Food involvement and food purchasing behaviour

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Abstract. *This paper investigates the factors affecting product class involvement for food. Factors affecting specific aspects of involvement are also explored. The aim is to determine the factors that affect involvement with food and sketch the profile of consumers more likely to be involved or not involved with food. Building on the literature a conceptual model is developed and empirically tested using survey data collected from supermarkets in Athens. Data were analyzed using probit and ordered probit analysis and marginal effects were calculated which show how much the level of involvement or importance is affected when a variable is changed. Results show that younger consumers, those with higher education and income that engage in nutritional label use behaviour and do not prepare food for their household are more likely to have low involvement with food. Less distinctive characteristics are apparent for the highly involved consumers. Different consumer profiles are also associated with different aspects of food involvement based on importance attached to price, ease of preparation, nutrition, taste, and brand name.*

Keywords: product class involvement, food involvement, consumer behaviour, food shopping, attribute importance

1. Introduction

Almost 40 years have passed since Lancaster [1] published his now famous product characteristics theory. His theory reflected a new approach to consumer modeling that gave importance to product characteristics or attributes. Considered an extension of the neoclassical consumer theory, Lancaster's theory has been applied to goods whose attributes are additive and non- conflicting, e.g. the nutrient values of foods [2,3,4,5].

The impact of the product characteristics model was more profound on economic thought rather than on empirical implementations of it. Economists started looking at foods not just as consumption commodities but also as a bundle of attributes (see Fischer [6], Mitchell [7], Lazaridis and Drichoutis [8] for proposed classifications of food attributes). The question raised here is do consumers when purchasing really distinguish between product attributes? And if they do, how important is each of these attributes to them? Our attempt in this paper is not only to explore how important consumers perceive certain food attributes to be but also to investigate which factors affect their degree of importance. In addition we use these attributes to construct a measure of product class involvement, i.e. how involved are consumers with food, based on the importance they place on specific food attributes.

Several studies have also used "importance" as a measure of "involvement". For example, Antil [9] used "perceived importance" as a key component of the definition of involvement. Costley [10] conducted a meta analysis of involvement research and identified several studies that used perceived importance as an involvement measure. Laurent and Kapferer [11] proposed 4 facets of involvement, namely, (1) the importance of the product, (2) perceived

risk associated with the product purchase, (3) the symbolic or "sign" value, and (4) the hedonic value of the product. In Zaichkowsky's [12] work on personal involvement inventory, consumers gave direct ratings of their perceived importance of a product. Mittal [13], when comparing Laurent and Kapferer's and Zaichovksy's work, argued in favour of the latter's unidimensioal construct and raised the question on whether "…the four factors are, involvement per se, or some or all of them are antecedents of involvement". Mittal also cited in the same paper that Greenwald and Leavitt [14] concluded that "there is a consensus that high involvement means (approximately) personal relevance or importance." Finally, Mittal suggested that in Laurent and Kapferer's [11] work, that only the "importance" factor represent "involvement". Additionally, in Somasundaram's [15] paper, consumers' product involvement was conceptualized as consumer's perceived importance of the product. Like Mittal [13], Schneider and Rodgers [16] stated "…that product involvement itself should be narrowly conceived, encompassing only the importance or centrality of the product to the consumer. Other facets, including the extent to which a consumer finds a product or service category interesting or pleasurable, can be linked to involvement without necessarily being involvement." They also mentioned that "…like all constructs, product involvement can be as narrowly or broadly conceived as a researcher chooses". Brennan and Mavondo [17] also noted that involvement could be conceptualized as a single dimensional construct when using importance or concern as the denominator. Finally, one should have in mind that the construct of involvement we offer in this paper is not just on how important consumers find certain attributes individually, but also as a measure of how many aspects or attributes of food someone finds important.

As for the measurement scales, Poiesz and Cees [18] noted that in the development of the measurement scales, different conceptual perspectives resulted in different multi-item scales. For example they cited Celsi and Olson [19] for using 2-item scales, and Donthu *et al*.[20] for using a single-item scale to measure involvement. Multiple item scales were also used by Lastovicka and Gardner [21], Laurent and Kapferer [11], and Zaichkowsky [12,22].

It is interesting here to note that Brennan and Mavondo [17], based on their literature review, distinguish four types of involvement: the purchase decision involvement (PDI) or situational involvement (SI), the product class involvement (PCI), the response involvement (RI) which later was demonstrated to be a combination of PCI and PDI and the involvement with the advertising message (AMI). In this paper, we examine the concept of PCI, as it is a more general state of involvement, which endures beyond specific tasks. PDI is limited in that it takes place in specific situations (i.e. purchase situations). RI is the combined effect of PDI and PCI, and therefore it is not considered essential to be examined in the context of the present study. AMI is restricted to the educational domain since it examines the potential for a consumer to be manipulated into an involvement state by exposure to an advertising message [17].

In what follows we present a conceptual model, which will guide the empirical analysis, the data for the analysis, the estimation procedure and the results.

2. Conceptual model

Our conceptual model is exhibited in Figure 1. We assume that the overall level of involvement and the particular aspects of involvement individually (i.e., perceived importance of price, taste, nutrition, ease of preparation and brand name) are affected by four categories of variables: (a) individual characteristics (b) situational and attitudinal factors (c) product knowledge and (d) level of information search.

The conceptual model is a construct based on theoretical background information from the literature. A number of studies suggest the existence of a relation between product class involvement, product knowledge and information search behaviours. For example, the literature suggests that consumers with high enduring product involvement conduct

ongoing information search [23] and are expected to have greater prior product knowledge [24]. In these studies researchers suggested that involvement in a product class is positively related to product knowledge and information search. The operational definition of product knowledge is consumers' knowledge of terminology, attributes, and usage situations [25]. Furthermore, Bei and Widdows [26] showed that the effect of involvement interacted with product information and product knowledge. Brennan and Mavondo [17] find a relation between product class involvement and motivation to search. Enduring involvement has also been found to affect situational involvement and this in turn affects the propensity to seek product- related information prior to purchase [27].

Involvement is also considered to be a function of factors such as individual characteristics and situational factors [11,28,29]. Outcomes associated with high involvement include more time and effort spent in search- related activities [23], more extensive decision- making, greater perceived differences in product attributes, and a greater likelihood of establishing brand preferences [12,29].

In our case product class involvement is defined as the overall consumer's involvement with specific attributes of food. We define price, taste, nutrition, ease of preparation and brand as variables that measure product involvement as referred to by Moorthy *et al*.[30]. These factors have also been found to be important when making food- purchasing decisions [31,32].

While the broad categories of Figure 1 (i.e. individual characteristics, situational and attitudinal factors, product knowledge, information search) are well established and backed up by the literature, there are no guidelines on what measures to include in each category, since no other known study exploring the factors that affect food involvement exists to our knowledge.

The demographic factors are included under the category "individual characteristics". Age and gender are widely used as factors that usually affect consumer behaviour from the adoption of risk- reducing strategies [33,34] to information processing and search behaviours [35,36,37,38]. We cannot infer a priori what effect age and gender could have on level of involvement and therefore we make no hypothesis on the effect of these variables.

Moreover, we use education, working status, income and time spent on grocery shopping as factors to further assess consumer's characteristics and as indicators of consumer's time pressure that could affect the level of involvement. It is quite plausible to assume that the more educated, those who are working, those with higher incomes, and those that spend less time grocery shopping face greater time pressures than others. We then hypothesize that time pressure is an obstacle for involvement and consequently:

H_{1A}: Consumers with high levels of time pressure as approximated by higher education are less likely to be more involved.

H_{1B}: Consumers with high levels of time pressure as approximated by higher income are less likely to be more involved.

H_{1C}: Consumers with high levels of time pressure as approximated by working status are less likely to be more involved.

H_{1D}: Consumers with high levels of time pressure as approximated by lower levels of time spent grocery shopping are less likely to be more involved.

Furthermore, food- related factors are included to capture differences in the level of involvement. For example the more people feel that their health is likely to suffer in the future, the greater the perceived health risk and the greater the likelihood to find nutrition attribute as important and taste unimportant, since these two attributes are widely considered to be competitive. A variable reflecting special diet status is included in the model and as shown in Figure 1 we hypothesize that:

H_2: Consumers on a special diet status are more likely to be more involved.

In addition, we use household size to test if the level of involvement is affected by the fact that the food product is purchased for others to consume. Buying something for others to consume may induce concerns about satisfying others [39] and, therefore affect the level of involvement. For the same reasons, we included a meal planner variable and a grocery shopper variable to capture some of these effects. Thus,

H_{3A}: Consumers living in larger households are more likely to be more involved.

H_{3B}: Consumers that are the major grocery shoppers are more likely to be more involved.

H_{3C}: Consumers that are the main meal planners are more likely to be more involved.

In addition, we included in the model some food consumption related variables. These variables represent the importance that consumers attach to following certain dietary guidelines [40] and whether consumers believe that what one consumes can reduce the risk of getting a disease. Hence,

H_{4A}: Consumers that think it is important to follow certain dietary guidelines are more likely to be more involved.

H_{4B}: Consumers that believe what one eats can reduce the risk of getting a disease are more likely to be more involved.

Nutrition knowledge is often used as a proxy of prior knowledge in general [39] or prior product knowledge [41]. We also use as a proxy for information search behaviour the propensity to search for nutritional information since it is the most time consuming activity regarding in-store information search behaviours. We propose

H_{5A}: Consumers that spend more time looking for nutritional information are more likely to be more involved.

H_{5A}: Consumers with higher nutrition knowledge are more likely to be more involved.

3. The data

A survey of consumers was conducted during September 2003 at supermarkets of various sizes throughout the city of Athens in Greece. The sample surveyed was obtained from a combination of 15 supermarkets of five chain stores, from different socioeconomic areas of Athens. The geographical locations of the supermarkets were chosen with the aim of having the maximum geographical scattering and socioeconomic scattering of consumers' characteristics possible. The survey was carried out during both weekend and weekday periods, throughout the morning and afternoon hours.

After permission was obtained from the headquarters of the chain stores, the authors visited each supermarket and interviewed consumers inside the stores. The interviewer approached and interviewed consumers using a specific pattern. The first consumer was approached randomly and was asked to participate in the survey. If the consumer agreed to participate, he was then asked to answer the questions in the questionnaire. If the consumer did not agree to participate, the next consumer entering the store was approached. This process continued until a respondent was found. After the interview was completed with the first respondent, the tenth consumer entering the store was approached. If he did not agree to participate, the next consumer entering was approached and so on, until a respondent was found again. Following this pattern, a sample of 330 consumers was obtained.

Individuals who failed to respond to a question or to report their socioeconomic and demographic information were dropped from the sample. Hence, the number of respondents used in the analysis was 320. The description of the variables used in the analysis and their descriptive statistics are presented in Table 1.

In Table 2 we compare key demographic variables of the surveyed sample with the demographics of the Athens prefecture based on the 2001 population census. Our sample

is overrepresented by females, younger and well educated consumers. The average household size is also slightly higher. One should also keep in mind that the survey was addressed to people that grocery shop and therefore we did expect overrepresentation from females and younger adults. The overrepresentation of university-educated respondents is also normal in surveys that offered no incentive for participation. Usually these respondents are more willing to participate in surveys motivated by the 'colleague' feeling, especially when the survey is conducted by an institution such as a university.

Product class involvement was measured with questions pertaining to a consumer's perceived importance of food attributes. Similarly, Moorthy *et al*.[30] used responses to questions pertaining to a consumer's perceived consumption value in the given product class similar to what have been used to measure product class involvement in earlier studies[33,42]. Therefore, we asked consumers to rate how important was to them, while grocery shopping, five food attributes i.e. price, taste, nutrition, ease of preparation and brand name. Possible answers were on a scale of 1 to 5 (*not important at all* to *very important*). For each of the five attribute-importance questions, answers of *important* or *very important* were assigned a 1 and answers of *neutral*, *not important* and *not important at all* were assigned a 0. Hence, a total score between 0 and 5 was obtained. Scores of 4 and 5 were grouped together and were assigned a 2 indicating high involvement, scores of 3 were assigned a 1 indicating medium involvement and scores of 0, 1 and 2 were assigned a 0 indicating low involvement. The importance of food attributes was measured in two ways, either with the aforementioned coding of 0 and 1 or with the original coding of the 1 to 5 scale. As expected more people rated taste as important or very important than did nutrition. Specifically more than 90% of the sample rated taste as important or very important followed by nutrition with 87.5% (see Table 1). Only half of the sample (50.6%) indicated price as important or very important whereas brand name and ease of preparation were found as important or very important by the 41% and 40% of the sample, respectively. The average score for the product involvement variable is 1.07. Almost 36% (114 cases) of the sample rated all five food attributes as important or very important thus indicating high involvement while only 20.4% (91 cases) rated two or less of the attributes as important or very important thus indicating low involvement.

To construct the measure of nutrition knowledge, we followed previous studies[43,44,45]. The nutrition knowledge variable (*NUTRKNOW*) is based on seven questions. The first three questions asked respondents which of two food items (butter vs. margarine, egg yolk vs. egg white, skim milk vs. whole milk) has more cholesterol. The next two questions asked which of the two food items (whipping cream vs. yoghurt, roast chicken vs. boiled chicken) has more fat. The last two questions checked the respondent's knowledge about the recommended percentage of daily caloric intake from fat and the recommended total daily intake of sodium. For each question a correct answer was assigned a 1 and a wrong answer was assigned a 0, giving a total score between 0 and 7 for each consumer. The average score (4.09), and the percentages of correct answers for each question separately, are presented in Table 1. Generally, consumers scored better on the first five questions involving pairwise comparisons. By contrast, the scores for the last two (open-ended) questions dropped dramatically to 13.4 and 24.4 percent, respectively.

The variable (*DGIMP*) is a food consumption related factor reflecting the respondent's perceptions about the importance of following the Dietary Guidelines for Greeks[40]. These guidelines were developed by the Supreme Scientific Health Council under the supervision of the Ministry of Health and Welfare to provide information to Greeks about food choices that promote health. Respondents were asked how important it was to them: (i) to avoid too much salt, (ii) to avoid too much saturated fat, (iii) to choose a diet low in cholesterol, and (iv) to eat a variety of foods. For each question, responses of important or very important were assigned a 2. Responses of neutral were assigned a 1 and responses of not important

or not important at all were assigned a 0. Hence, a total score between 0 and 8 was obtained. The other variables are described in Table 1.

4. Estimation and results

Motivated by the discussion in the preceding sections, we estimate an empirical model of eleven equations:

$$INVOLV_i = f(X_i, e_i) \qquad (1)$$

$$ATTRIBUTEO_{ji} = f(X_i, u_{ji}), \quad j = 1 \text{ to } 5 \qquad (2)\text{-}(6)$$

$$ATTRIBUTEP_{ki} = f(X_i, r_{ki}), \quad k = 1 \text{ to } 5 \qquad (7)\text{-}(11)$$

Equation (1) attempts to explain the constructed measure of product class involvement (*INVOLV*) by a vector of determinants *X*. Equations (2)-(6) are the models of involvement with the specific food attributes (i.e. price, taste, nutrition, ease of preparation and brand name) where the dependent variables are coded as 1 to 5. Equations (7)-(11) are models of involvement with the specific attributes when the dependent variables are coded as 0 or 1. These last models are estimated to complement the estimation of equations (2) to (6) and to assess the robustness of the results. Moreover, the vast majority of the respondents valued taste and nutrition as important or very important (90.3% and 87.5% respectively) which produced low variability in the dependent variables. The variables included in vector *X* flow from the conceptual framework of Figure 1.

Limdep version 8.0 served as the econometric software of our analysis. The outcome variables we wish to model are discrete choice variables and this call for the use of what is known as Qualitative Response models [46]. For binary choice dependent variables and ranking (ordinal) dependent variables, probit and ordered probit models are considered appropriate. Hence, equations (1)-(6) were estimated as ordered probit models whereas equations (7)-(11) were estimated as binary probit models. We also tried to estimate equations (7)-(11) using multivariate probit analysis but estimation did not converge. Our discussion of the results is based on the statistical significance of the marginal effects and discrete changes, which were calculated at the means of all other variables [1]. Discrete changes were calculated for the dummy variables of the equations. White's heteroskedasticity tests were conducted for all equations and were corrected wherever needed. Since no available econometric software, to our knowledge, provides t-statistics for the marginal effects of ordered probit models after correcting for heteroskedasticity [2], special but cumbersome routines were developed inside Limdep to account for the variation from the heteroskedasticity terms in the marginal effects and to provide t-statistics.

4.1 Results for product class involvement equation

Table 3 shows that a number of socio-economic and other factors affect overall involvement with food, such as income, age and education and thus confirming several of our model's proposed or hypothesized relationships.

Older respondents are more likely to be more involved with food as indicated by the age variables (*AGE55*, *AGE56*). This result may indicate the higher concern of older individuals when it comes to food. Aging is associated with physiological changes that occur slowly in all body systems. Individuals desire to offset the reduction in health capital caused by aging by increasing their investment in health. This can partly be achieved by a good diet, which may mean a higher involvement with food. For example, Bogue *et al*.[47] found that people

[1] The parameter estimates are available upon request.

[2] At least not with automatic routines.

aged over 35 were more concerned about their health and were most likely to consume foods consistent with the recommended dietary guidelines.

Interestingly, highly educated people (*EDUC2*) are more likely to have low involvement with food and thus confirming our hypothesis (H_{1A}). For example, respondents with a university education or higher are 11.5% more likely to have low involvement with food than lower educated consumers (i.e. to find two or less of the food attributes not important or not important at all). In addition, higher income people (*INC3*) are more likely to have low involvement and thus confirming our hypothesized relationship (H_{1B}). These two results may be an indication of the time pressure that highly educated and high-income people face. This makes more sense if we consider the fact that price and nutrition are search attributes [3] [48,49] and, therefore, require time to gather information for these attributes, and the fact that price may not be a concern for higher income people and/or higher educated people.

The next two hypotheses related to time pressure (H_{1C}, H_{1D}) are rejected or not supported. Working consumers are less likely to have low or medium involvement. This may be an indication that working status is either not a suitable measure for time pressure or that there is a different mechanism that drives the results. For example, it is possible that working consumers may feel a bigger deterioration in their health status because of work and therefore try to compensate some of this deterioration by following Hippocrates statement (460-377 BC): 'Let thy food be thy medicine and thy medicine be thy food'. This, however, would require them to be more involved with food. The second hypothesis (H_{1D}) is not supported by our results since we cannot find an evident relationship between shopping time and involvement.

The hypothesis regarding special diet (H_2) is partially rejected. As shown in Table 3, respondents currently on a special diet (*SPECDIET*) are more likely to have low involvement, contradicting our hypothesis. This may be an indication that people that may have a special concern on one of the food attributes like nutrition may perceive the rest of the attributes as unimportant.

We do not find support for hypotheses (H_{3A}-H_{3B}) and only partial support for the third hypotheses (H_{3C}). Table 3 shows that no relation is apparent for household size (*HSIZE*) and grocery shoppers (*SHOPPER*) variables with respect to involvement. However, meal planners (*PLANNER*) are less likely to have low involvement, thus partially supporting our hypothesized relation (H_{3C}).

Regarding the food consumption related variables, we find partial support for the H_{4A} hypotheses. Respondents that place importance on following the dietary guidelines (*DGIMP*) are less likely to have a low level of involvement with food. In contrast, we find no support to the hypotheses that people aware of the diet-disease relation (*DIETDIS*) are more likely to be more involved (H_{4B}).

The hypotheses regarding nutritional information search (H_{5A}) is rejected by our analysis. Nutritional label users (*LABUSE*) are less likely to be highly involved and more likely to have low involvement than people that do not use labels that much. This may be an indication that people that are more concerned about nutrition and therefore use nutritional labels make a trade off between nutrition and taste and between nutrition and price as search attributes. Finally, there is no support to our hypothesis that consumers with higher nutrition knowledge will be more involved with food (H_{5A}).

4.2 Results for attribute involvement equations

[3] Nutritional content of foods is considered a credence attribute but can be transformed into a search attribute when a nutritional label is present [48].

In this section, we further explore involvement with food by examining the effects of the variables included in the *X* vector on each of the food attributes. For comparative reasons, we exhibit in Tables 4 to 8 results from both binary and ordered probit analysis.

Weak or strong age effects are evident in all equations. Older people are more likely to find price very important but less likely to find price important, neutral or not important. The same effect appear for the brand equation were respondents over 41 are more likely to find brand very important and less likely to find brand important, neutral or not important. Likewise, people over 56 years old are more likely to find ease of preparation very important. However, there is one big distinction here with the price and brand equations, that older respondents are more likely to attach no importance at all in ease of preparation attribute. In all, it seems that as age increases, people become more likely in finding price, brand and ease of preparation very important. This result is in accordance with the results of the previous section for product class involvement.

Education effects (*EDUC2*) are also evident in price and ease of preparation equations. Higher educated respondents are more likely to attach low importance in price and less likely to find price as very important. Similarly, these respondents are less likely to either find ease of preparation very important or not important at all and more likely to place medium values of importance to these attributes. Assuming that income and education are correlated, the results for income (*INC3*) reinforce the robustness of the education effect but only for the price equation. As expected, higher income people are less likely to find price important or very important and more likely to attach lower importance values to price.

Effects from label usage behaviour (*LABUSE*) are evident in all but two models. Label usage effects appear in price, taste and ease of preparation equations. Interestingly, there is no effect of label usage on the perceived importance of nutrition, as one would expect. In general people that read nutritional labels are less likely to find price, taste and ease of preparation very important. These results are also supported by the binary probit equations except in the case of ease of preparation attribute. In addition, label users are more likely to place low importance in price and ease of preparation but also more likely to find taste important. These results are also in accordance with the previous section of the product class involvement. In general, we could say that the taste – nutrition trade off is also apparent here. If we assume that the importance respondents place on price is related with search for price information, then our models also suggest that the action of searching for nutrition information is a competitor of searching for price information.

The size of the household (*HSIZE*) did not appear as an important explanatory variable for product class involvement in the previous section. However, strong effects are evident for brand and ease of preparation models even though these are not supported by the results of the binary probit equations. The effect is similar for the two attributes. Larger households are less likely to find ease of preparation and brand as important or very important and more likely to place low values of importance to these attributes. As far as ease of preparation is concerned, this result may be an indication of economies of scale since larger households may not require ease of preparation and therefore do not find this attribute as important. The fact that larger households are less likely to find brand important or very important may reveal the preferences of these households for other aspects of food e.g. private labels, bulk packages.

There is a controversial effect of the importance of following the dietary guidelines (*DGIMP*) for the nutrition and brand models. Specifically, respondents that find following the dietary guidelines more important are more likely to find nutrition very important and less likely to find nutrition important or neutral. On the other hand the same respondents are less likely to find brand important and very important and more likely to place low values of importance to brand. There is no need to further explain the positive effect of the (*DGIMP*) variable on importance to nutrition but the reason for the negative effect on the brand equation is not clear. Note here that the binary probits produce the same results only for

the nutrition equation. However, in the previous section we found a positive effect of the (*DGIMP*) variable, which may be an indication that the effect of this variable on nutrition dominates the effect of brand.

Meal planners (*PLANNER*) are more than 16% more likely to find taste very important and about 9% less likely to find taste important. This supports the results of the previous section and gives an indication on how important taste is for meal planners. It is also interesting that while no effect of the diet- disease variable (*DIETDIS*) is evident in the product class involvement equation, people that think what one eats can affect the risk of getting a disease are more than 16% more likely to find nutrition very important but also 9% less likely to find price very important which again points out the contrasting roles of price and nutrition in food purchasing behaviour. These effects are also apparent in the corresponding binary probit equations.

Even though we found no gender effects in the product class involvement equation we find some effects on the importance of nutrition. As indicated by the *MALE* variable, males are more likely to place low values of importance to nutrition. The effect of product knowledge, as modelled through nutrition knowledge variable (*NUTRKNOW*), on food attributes is also interesting. Note that even though no effect was obvious in the product class involvement equation, nutrition knowledge has an effect on three out of five food attributes. In general, the effect is positive on high levels of importance and negative for low importance levels. Specifically, nutritionally knowledgeable respondents are more likely to rate price, taste and ease of preparation very important but are less likely to place low values of importance to these attributes. Surprisingly, no effect on importance of nutrition is evident. It appears that these effects cancel out when combined with results from the product class involvement equation.

5. Concluding remarks

In this study product class involvement for food was analysed using a conceptual framework based on the involvement literature. Even though involvement in different product classes has been examined in the past, no known study has examined involvement for food and the factors that affect it. In order to test our conceptual framework, primary data were collected from personal interviews with consumers from supermarkets in Athens, Greece.

Results revealed a number of factors that affect overall involvement with food and the specific aspects of involvement (i.e., importance of price, taste, nutrition, ease of preparation and brand name). Results of this study can be used by the food sector, especially food marketers, as a guide in developing food marketing programmes. Analysing product class involvement can be useful as a segmentation tool that can assist marketing management with marketing mix decisions, and in particular with promotional strategy. For example, our results suggest that different profiles of consumers exist for different levels and aspects of involvement with food. These results can then be used as a guide to develop market segmentation strategies for different levels of involvement. In addition, by knowing the factors that affect the specific aspects of involvement, food companies that produce products that carry or not those aspects can target specific segments of the population. For example, food marketers of nutritious products should target their marketing campaigns to those consumers who are more likely to put higher importance on nutrition. On the other hand, marketers of convenience foods should target those individuals more likely to put higher importance on ease of preparation. Marketers focused on delivering value to customers should then target their products to those more likely to put higher importance on price.

As much market segmentation as possible is also needed to guide new food product development and to increase the chances of success of new food products since the vast

majority of food novelties (72%-88%) continues to fail. Understanding the factors that affect involvement with food is essential for food companies' profitability and survival.

A caveat of this study should also be noted. This caveat has to do with the localised nature of this study and, therefore the limitations in generalizing results. Future research should use larger samples that would test the robustness of our results. Other caveats have to do with the constraints of the data. Ideally we would have wanted to collect data on many aspects of the food purchasing decision but this was not possible considering the available means for the conduct of the survey. Future research could examine store involvement as a factor affecting overall product class involvement or examine involvement for different types of food products (e.g., fruits, vegetables, meats, bread). For example, involvement could differ for fresh products that are bought very frequently and are perishable and for less perishable food products like pasta or sauces. Furthermore, it would be of interest if one could examine the effect of the stage of the family life cycle on involvement, as an additional factor affecting PCI.

Table 1. Description of variables

Variable	*Variable Description*	*Mean*	*Scale*	*N*	*%*	*Std.Dev.*
(PRICE)	Importance of price (1-5 scale for ordered probit) Importance of price (0-1 scale for probit)	2.54 0.51	1-5 0-1	180	50.6	1.25 0.50
(TASTE)	Importance of taste (1-5 scale for ordered probit) Importance of taste (0-1 scale for probit)	3.49 0.90	1-5 0-1	289	90.3	0.76 0.30
(NUTR)	Importance of nutrition (1-5 scale for ordered probit) Importance of nutrition (0-1 scale for probit)	3.40 0.87	1-5 0-1	280	87.5	0.90 0.33
(EASE)	Importance of ease of preparation (1-5 scale for ordered probit) Importance of ease of preparation (0-1 scale for probit)	2.05 0.40	1-5 0-1	127	39.7	1.42 0.49
(BRAND)	Importance of brand (1-5 scale for ordered probit) Importance of brand (0-1 scale for probit)	1.98 0.41	1-5 0-1	130	40.6	1.34 0.49
(INVOLV)	Product class involvement	1.07	0-3 2 1 0	114 115 91	35.6 35.9 28.4	0.798
(MALE)	Dummy (0,1) 1=The respondent is male, Else=0	0.38	0-1	122	38.1	0.486
*(AGE28)**	Dummy (0,1) 1=The respondent is 18-28 years old, Else=0	0.26	0-1	84	26.3	0.440
(AGE40)	Dummy (0,1) 1=The respondent is 29-40 years old, Else=0	0.30	0-1	96	30.0	0.459
(AGE55)	Dummy (0,1) 1=The respondent is 41-55 years old, Else=0	0.32	0-1	103	32.2	0.468
(AGE56)	Dummy (0,1) 1=The respondent is >56 years old, Else=0	0.12	0-1	37	11.6	0.320
*(EDUC1)**	Dummy (0,1) 1=The respondent has high-school education, Else=0	0.51	0-1	164	51.2	0.501
(EDUC2)	Dummy (0,1) 1=The respondent has university education or higher, Else=0	0.49	0-1	156	48.8	0.501
(WORK)	Dummy (0,1) 1=The respondent is employed, Else=0	0.64	0-1	205	64.1	0.481
*(INC1)**	Dummy (0,1) 1=Annual household income is <10000€, Else=0	0.38	0-1	122	38.1	0.486
(INC2)	Dummy (0,1) 1=Annual household income is 10000-20000€, Else=0	0.30	0-1	96	30.0	0.459
(INC3)	Dummy (0,1) 1=Annual household income is >20000€, Else=0	0.32	0-1	102	31.9	0.467
(DGIMP)	Importance of following dietary guidelines for Greeks (0 – 8 scale)	7.12	0 - 8			1.588

	Avoid too much salt	1.66	0	27	8.4	
			1	56	17.5	
			2	237	74.1	0.629
	Avoid too much saturated fat	1.83	0	13	4.1	
			1	28	8.8	
			2	279	87.2	0.471
	Choose a diet low in cholesterol	1.7	0	27	8.4	
			1	41	12.8	0.615
			2	252	78.8	
	Eat a variety of foods	1.93	0	6	1.9	
			1	12	3.8	0.327
			2	302	94.4	
(DIETDIS)	Respondent strongly agrees that what one eats can affect the risk of getting a disease=1, 0 otherwise	0.64	0-1	206	64.4	0.480
(SPECDIET)	Dummy (0,1) 1=The respondent is on a special diet, Else=0	0.25	0-1	79	24.7	0.432
(SHOPPER)	Dummy (0,1) 1=The respondent is the major food shopper, Else=0	0.85	0-1	271	84.7	0.361
(PLANNER)	Dummy (0,1) 1=The respondent is the major meal planner, Else=0	0.67	0-1	215	67.2	0.470
(HSIZE)	Size of the household	2.99				1.301
(SHOPMIN)	Average amount of time spent while grocery shopping per visit in minutes	35.49				23.451
(NUTRKNOW)	Nutrition knowledge (0-7 scale)	4.09	0 - 7			1.141
	Butter vs. Margarine	0.72		229	71.6	0.452
	Egg yolks vs. Egg whites	0.82		263	82.2	0.383
	Skim milk vs. Whole milk	0.91		290	90.6	0.292
	Whipping cream vs. Yoghurt	0.95		305	95.3	0.212
	Roast chicken vs. Boiled chicken	0.32		102	31.9	0.467
	Percent of daily caloric intake from fat	0.13		43	13.4	0.342
	Total daily intake of sodium	0.24		78	24.4	0.430
(LABUSE)	Label use while shopping	2.52	1-4			1.097
	Always		4	73	22.8	
	Often		3	100	31.3	
	Not often		2	68	21.3	
	Never		1	79	24.7	

*The asterisk indicates the dummy variables that were not used in the estimation process to avoid the problem of multicolinearity

Table 2. Comparison of sample and population characteristics

Demographic Characteristics	2001 Census	Surveyed Sample
Males (%)	47.51	38.10
Females (%)	52.49	61.90
18-28 years old (%)	20.51	26.30
29-40 years old (%)	20.59	30.00
41-55 years old (%)	26.62	32.20
>56 years old (%)	32.29	11.60
University education or higher (%)	19.32	48.80
High-school education (%)	80.68	51.20
Mean household size	2.61	2.99

Table 3. Marginal effects and discrete changes for product class involvement equation

	Ordered Probit		
Variables	*Low Involvement*	*Medium Involvement*	*High Involvement*
MALE	0.0286	0.0031	-0.0317
AGE40	-0.0199	-0.0027	0.0227
AGE55	**-0.1137****	**-0.0224****	0.1360
AGE56	**-0.2319****	**-0.1337****	**0.3656****
EDUC2	**0.1155****	0.0133	-0.1288
INC2	0.0087	0.0010	-0.0097
INC3	**0.1440****	0.0053	-0.1492
LABUSE	**0.0479****	0.0058	**-0.0538****
WORK	**-0.0501***	**-0.0049****	0.0550
SPECDIET	**0.0514****	0.0040	-0.0554
HSIZE	0.0190	0.0023	-0.0213
DGIMP	**-0.0293***	-0.0036	0.0329
SHOPPER	0.0341	0.0056	-0.0398
PLANNER	**-0.0919****	-0.0063	0.0982
DIETDIS	0.0263	0.0036	-0.0299
SHOPMIN	-0.0002	0.0000	0.0002
NUTRKNOW	-0.0180	-0.0022	0.0202
Threshold parameters[a]	Coeff.	Std. Error	t-statistic
Mu(1)	1.028	0.083	12.439
Fit measures			
Log likelihood function	-327.24		
Restricted log likelihood	-349.78		
McFadden R^2 [b]	0.064		
X^2	45.07		
p	2.37E-04		

*(**) Significant at the 10% (5%) significance level.

[a]These are threshold parameters that separate the adjacent categories, estimated with the other model parameters. The first threshold parameter Mu(0) is typically normalised to zero.

[b]$1-(\log L_{unrestricted}/\log L_{restricted})$

Table 4. Marginal effects and discrete changes for importance of price equation

	Ordered Probit					Probit	
Variables	*Price importance=1*	*Price importance=2*	*Price importance=3*	*Price importance=4*	*Price importance=5*		
MALE	0.0091	0.0067	0.0121	-0.0043	-0.0235	-0.0200	
AGE40	**0.0918****	0.0129	**-0.1003****	**-0.0883****	0.0840	0.0491	
AGE55	0.0369	**-0.0229***	**-0.1812****	**-0.0780***	**0.2453****	**0.2324****	
AGE56	-0.0246	**-0.0474****	**-0.2049****	**-0.0830***	**0.3599****	**0.4108****	
EDUC2	**0.0557****	**0.0403****	**0.0725****	-0.0255	**-0.1430***	**-0.2158****	
INC2	0.0129	0.0094	0.0166	-0.0062	-0.0326	0.0329	
INC3	**0.1045****	**0.0650****	**0.0922****	**-0.0536***	**-0.2081****	**-0.2530****	
LABUSE	**0.0147***	**0.0109***	**0.0199****	**-0.0068**	**-0.0387****	**-0.0688****	
WORK	-0.0099	-0.0072	-0.0130	0.0047	0.0254	0.0501	
SPECDIET	0.0026	0.0019	0.0035	-0.0012	-0.0068	0.0221	
HSIZE	0.0042	0.0031	0.0057	-0.0019	-0.0110	-0.0151	
DGIMP	-0.0069	-0.0051	-0.0094	0.0032	0.0182	0.0289	
SHOPPER	0.0295	0.0237	0.0505	-0.0104	-0.0933	**-0.1829***	
PLANNER	-0.0128	-0.0093	-0.0165	0.0061	0.0324	0.1069	
DIETDIS	**0.0318***	**0.0242***	**0.0472***	-0.0134	**-0.0898***	**-0.1840****	
SHOPMIN	-0.00039	-0.00029	-0.00053	0.00018	0.00103	0.0010	
NUTRKNOW	**-0.0149***	**-0.0110***	**-0.0202***	0.0069	**0.0392***	**0.0581****	
Threshold parameters[a]	Coeff.	Std. Error	t- statistic				
Mu(1)	0.608	0.126	4.826				
Mu(2)	2.066	0.227	9.087				
Mu(3)	2.939	0.296	9.920				
Fit measures							
Log likelihood function	-434.28					Log likelihood function	-191.23
Restricted log likelihood	-471.43					Restricted log likelihood	-221.78
McFadden R^2 [b]	0.079					McFadden R^2	0.137
X^2	74.29					X^2	61.10
p	0.000					P	0.000

*(**) Significant at the 10% (5%) significance level.

[a]These are threshold parameters that separate the adjacent categories, estimated with the other model parameters. The first threshold parameter Mu(0) is typically normalised to zero.
[b]$1 - (\log L_{unrestricted} / \log L_{restricted})$

Table 5. Marginal effects and discrete changes for importance of taste equation

	Ordered Probit					Probit	
Variables	*Taste importance=1*	*Taste importance=2*	*Taste importance=3*	*Taste importance=4*	*Taste importance=5*		
MALE	-0.0007	-0.0039	-0.0183	-0.0366	0.0594	0.0205	
AGE40	-0.0006	-0.0033	-0.0157	-0.0318	0.0514	0.0179	
AGE55	-0.0050	-0.0181	**-0.0526***	0.0703	0.0054	0.0454	
AGE56	-0.0011	-0.0066	-0.0342	-0.0803	0.1222	0.0514	
EDUC2	0.0004	0.0022	0.0101	0.0196	-0.0323	-0.0154	
INC2	0.0006	0.0034	0.0153	0.0286	-0.0479	-0.0455	
INC3	0.0009	0.0047	0.0212	0.0394	-0.0662	**-0.0924***	
LABUSE	0.0005	0.0030	0.0139	**0.0271***	-0.0445	**-0.0263***	
WORK	0.0010	0.0058	0.0276	0.0565	-0.0909	-0.0369	
SPECDIET	-0.0002	-0.0011	-0.0052	-0.0104	0.0169	-0.0196	
HSIZE	-0.0001	-0.0004	-0.0017	-0.0034	0.0056	0.0102	
DGIMP	-0.0002	-0.0010	-0.0048	-0.0094	0.0155	**0.0155***	
SHOPPER	0.0006	0.0037	0.0179	0.0381	-0.0603	0.0170	
PLANNER	-0.0026	-0.0128	-0.0543	**-0.0931****	**0.1628****	0.0728	
DIETDIS	0.0038	0.0142	0.0355	-0.0630	0.0095	**-0.0519***	
SHOPMIN	-0.00005	-0.00025	-0.00116	**-0.00227****	**0.00372****	0.0005	
NUTRKNOW	-0.0006	-0.0032	-0.0150	**-0.0293***	**0.0481***	**0.0218***	
Threshold parameters[a]	Coeff.	Std. Error	t-statistic				
Mu(1)	0.763	0.482	1.584				
Mu(2)	1.698	0.561	3.028				
Mu(3)	2.845	0.648	4.387				
Fit measures							
Log likelihood function	-282.76					Log likelihood function	-89.28
Restricted log likelihood	-303.36					Restricted log likelihood	-101.81
McFadden R^2 [b]	0.068					McFadden R^2	0.123
X^2	41.20					X^2	25.05
p	2.27E-03					P	9.35E-02

*(**) Significant at the 10% (5%) significance level.

[a]These are threshold parameters that separate the adjacent categories, estimated with the other model parameters. The first threshold parameter Mu(0) is typically normalised to zero.
[b]$1-(\log L_{unrestricted}/\log L_{restricted})$

Table 6. Marginal effects and discrete changes for importance of nutrition equation

	Ordered Probit					Probit	
Variables	*Nutrition importance=1*	*Nutrition importance=2*	*Nutrition importance=3*	*Nutrition importance=4*	*Nutrition importance=5*		
MALE	**0.0337****	**0.0323****	**0.0968****	-0.0122	-0.1506	**-0.1250****	
AGE40	0.0135	0.0119	0.0070	**-0.1640***	0.1317	0.0160	
AGE55	-0.0006	-0.0014	-0.0083	-0.0162	0.0265	0.0293	
AGE56	0.0008	0.0017	0.0100	0.0181	-0.0306	-0.0337	
EDUC2	-0.0012	-0.0028	-0.0168	-0.0320	0.0527	0.0249	
INC2	-0.0059	-0.0104	-0.0321	0.1059	-0.0575	-0.0021	
INC3	0.0022	0.0049	0.0284	0.0504	-0.0858	-0.0183	
LABUSE	-0.0009	-0.0021	-0.0130	-0.0248	0.0409	0.0169	
WORK	-0.0017	-0.0038	-0.0227	-0.0413	0.0696	-0.0059	
SPECDIET	0.0002	0.0004	0.0022	0.0041	-0.0068	-0.0510	
HSIZE	-0.0006	-0.0013	-0.0080	-0.0152	0.0251	0.0022	
DGIMP	-0.0020	-0.0045	**-0.0275***	**-0.0524****	**0.0865****	**0.0373****	
SHOPPER	-0.0046	-0.0095	-0.0505	-0.0768	0.1414	0.0750	
PLANNER	-0.0011	-0.0024	-0.0143	-0.0263	0.0440	-0.0448	
DIETDIS	-0.0045	-0.0097	**-0.0543***	**-0.0923****	**0.1608****	**0.0628***	
SHOPMIN	0.00000	0.00000	0.00001	0.00002	-0.00003	0.0003	
NUTRKNOW	0.0001	0.0001	0.0008	0.0016	-0.0026	-0.0170	
Threshold parameters[a]	Coeff.	Std. Error	t-statistic				
Mu(1)	0.605	0.307	1.970				
Mu(2)	1.759	0.502	3.502				
Mu(3)	3.206	0.662	4.846				
Fit measures							
Log likelihood function	-284.05					Log likelihood function	-92.69
Restricted log likelihood	-331.09					Restricted log likelihood	-120.56
McFadden R^2 [b]	0.142					McFadden R^2	0.231
X^2	94.09					X^2	55.76
p	0.000					P	5.17E-06

*(**) Significant at the 10% (5%) significance level.

[a]These are threshold parameters that separate the adjacent categories, estimated with the other model parameters. The first threshold parameter Mu(0) is typically normalised to zero.
[b]$1-(\log L_{unrestricted}/\log L_{restricted})$

Table 7. Marginal effects and discrete changes for importance of ease of preparation equation

	Ordered Probit					**Probit**	
Variables	*Ease of preparation importance=1*	*Ease of preparation importance=2*	*Ease of preparation importance=3*	*Ease of preparation importance=4*	*Ease of preparation importance=5*		
MALE	0.0109	0.0035	0.0004	-0.0037	-0.0110	0.0249	
AGE40	0.0260	0.0082	0.0005	-0.0090	-0.0258	-0.0073	
AGE55	**0.1506****	-0.0223	**-0.0841****	**-0.0670****	0.0228	-0.0106	
AGE56	**0.1523****	**-0.0722****	**-0.1368****	**-0.0880****	**0.1447****	0.0984	
EDUC2	**-0.0962****	**0.0646****	**0.1309****	**0.0540****	**-0.1533****	-0.0889	
INC2	-0.0067	-0.0022	-0.0003	0.0023	0.0069	0.0204	
INC3	-0.0015	-0.0005	-0.0001	0.0005	0.0015	-0.0087	
LABUSE	**0.0335****	**0.0110***	0.0012	-0.0115	**-0.0342***	-0.0299	
WORK	**0.1087****	-0.0260	**-0.0913****	-0.0568	0.0654	0.0347	
SPECDIET	0.0054	0.0017	0.0002	-0.0018	-0.0054	-0.0237	
HSIZE	**0.0251***	**0.0082***	0.0009	**-0.0086***	**-0.0257***	-0.0359	
DGIMP	-0.0095	-0.0031	-0.0003	0.0032	0.0097	0.0053	
SHOPPER	0.0032	0.0011	0.0001	-0.0011	-0.0033	-0.0295	
PLANNER	-0.0381	-0.0119	-0.0006	0.0132	0.0375	0.1113	
DIETDIS	-0.0375	-0.0118	-0.0008	0.0129	0.0371	**0.1099***	
SHOPMIN	-0.00075	-0.00025	-0.00003	0.00026	0.00077	0.0003	
NUTRKNOW	**-0.0361****	**-0.0118****	-0.0013	**0.0124***	**0.0369****	0.0119	
Threshold parameters[a]	Coeff.	Std. Error	t-statistic				
Mu(1)	0.573	0.112	5.119				
Mu(2)	1.324	0.206	6.429				
Mu(3)	1.969	0.287	6.861				
Fit measures							
Log likelihood function	-488.42					Log likelihood function	-208.38
Restricted log likelihood	-510.68					Restricted log likelihood	-214.95
McFadden R^2 [b]	0.043					McFadden R^2	0.031
X^2	44.52					X^2	13.13
p	1.99E-03					P	7.27E-01

*(**) Significant at the 10% (5%) significance level.
[a]These are threshold parameters that separate the adjacent categories, estimated with the other model parameters. The first threshold parameter Mu(0) is typically normalised to zero.
[b]$1 - (\log L_{unrestricted} / \log L_{restricted})$

Table 8. Marginal effects and discrete changes for importance of brand equation

	Ordered Probit					Probit
Variables	*Brand importance=1*	*Brand importance=2*	*Brand importance=3*	*Brand importance=4*	*Brand importance=5*	
MALE	-0,0281	-0,0055	-0,0033	0,0179	0,0191	0.0204
AGE40	-0,0152	-0,0029	-0,0018	0,0097	0,0103	0.0279
AGE55	0,0265	**-0,0327****	**-0,1004****	-0,0294	**0,1360****	0.1132
AGE56	0,0514	**-0,0449****	**-0,1398****	**-0,0856***	**0,2189****	**0.2673****
EDUC2	0,0222	0,0042	0,0024	-0,0141	-0,0147	-0.0569
INC2	-0,0102	-0,0020	-0,0012	0,0065	0,0069	-0.0575
INC3	0,0059	0,0011	0,0006	-0,0037	-0,0039	-0.0808
LABUSE	0,0141	0,0027	0,0015	-0,0090	-0,0094	-0.0231
WORK	0,0067	0,0013	0,0007	-0,0043	-0,0045	0.0362
SPECDIET	0,0522	0,0092	0,0036	-0,0331	-0,0319	-0.0265
HSIZE	**0,0289***	**0,0055***	0,0031	**-0,0184***	-0,0191	-0.0214
DGIMP	**0,0188***	**0,0036***	0,0020	**-0,0119***	**-0,0124***	-0.0270
SHOPPER	-0,0197	-0,0036	-0,0017	0,0125	0,0125	0.0473
PLANNER	-0,0559	-0,0100	-0,0044	0,0355	0,0349	0.0506
DIETDIS	-0,0235	-0,0044	-0,0023	0,0149	0,0152	0.0624
SHOPMIN	0,00015	0,00003	0,00002	-0,00009	-0,00010	-0.0005
NUTRKNOW	-0,0017	-0,0003	-0,0002	0,0011	0,0011	-0.0114
Threshold parameters[a]	Coeff.	Std. Error	t-statistic			
Mu(1)	0.347	0.062	5.536			
Mu(2)	1.196	0.108	11.035			
Mu(3)	2.369	0.188	12.545			
Fit measures						
Log likelihood function	-474.88				Log likelihood function	-208.33
Restricted log likelihood	-490.51				Restricted log likelihood	-216.15
McFadden R^2 [b]	0.032				McFadden R^2	0.036
X^2	31.20				X^2	15.63
p	3.79E-02				P	5.50E-01

*(**) Significant at the 10% (5%) significance level.

[a]These are threshold parameters that separate the adjacent categories, estimated with the other model parameters. The first threshold parameter Mu(0) is typically normalised to zero.
[b]$1-(\log L_{unrestricted}/\log L_{restricted})$

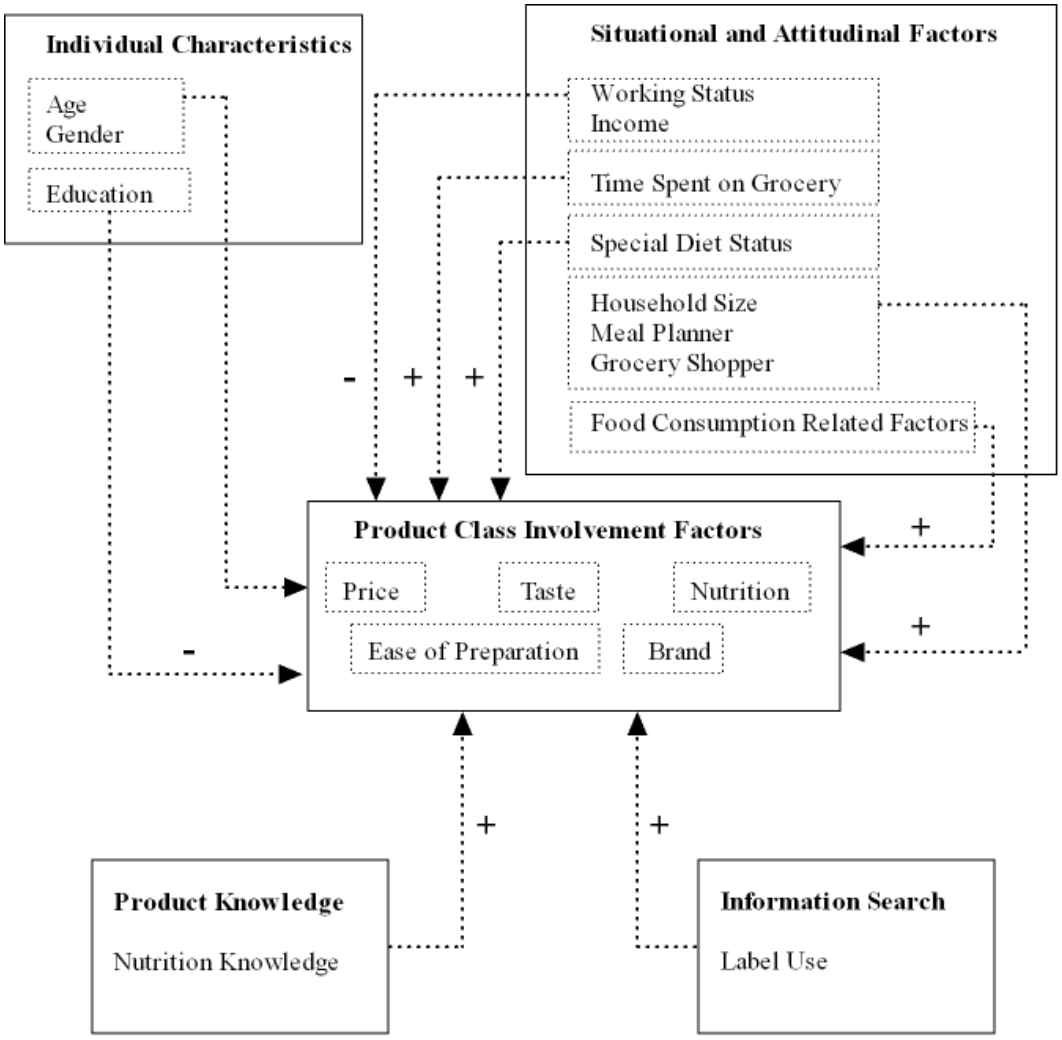

Figure 1. Conceptual model and proposed relations

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