
Level 5	AC	37	59.7	39	55.7	50	71.4
	CV	34	54.8	41	58.6	47	67.1
Level 6	AC	36	58.1	36	51.4	46	65.7
	CV	32	51.6	40	57.1	46	65.7
Level 7	AC	35	56.5	35	50.0	45	64.3
	CV	31	50.0	35	50.0	40	57.1
Level 8	AC	32	51.6	33	47.1	44	62.8
	CV	30	48.4	32	45.7	37	52.8

^a Attribute-Consequence; ^b Consequence -Value

The credence product presents the highest cut-off points at all levels, which seems to suggest that consumers are able to make more connections where this functional food is concerned, suggesting that their HVMs will be more complex and their choice structures will involve a higher degree of abstraction.

Figures 1, 2 and 3 show the HVM for each selected product type at a cut-off level of eight. For all the means-end chain components (attributes, benefits and values) shown on the maps, we give the percentage of respondents who made the linkage. The generally high observed frequency, over 55% in most cases, gives a first impression of the relevance of the connections shown on the maps.

Figure 1: Hierarchical value map for the experience good^a (rice) at a cut-off level of 8.

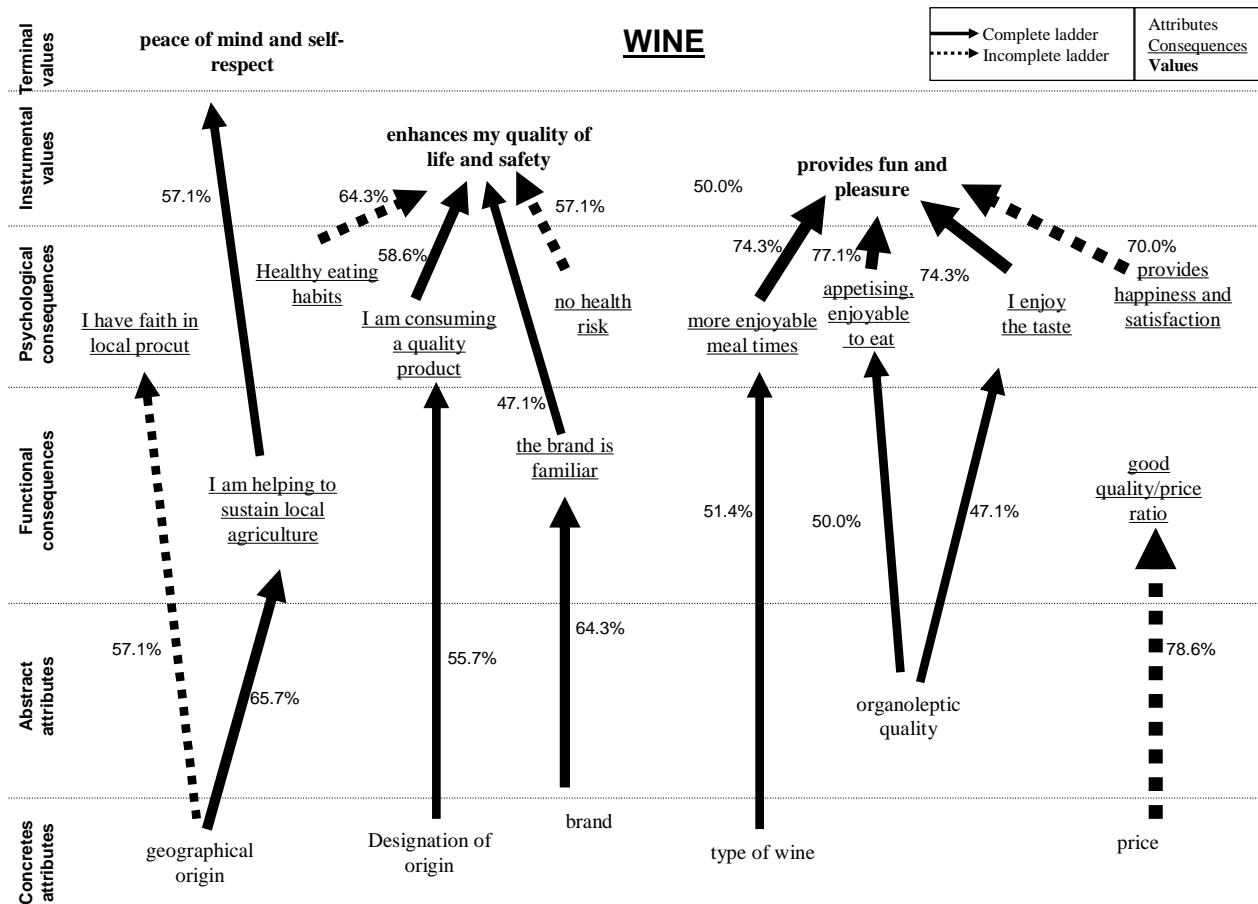


^a The percentages shown on the graph indicate the percentage of respondents who made the linkage.

Initial partial analysis of the results reveals interesting similarities between the three products. Thus, in terms of their attributes, the concrete features more strongly than the abstract, this being more noticeable in the experience and search goods than in the credence good. Attributes relating to “flavour” and “organoleptic quality” and “labelling” contribute to the consumer appeal of all three foods. The concrete attributes “price” and “brand” are important only in the search good (wine) and the credence good (the functional food), showing that consumers rely on these search cues to judge the quality of these products. To mention some of the specific attributes of the three study products that arouse a particular degree of interest in the respondents, “variety” is important in the case of rice, the quality seal (“Designation of Origin”) in that of wine, and the potential health benefits (“positive health benefit” and “low in cholesterol”) in the case of the functional food.

As far as the consequences or benefits are concerned, psychological factors prevail over functional factors in all cases, which gives an idea of the complexity of the consumer choice structure with respect to these products, where the consumer's self-knowledge starts to play a role. More consequences can be seen to be associated with the product featuring the largest number of credence attributes (the functional food), which reveals a more complex decision structure.

Figure 2: Hierarchical value map of the search good^a (wine) at a cut-off level of 8.



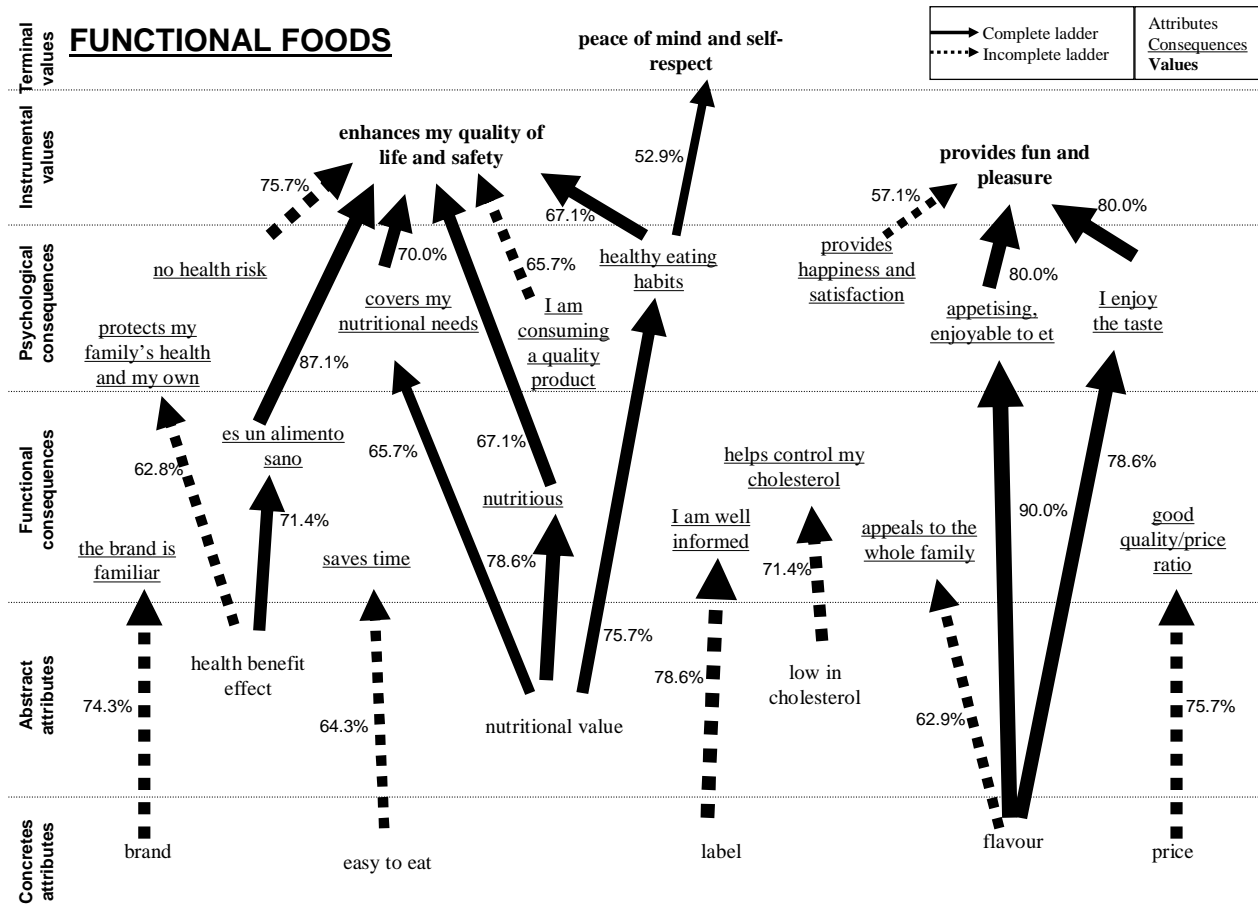
^aThe percentages shown on the graph indicate the percentage of respondents who made the linkage.

If we were to make a more detailed analysis of the consequences, we would have to point out that the psychological benefits “I have healthy eating habits”, “appetising and enjoyable to eat” and “no health risk” form part of the consumer appeal of all three goods, and relate in every case with the impact of food on health. There are nevertheless other abstract benefits in which these three products differ. Thus, “I find it traditional and familiar”, “gives me a sense of cultural identity” and “brings back memories” are key factors only in the experience good (rice), which appears to suggest that the consumption of this product is linked with tradition. The main factors in the case of the credence good (the functional food) are “keeps me and my family healthy” and “covers my nutritional needs”, thus revealing the predominance of the food-health link.

In the area of functional consequences, it is possible to observe certain similarities, such as “I am familiar with the brand”, “I’m well-informed” and “good quality/price ratio”, all of which are facets of information seeking. Differences can also be observed, however, particularly with respect to the versatility and speed of preparation of rice (“it takes little time to cook” and “it adds variety and creativity to my cooking”), the perception of supporting local agriculture with respect to wine, and the universal appeal of the functional food to all members of the family. Thus, observations across the three products show that, as the presence of non-verifiable attributes in the product increases, so do the factors influencing the choice process, the main product characteristics taken into account being those relating to health, enjoyment and cultural identification.

As far as values are concerned, the same number of values is attached to each of the three products, all of them presenting a common link with the instrumental values “enhances my quality of life and safety” and “provides fun, pleasure and enjoyment”. The associated terminal values differ across the three products, with consumers stating that the experience good (rice) gives them “a sense of social belonging”, while the terminal value associated with the other two products is “gives me peace of mind, dignity and self-respect”. It can be seen that consumers express a greater sense of self-confidence, self-satisfaction and commitment in relation to the consumption of wine and the functional food.

Figure 3: Hierarchical value map of the credence good^a (functional food) at a cut-off level of 8.



^a The percentages shown on the graph indicate the percentage of respondents who made the linkage.

Summing up this first stage in the analysis of the results, the first key finding is that all three products involve complex decision structures, since the associated means-end chains feature all three types of level, that is, attributes, consequences and values. The complexity of the decision structures has also been seen to increase with the presence of attributes that are non-verifiable even when consuming the product, since this implies the influence of issues involving a higher level of abstraction.

A more detailed analysis of these initial results can be made at a second stage. In this way, we aim to advance beyond these results in order to gain a deeper understanding of how chains of attributes, consequences and values are formed in the mind of the purchaser. In relation to the ladders or chains created in this way, there are two linkages that are shared by all three goods. The first of these is the complete ladders leading from “flavour” and “organoleptic quality” to the psychological consequence “appetising and enjoyable to eat” and the instrumental value “provides fun, pleasure and enjoyment”. This appears to suggest that one of the reasons for purchasing a given food item is the enjoyment to be derived from eating it, an association that is hardly surprising in the food market. The second is the incomplete ladder connecting the psychological consequence “no health risk” with the instrumental value “enhances my quality of life and safety”, once again revealing consumers’ health concerns.

The experience good (rice) stands out for the importance consumers attach to its “nutritional value”, which results in three complete ladders, all involving the nutritional and healthful attributes of the product. Another important issue, noted earlier, is the perception of this product as a traditional food, the consumption of which makes them feel part of a social group. In the case of the search good (wine), brand and quality labels (traditional search cues) adopt a key role, being associated by consumers with “I am consuming a quality product” and “enhances my quality of life and safety”. Finally, in the case of the functional food (credence good) the association of the attribute “health benefit effect” with the consequence “it’s a healthy

food” or “nutritional value” predominates over that with the consequences “I have healthy eating habits” and “covers my nutritional needs”, all of which lead to the terminal value “enhances my quality of life and safety”.

All these findings raise the question of possible consumption variation across the three products considered. Thus, the dominant features in the experience good are the experience attributes (“memories of summer”, “cultural identification”, and “tradition”), all of which make reference to custom or tradition in relation to the consumption of this product. In the case of the search good it is precisely search cues (“brand”, “Designation of Origin”, “type of wine”, and “price”) that provide the main cues to enable the consumer to judge the quality of the product. It is in the last of the three, the credence good (functional food), that credence cues (“low in cholesterol”, and “health benefit effect”) both of which refer to the health benefit to be derived from its consumption reach their maximum relevance and can be identified by consumers through brands, labels and price.

Tables 4 and 2A in the Annex show the ladders, both complete and incomplete, for each product, broken down by type of attribute, consequence and value. At the lower end of the abstraction scale (concrete attribute-functional consequence-instrumental value) we find the experience good (rice). At the upper end, we find the ladder with the highest level of abstraction (abstract attribute-psychological consequence-terminal value) associated with the credence good, illustrating the possibility of a higher level of abstraction for this type of good.

Table 4. Complete ladders for each food group

Attributes	Consequences	Values	Experience good	Search good	Credence good	
			Rice	Wine	Functional	
Concrete	Functional	Instrumental	2	-	-	
		Terminal	-	1	-	
	Psychological	Instrumental	1	3	2	
		Terminal	-	-	-	
	Abstract	Functional	Instrumental	2	-	2
			Terminal	1	-	-
Psychological		Instrumental	-	2	2	
		Terminal	-	-	1	

For a deeper analysis of the degree of abstraction in the linkages made around these products, Table 5 offers a summary of the average number of attributes, consequences and values of each type. As revealed by the statistical tests performed, there are significant differences across the six levels shown (concrete and abstract attributes, functional and psychological consequences and instrumental and terminal values). In terms of the number of concrete attributes, the experience good has most, followed by the search good and the credence good in that order. This order is reversed in the case of the number of abstract attributes, where the credence good comes first (3.50 versus 3.42 and 2.69). These results are consistent with the theory that the complexity of the decision structure increases with the degree of abstraction involved, in the same sense that the difficulty of the decision making process increases with the number of product attributes. There is also an increase in the number of more abstract consequences or benefits in the case of the credence good (12.15 versus 11.58 and 8.16), and the same is also found for the values, which are more numerous in association with the credence good than with either the search or experience goods.

Table 5. Average number of attributes, consequences and values for each product category

	F	Experience good	Search good	Credence good
		Rice	Wine	Functional
Concrete attributes	292.384***	13.05	8.36	7.26
Abstract attributes	15.196***	2.69	3.42	3.50
Functional consequences	78.563***	7.83	4.89	4.56
Psychological consequences	27.814***	8.16	11.58	12.15
Instrumental values	14.491***	2.87	3.25	3.58
Terminal values	5.577***	3.06	3.40	3.87

*** P< 0.01

These results suggest that in products in which there is a strong presence of hidden attributes, that is, those that cannot be evaluated directly by the consumer, the level of abstraction in the decision structure increases towards the highest theoretical levels mentioned by [67] and hence includes a greater number of values, which form the final link in the means-end chain. In other words, as this article has shown, the consumers of credence goods tend to a higher degree to use the attributes of the product to pursue personal values in their purchase decisions. Put another way, the more product attributes influencing the purchase decision, the deeper the involvement of the consumer and her personal values in the final choice. Markets are likely

to increase in complexity with the growing presence of products with more demanding product-attribute design requirements.

V. CONCLUSIONS

The observation of consumer behaviour trends in developed countries reveals major changes in consumption habits, such that, with the nutritional needs of most consumers already covered, there is a growing tendency to purchase foods in order to obtain quality and emotional benefits. Thus, the ability to identify and understand the process by which consumers' purchase decisions are conditioned by aspects of their personality can help marketers to improve their strategic positioning. The key role played by emotional benefits in the daily life of consumers, especially in light of the growing importance of credence attributes in today's products, suggests increasing complexity in terms of both product definition and the sequentiality of the purchase decision.

This study therefore set out to test the importance of the role played in the purchase decision by consumers' emotional responses towards products and the benefits they expect to obtain from consuming them. Thus, the main aim of this analysis focused on variation in the complexity of the decision structure as a function of the number of hidden attributes of the food product, that is, those that consumers are unable to verify either at the time of purchase or consumption. This general aim was achieved by employing means-end chain methodology and laddering interviews to elicit consumers' responses to three products with different relative amounts of experience, search and credence attributes.

The resulting hierarchical value maps suggest that food in general, and in particular the three items selected for this analysis (rice, wine and a functional food), induce an emotional reaction in consumers that appears to increase in complexity with the number of credence characteristics featured by the product. This is illustrated by the higher degree of abstraction observed in association with the credence good, suggesting that consumers incorporate credence characteristics into the cognitive processes that later influence their decision structures. The degree of abstraction observed in the experience good is also higher than in the search good.

The main implication of these results lies in the finding that consumers' decision-making processes are no longer based solely on their product knowledge, they are also becoming increasingly influenced by their self-knowledge, the role of which becomes more significant when the purchase decision involves one of the growing number of credence goods in the marketplaces of all developed countries (functional foods, organic produce, etc.). This opens up some interesting opportunities for the marketers of food products, since consumer personality analysis, especially in so far as it reveals the psychological benefits and terminal values pursued by consumers, can serve product managers in charge of so-called credence goods as a useful tool for designing information and advertising campaigns and informing product positioning strategies.

Finally, we need to mention the limitations of the present study when it comes to generalizing the results to other markets. They relate mainly to the size of sample from which the data were drawn and possible variations in attributes, consequences and values. The extension of this survey to other areas and products, or to a larger sample, might be useful to obtain further support for the results reported above.

References

1. Audenaert A & Steenkamp J-BEM (1997) A consumer-oriented approach to the marketing of food products: application of means-end chain theory to the consumption of beef. In Wierenga B, Van Tilburg A, Grunert K, Steenkamp JB EM & Wedel M *Agricultural Marketing and Consumer Behaviour in a Changing World*. Kluwer Academic Publishers.
2. Bagozzi N, Dabholkar (1994) Consumer recycling goals and their effects on decisions to recycle: a means-end chain analysis. *Psychol Market* 1 (4) (July-August): 313-340.
3. Bech-Larsen T, Grunert K G (2003) The perceived healthiness of functional foods: a conjoint study of Danish, Finnish and American consumers' perception of functional foods". *Appetite* 40, 1: 9-14.
4. Botschen G, Hemetsberger A (1998) Diagnosing means-end structure to determine the degree of potential marketing program standardization. *J Bus Res* 42: 151-159.
5. Bredahl L (1999) Consumers' cognitions with regard to genetically modified foods. Results of a qualitative study in four countries. *Appetite* 33: 343-360.
6. Brunso T A, Fjord TA, Grunert K G (2002) Consumers' food choice and quality perception. MAPP Working Paper, 77 (January).
7. Chiu C M (2005) Applying means-end chain theory to eliciting system requirements and understanding users perceptual orientations. *Inform Manage-Amster* 42: 455-468.
8. Claeys C, Swinnen A, Vanden Abeele P (1995). Consumer's means-end chains for "think" and "feel" products. *Int J Res Mark* 12, 3, October: 193-208.
9. Costa A I A, Schoolmeester D, Dekker M, Jongen W M F (2003). To cook or not to cook: a means-end chain study of the motivations behind meal choice. In A I A Costa, (Ed) *New insights into consumer-orientated food product design* (167-198). Ed. Ponson & Looyen. Wageningen.
10. Costa A I A, Dekker M, Jongen W M F (2004). An overview of means-end theory: potential application in consumer-oriented food product design. *Trends Food Sci Tech* 15: 403-415.

11. Darby M R, Karni E (1973) Free competition and the optimal amount of fraud. *J Law Econ* 16 April: 67-86
12. De Boer M, McCarthy M B (2003) Means-end chain theory applied to Irish convenience food consumers. 83rd EAAE Seminar Food quality products in the advent of the 21st century, Chania (Greece), September.
13. Dubé L, Cervellon M C, Jingyuan H (2003). Should consumer attitudes be reduced to their affective and cognitive bases? Validation of a hierarchical model. *Int J Res Mark* 20, 3: 259-272.
14. Fishbein M, Ajzen I (1975) Attitudes towards objects as predictors of single and multiple behavioural criteria. *Psychol Rev* 81(1):29-74.
15. Flight I, Russell C G, Blossfeld I, Cox D N (2003) From sensory attributes to marketing hooks: using laddering to understand consumer perceptions of red meat. *Food Aus* 55:418-424.
16. Fotopoulos C, Krystallis A, Ness M (2003) Wine produced by organic grapes in Greece: using means-end chains analysis to reveal organic buyers' purchasing motives in comparison to the non-buyers. *Food Qual Prefer* 14: 549- 566 .
17. Frewer L, Scholderer J, Lambert N (2003) Consumer acceptance of functional foods: issues for the future. *British Food J* 105 (10): 714-731
18. Grunert K G (1995) Food quality: a means-end chain perspectives. *Food Qual Prefer* 6: 171-176.
19. Grunert K G, Grunert S C (1995) Measuring subjective meaning structures by the laddering method: theoretical considerations and methodological problems. *Int J Res Mark* 12: 209-225.
20. Grunert K G, Grunert S C, Sørensen E (1995) Means-end chains and laddering: an inventory of problems and an agenda for research. Working Paper n° 34. Aarhus: MAPP Center.
21. Grunert K G, Larsen H H, Madsen T K, Baadsgaard K (1996) Market orientation in Food and Agriculture. Kluwer Academic Publishers. Boston.
22. Grunert K G, Brunsø K, Bredahl L (1998) Food-related lifestyle in France and Germany. En *New Developments and Approaches in Consumer Behaviour Research*, I Balderjahn, C. Menniken & E. Vernet. Stuttgart: Schäffer/Poeschl-MacMillan, 1-15.
23. Grunert K G, Bech-Larsen T, Bredahl L (2000) Three issues in consumer quality perception and acceptance of dairy products. *Int Dairy J* 10: 575-584.
24. Grunert K G, Lähteenmäki L, Nielsen N A, Poulsen J B, Ueland O, Aström A (2001) Consumer perceptions of food products involving genetic modification: results from a qualitative study in four Nordic countries. *Food Qual Prefer* 12: 527-542 .
25. Grunert K G, Valli C (2001) Designer-made meat and dairy products: consumer led product development. *Livest Prod Sci* 72: 83-98.
26. Gutman J (1982). A Means-End Chain Model Based on Consumer Categorization Processes. *J Marketing*, 46 (Spring): 60-72.
27. Gutman J, Alden S D (1985). Adolescents' cognitive structures of retail stores and fashion consumption: a means-end chain analysis of quality. In: Jacoby, J.; Olson, J.C. (eds.). *Perceived quality: how consumers view stores and merchandise* (99- 114). Lexington Books, Lexington.
28. Hanf J H (2003) Product quality versus emotional benefits?. 83rd EAAE Seminar "Food quality products in the advent of the 21st century", Chania (Greece), septiembere.
29. Howard JA (1977) *Consumer behavior: application of theory*. Ed. McGraw-Hill, New York.
30. Issanchou S (1996) Consumer expectations and perceptions of meat and meat products quality. *Meat Sci* 43: S5-S19.
31. Jacoby J, Jaccard J J, Currim I, Kuss A, Ansari A, Troutman T (1994) Tracing the impact of item-by-item information accessing on uncertainty reduction. *J Consum Res* 21: 291-303
32. Jaeger S R, MacFie H J H (2000) Incorporating "health" into promotional messages for apples: a means-end theory approach. *J Food Prod Marketing*. 6(2): 57-78.
33. Kahle L R, Beatty S E , Homer P (1986) Alternative measurement approaches to consumer values: the list of values (LOV) and values and life style (VALS). *J Consum Res* 13: 405-409.
34. Krystallis A, Ness M (2003) Motivational and cognitive structures of Greek consumers in the purchase of quality food products. *J Int Consum Marketing* 16 (2): 7-36 .
35. Leppard P, Russel C G, Cox D N (2004) Improving means-end-chain studies by using a ranking method to construct hierarchical value map. *Food Qual Prefer* 15: 489-497.
36. McAlister L (1982). A dynamic attribute satiation model of variety seeking behavior. *J Consum Res* 9:141-150.
37. Makatouni A (2002) What motivates consumers to buy organic food in the UK?". *British Food J* 104, 3/4/5: 345-352.
38. Mecanalyst plus. Versión 1.0.8. Italy.
39. Miele M, Parisi V (2000) Consumer concerns about animal welfare and food choice. Italian report on laddering interviews. March.
40. Mitchell A (1983). *Nine American Lifestyles*. Ed. Warner, New York.
41. Nelson P (1970). Information and consumer behaviour. *J Polit Econ* 78 (2): 311-329
42. Nielsen N A, Bech-Larsen T, Grunert K G (1998) Consumer purchase motives and product perceptions: a laddering study on vegetable oil in three countries. *Food Qual Prefer* 9: 455-466.
43. Olson J C, Reynolds T J (1983) Understanding Consumers' Cognitive Structure: Implications for Advertising Strategy. In L. Percy & A. Woodside (Eds.), *Advertising and Consumer Psychology*. Lexington, MA: Lexington Books.
44. Olson J C, Reynolds T J (2001) The means-end approach to understanding consumer decision making. In Olson, J.C.; Reynolds, T.J. *Understanding consumer decision making: the means-end approach to marketing and advertising strategy* (3-20). Ed. Mahwah, NJ: Erlbaum.
45. Pieters R, Baumgartner H, Allen D (1995) A means-end chain approach to consumer goal structures. *Int J Res Mark* 12: 227-244.
46. Poulsen C S, Juhl H J, Grunert K G (2003) A new approach to analyse data from laddering interviews. 83rd EAAE Seminar Food quality products in the advent of the 21st century, September, Chania (Greece).
47. Reynolds T J, Gutman J (1984) Laddering: extending the repertory grid methodology to construct attribute-consequence-value hierarchies. In *Personal Values and Consumer Psychology*, vol. II, Pitts, R.; Woodside, A. Ed. Lexington, MA: Lexington Books.
48. Reynolds T J , Gutman J (1988) Laddering theory, Method, Analysis and Interpretation. *J Advert Res* 28: 11-31.
49. Reynolds T J, Gutman J (2001) Advancements in laddering. In Olson, J.C.; Reynolds, T.J. (eds.). *Understanding consumer decision making: the means-end approach to marketing and advertising strategy* (91-118). Mahwah, NJ: Erlbaum.
50. Reynolds TJ, Gengler C E, Howard D J (1995) A means-end analysis of brand persuasion through advertising. *International J Advert Res* 28: 43-54.
51. Roininen K, Tuorila H, Zandstra E H, De Graaf C, Vehkalahti K (2001) Differences in health and taste attitudes and reported behaviour among Finnish, Dutch and British consumers: a cross-national validation of the health and taste attitude scales. *Appetite* 35 (1): 33-45.
52. Rosenberg M J (1956) Cognitive structure and attitudinal affect. *J Abnormal Soc Psychol* 53: 367-372.
53. Russell C G, Busson A, Flight I, Bryan J, Van Lawick J A, Cox D N (2004) A comparison of three laddering techniques applied to an example of a complex food choice. *Food Qual Prefer* 15: 569-583 .
54. Russell C G, Flight I, Leppard P, Van Lawick V P, Syrette J A, Cox D N (2004) A comparison of paper and pencil and computerised methods of hard laddering. *Food Qual Prefer* 15: 279-291.
55. Senauer B, Asp E, Kinsey J (1991) *Food trends and the changing consumer*. Eagan Press. Eagan , MN.
56. Steenkamp J-B E M (1989) *Product Quality: An Investigation into the Concept and how it is Perceived by Consumers*. Assen: Van Gorcum.

57. Steenkamp J-B E M (1997) Dynamics in consumer behavior with respect to agricultural and food products. En Wierenga B.; Van Tilburg A.; Grunert, K.; Steenkamp J-B.E.M. & Wedel M. *Agricultural Marketing and Consumer Behaviour in a Changing World* (pp. 217-230). Kluwer Academic Publishers.
58. Steenkamp J-B E M, Van Trijp H C M (1996) Quality Guidance: a consumer-based approach to Food Quality Improvement using Partial Least Squares. *Eur Rev Agric Econ* 23 (2): 195-215.
59. Teratanavat R P, Hooker N H, Haugtvedt C P, Rucker D D (2004) Consumer understanding and use of health information on product labels: marketing implications for functional food. *American Agricultural Economics Association Annual Meeting*, Denver, Colorado, 1-4 Agosto.
60. Teratanavat R P, Hooker N H (2006) Consumer valuations and preference heterogeneity for a novel functional food. *J Food Sci* 71, 7:S533-S541.
61. Ter Hofstede F, Audenaert A, Steenkamp J-B E M, Wedel M (1998) An investigation into the association pattern technique as a quantitative approach to measuring means-end chain. *Int J Res Mark* 15: 37-50.
62. Urala N, Lähteenmäki L (2004) Attitudes and consumers' willingness to use functional food. *Food Qual Prefer* 15: 793-803.
63. Valette-Florence P, Sirieix L, Grunert K G, Nielsen N (1999) Means-end chain analyses of fish consumption in Denmark and France: a multidimensional perspective. *J Euro-Marketing* 8,172: 15-27.
64. Van den Heuvel T, Van Trijp H, Van Woerkum C, Jan Renes R, Grenmen B (2007) Linking product offering to consumer needs, inclusion of credence attributes and the influences of product features. *Food Qual Prefer* 18: 296-304
65. Vannoppen J, Verbeke W, Van Huylenbroeck G, Viaene J (2001) Consumer valuation of short market channels for fresh food through laddering. *J Int Food Agribus Marketing* 12: 41-69.
66. Vannoppen J, Verbeke W, Van Huylenbroeck G (2001b) Motivational structures toward purchasing labelled beef and cheese in Belgium. *J Int Food Agribus Marketing* 12 (2): 1-29 .
67. Walker B A, Olson J C (1991) Means-end chains: connecting products with self. *J Bus Res* 22 (2):111-119.
68. Young S, Feigin B (1975) Using the benefit chain for improved strategy formulation. *J Marketing* 39: 72-74.
69. Zanolli R, Naspetti S (2002) Consumer motivations in the purchase of organic food. A means-end approach. *British Food J* 104: 643-653.
70. Zeithmal V A (1998) Consumer perceptions of Price Quality and Value: a Means-End Model and Synthesis of Evidence. *J Marketing* 52 (3): 2-22.

Annex

Table 1A. Identification classification of attributes, consequences and values for rice, wine and a functional food

ATTRIBUTES		E ^a	S	C	CONSEQUENCES			E	S	C	VALUES			E	S	C
Concrete attributes	-Flavour	X ^b		X	Functional consequences	-Health food	X		X	Instrumental values	- Provides fun and pleasure	X	X	X		
	-Quality label calidad (DO)	X	X			-Nutritious	X		X		- Enhances my quality of life and safety	X	X	X		
	-Geographical origin	X	X			-Appeals to the whole family	X		X		- Appeals to the emotions	X	X	X		
	-Label	X		X		-Money-saving	X				- More success	X	X	X		
	-Packaging	X		X		-Long life	X									
	-Standard rice	X				-Good results in the kitchen	X									
	-Long grain rice	X				-Easy to purchase	X									
	-Quick boil rice	X				-Quick to cook	X									
	-Precooked rice	X				-Variety and creativity	X									
	-Ready to heat	X				-More enjoyable meal times			X							
	- Price	X	X	X		-Good quality/price ratio			X		X					
	-Versatility	X				-I am well informed	X	X	X							
	-Brand	X	X	X		-I am helping to sustain local agriculture			X							
	-Type of wine	X				-Helps me interact socially			X							
	-Vintage	X				-I enjoy the taste			X		X					
	-Low alcohol			X		-I can buy it easily	X		X							
	-Easy to eat			X		-Helps my weight-watching					X					
	Abstract attributes	-Organoleptic quality	X	X		X	Psychological consequences	-Healthy eating habits	X		X	X	Terminal values	- A sense of social belonging	X	X
-Prestige			X		-Traditional and familiar	X		X		- Enhances interaction with others	X	X		X		
-Wine image			X		-Appetising, enjoyable to eat	X		X	X	- Self-fulfilment and attention to duty	X	X		X		
-Custom			X		-Feel I'm doing the right thing	X			X	- More respect from others	X	X		X		
-Nutritional value		X		X	-No health risk	X		X	X	- Peace of mind and self-respect	X	X		X		
-Calcium content				X	-Cultural identification	X		X								
-Low in cholesterol				X	-Brings back memories	X		X	X							
-Bifidus affect				X	-Makes me feel good				X							
-Manufacturer's guarantee				X	-I am consuming a quality product				X	X						
-Health benefit effect				X	-Status symbol				X	X						
-Traditional food		X			-I have faith in local products				X							
-Memories of the sun		X			-I feel relaxed				X							
-Organic		X			-It's genuine				X							
					-I am keeping up tradition				X							
					-Provides happiness and satisfaction				X	X						
					-Feeds my family properly					X						
					-Protects my family's health and my own					X						
					-Covers my nutritional needs					X						

^a E. Experience (rice); S: Search (wine); C: Credence (Functional). ^b oh Indicates its presence in the product category analysed.

Table 2A . Incomplete ladders for each food category .

Attributes	Consequences	Experience good	Search good	Credence good
		Rice	Wine	Functional
Concrete	Functional	4	1	5
	Psychological	-	1	-
Abstract	Functional	-	-	1
	Psychological	1	-	1

Consequences	Values	Experience good	Search good	Credence good
		Rice	Wine	Functional
Functional	Instrumental	-	-	-
	Terminal	-	-	-
Psychological	Instrumental	1	3	3
	Terminal	1	-	-