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Marketing

Consumer Segmentation

Reduction of Market Risk in the Development of Functional Food Products

Friðrik Björnsson

Auður Hermannsdóttir, Kári Kristinsson and Kolbrún Sveinsdóttir

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HÁSKÓLI ÍSLANDS

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Auður Hermannsdóttir, Kári Kristinsson and Kolbrún Sveinsdóttir

School of Business

Department of Social Sciences – University of Iceland

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Abstract

The study's purpose was to segment Icelandic consumers in order to find a suitable target market for new functional ready-to-eat seafood products. The study was performed for practical purposes of an Icelandic manufacturer and seller of convenience seafood products. The results were intended to evaluate market potential and provide the company information that would aid the efficiency of its activities in the marketing of the to-be-developed products. A questionnaire consisting of parts of various validated scales addressing food related attitudes, beliefs and behaviors was submitted to a random sample of 3,700 individuals, but 500 valid responses were gathered. A K-means cluster analysis revealed five consumer segments, one of which was identified as a target segment. The identified target segment was labeled as Health oriented believers. The segment's beliefs and positive attitudes toward functional foods, and its substantial size of around one fifth of the market suggest a good market potential for new functional ready-to-eat seafood products.

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1 Introduction

Food products are defined as functional if they beneficially affect one or more body functions beyond adequate nutritional effects of a traditional product, and thereby improve health and well being or/and reduce risk of disease (Diplock et al., 1999 in Chen, 2011; Frewer, Scholderer, & Lambert, 2003). Due to continuously increasing demand, functional food products are becoming a major focus of new product development in the food industry (Khan, Grigor, Winger, & Win, 2013). However, the development of such products is expensive, complex and involves a high level of risk (Herzenstein, Posavac, & Brakus, 2007 in Ansari, 2014; Smith, 2007; van Kleef, van Trijp, Luning, & Jongen, 2002). A substantial part of the risk is due to uncertainty of the market performance of the new functional food products, known as market risk, which is integral to product development (Browning, 1998; LaBahn & Krapfel, 2000 in Wagner & Johnson, 2004).

The uncertainty of market performance of the new product is a major component of the market risk that accompanies the release of functional food products. This stems from various factors, many relating to uncertainty of consumer acceptance. Consumers might for example be suspicious of technologically modified foods (Lee & Yoo, 2011) or are generally avoidant of new food products (Pliner & Hobden, 1992; Verneau, Caracciolo, Coppola, & Lombardi, 2014). In addition, consumer acceptance is affected by more general aspects that influence consumers' decisions process, such as quality aspects (Brunsø, Scholderer, & Grunert, 2004a; Cullen & Kingston, 2009), price (Cullen & Kingston, 2009; De Steur et al., 2010; Kihlberg & Risvik, 2007), taste (Cullen & Kingston, 2009; Duffy & Bartoshuk, 2000), objective knowledge (De Steur et al., 2010), health aspects (Cullen & Kingston, 2009; Devcich, Pedersen, & Petrie, 2007; Shepherd, Magnusson, & Sjödén, 2005; Westcombe & Wardle, 1997), convenience (Bech-Larsen, Grunert, & Poulsen, 2001; Nijmeijer, Worsley, & Astill, 2004; Urala & Lahteenmaki, 2003), preferred cooking methods, ways of shopping and consumption situations (Brunsø et al., 2004a), attitudes to advertising and importance of product information (Nijmeijer et al., 2004). Furthermore, it has been suggested that if functional food

products are perceived as unnatural it can have negative effect on consumers' evaluations of the product (Bech-Larsen et al., 2001; Poulsen, 1999). Reduction of the market risk stemming for the before mentioned factors is very important for success in product development (Cooper, 2003). One way to reduce market risk is to determine and achieve understanding of the product's target market, which can guide companies in the development process and marketing activities for the product (Day & Wensley, 1988).

The present study was a part of EnRichMar; a cross-cultural, cooperative research project between various companies and research institutes from several European nations. The project's purpose is to increase the value of convenience food products by enriching the products with functional ingredients, produced from underutilized marine raw materials and byproducts from fish processing. A part of the EnRichMar research project was the task of segmenting consumers in each of five geographical markets; Iceland, Finland, Germany, Netherlands and Norway. Two research institutes (Matís from Iceland and VTT from Finland) and three different small/medium enterprises (SMEs) were directly involved in the segmentation task.

This study was performed for a practical purpose of an Icelandic manufacturer and seller of convenience seafood products. The company is currently looking into the possibility of selling ready-to-eat seafood products enriched with functional ingredients such as seaweed and Omega 3. The study's purpose was to segment consumers on the Icelandic retail food market in order to identify a suitable target segment for such products. The report begins with a theoretical discussion about market segmentation, followed by criteria for effective segmentation. Subsequently, the two main classes of segmentation methods are shortly reviewed, followed by a discussion of various segmentation bases. Then, the study's methodological aspects are reviewed and rationalized. Thereafter, the study's results are reported and finally the results and their meaning are discussed further.

2 Market segmentation

In the simplest terms, market segmentation is viewing a market as a number of smaller markets, i.e. dividing the market into a number of market segments. Theoretically, a market can be segmented with a wide range of detail; everything from viewing the market as only two groups, to segmenting the market into individual consumers. However, in order for market segmentation to be useful, a fundamental prerequisite is that market demand is divergent, meaning that consumer wants are heterogeneous, leading to different product preferences. The purpose of market segmentation is viewing the heterogeneous market as a number of smaller, more homogeneous market segments which have internally similar product preferences and externally different product preferences, which allows companies to satisfy their customers' wants with more precision, in comparison with trying to satisfy the wants of the market as a whole. This means that by adjusting marketing effort to the requirements and wants of particular consumer groups companies can secure product demand of the target market (Smith, 1956). This is commonly referred to as differentiating or positioning the product, which is an essential successor of the segmentation process (Borna & Chapman, 1993; Kotler & Keller, 2006; Smith, 1956).

The connection between market segmentation and differentiation can be explained further in terms of preference functions and distributions of product characteristics (Rosen, 1974). Theoretically, products can be viewed as a bundle of a limited number of product characteristics. When consumers make purchasing decisions they evaluate the benefits that they associate with each characteristic of the products and the diminishing effects of prices and transaction cost, and choose the product that maximizes their utility, i.e. value (Rosen, 1974). To comprehend this evaluation process, consumers can be viewed as distributions of preference functions, which describes the value that they personally associate with each product characteristic (Lancaster, 1979; Rosen, 1974). When consumers make purchase decisions they strive to achieve congruence between two functions; their own preference function and a product characteristic function. Hence, the more similar a product characteristic distribution function is to a consumer's

preference function the more likely is that the consumer chooses to buy the company's product (Dickson & Ginter, 1987; Rosen, 1974). Therefore it should be the aim of companies to perform their marketing activities in a way that maximizes congruence between the company's product functions and the preference functions of the company's target market. In this view, the goal of market segmentation can be considered as to find a group of homogeneous consumer preference functions and the goal of differentiation is to perform marketing activities in a way that creates or changes a product function to what achieves congruence with the preference functions of the consumers in the target market.

With respect to this challenge, market segmentation is viable in early stages of product development processes since product development should be related to consumer preferences (van Raaij & Verhallen, 1994). It is however important to note that consumers rarely possess full product information and therefore base their product purchasing decisions on their perceptions of product characteristics based on partial information (Dickson & Ginter, 1987). Those perceived characteristics are both physical and nonphysical and are those which formulate the consumers decision criteria, not the actual product characteristics (Porter, 1976 in Dickson & Ginter, 1987). Therefore companies should strive to perform their marketing activities in a way that makes the *perceived* product characteristic distribution function congruent with the consumer preference function.

2.1 Criteria for effective segmentation

There are six criterion that commonly formulate the criteria for effective market segmentation; identifiability, accessibility, responsiveness, actionability, stability and substantiality (Kotler, 1997; Wedel & Kamakura, 2000; Yankelovich & Meer, 2006).

Identifiability refers to the practical managerial ability of identifying the consumers that belong in a segment. First and foremost this requires necessary informational resources and depends on the availability of valid, reliable and measurable criteria, i.e. measureable variables which can be used as a basis to distinguish consumers into appropriate clearly distinguishable segments (Kotler, 1997; Wedel & Kamakura, 2000; Yankelovich & Meer, 2006).

Accessibility describes the extent to which a company can reach a targeted market segment through promotional or distributional efforts (Yankelovich & Meer, 2006). On one hand this refers to the availability and accuracy of information that can be used in selection of selecting communicational channels for promotional activities, e.g. demographic information and media habits (Blattberg & Sen, 1974). On the other hand this refers to the availability and accuracy of information useful to determine suitable distribution channels, e.g. socio-economics and purchasing habits (Kotler, 1997; Wedel & Kamakura, 2000; Yankelovich & Meer, 2006).

Responsiveness describes the degree to which the segments respond uniquely to marketing efforts (Yankelovich & Meer, 2006). This is a fundamental conceptual condition for an effective segmentation strategy since differentiation will only be effective if each segment is internally homogeneous but unique in response to marketing effort compared to other segments (Kotler, 1997; Wedel & Kamakura, 2000; Yankelovich & Meer, 2006).

Actionability is closely related to the *responsiveness* criterion and addresses the extent to which the profiles of the targeted segments provide guidance for decisions on the effective application of marketing instruments. Therefore, actionability of marketing segments is a prerequisite for designing effective marketing programs for target markets (Yankelovich & Meer, 2006). In addition actionability refers to if the company is able to perform marketing actions needed to deliver superior value when satisfying the consumer needs and if those actions are consistent with the goals and core competencies of the firm (Kotler, 1997; Wedel & Kamakura, 2000; Yankelovich & Meer, 2006).

Stability of market segments is necessary, at least for a long enough time period that is needed to design, implement and benefit from a marketing strategy (Yankelovich & Meer, 2006). If the targeted segment changes too fast, e.g. in terms of composition or behavior, marketing efforts are not very likely to succeed since the ground for the marketing efforts is likely to be vanished (Kotler, 1997; Wedel & Kamakura, 2000; Yankelovich & Meer, 2006).

Substantiality concerns if a market segment is sufficiently large to be profitable (Yankelovich & Meer, 2006). More specifically substantiality addresses the marginal

benefits of focusing on a particular target market compared to the required costs of delivering superior value when fulfilling the target market's wants. In this context challenge for companies is to determine the suitable precision level of the segmentation, i.e. determine the number of segments. The segments need to be precise enough to generate a possibility for the company to satisfy its wants to more extent than competitive companies, but still be large enough to be profitable (Smith, 1956). This criterion is therefore connected to the cost structure, marketing goals and capabilities of companies (Kotler, 1997; Wedel & Kamakura, 2000; Yankelovich & Meer, 2006).

Since market segments are not absolute in nature, but rather artificial groups of consumers created by managers and researchers, the countless existing ways to segment markets meet the above described criteria to a different extent. The results of market segmentation are mainly dependent on two critical tasks of the market segmentation process; the method used to segment the market and the basis which the segmentation is based on (Wedel & Kamakura, 2000). Both tasks are subjective in nature and are determined in accordance with the specific objectives of the concerning study (Johnson, 1971; Wedel & Kamakura, 2000).

2.2 Methods

Segmentation methods can roughly be divided in two basic analytical approaches; *priori* segmentation methods and *post hoc* segmentation methods (Green, 1977). In a *priori* segmentation, a descriptor that defines the segments, i.e. the basis on which the market is divided into groups, is chosen in advance, as well as the number of segments, which equals the number of the variable's dimensions. In general, only one variable is chosen as a segmentation basis and afterwards more variables are applied to characterize the segments (Green, 1977). In a *post hoc* segmentation, which utilization is more frequent today (Carrillat, Riggle, Locander, Gebhardt, & Lee, 2009 in Kaciak, 2011), consumers are statistically divided into segments according to the similarities and dissimilarities of their multivariate profiles. Following this, more variables which were not utilized as a basis for division can be added to further characterize the segments. In this kind of market segmentation the market researcher does not know the number of segments or their relative size in advance (Green, 1977).

In application of *post hoc* methods, researchers need to make subjective decisions regarding the size of the segments and the method of analysis. Furthermore, the process requires subjective decisions which include compromising between within-segment homogeneity on one hand and viable, accessible segments on the other. Those decisions may not be empirically verifiable (Hoek, Gendall, & Esslemont, 1996), for which the process of market segmentation has been criticized (Alford, 1990 in Hoek et al., 1996).

In addition, segmentation studies have been criticized for a lack of empirical support for segment stability over time. This is due to authoritative segmentation analyses having usually been one-off studies (Hoek et al., 1996). Contrary to ideal practices, marketers implicitly assume that segments remain stable, at least in short or medium terms (Hoek et al., 1996). Despite some methodological limitations, a study performed by Yuspeh and Fein (1982) gives reason to worry about this lack of validation in practice since only a small part of respondents were accurately reclassified two years after original segments had been defined (Hoek et al., 1996). This suggests that the original study had not provided reliable long-term predictions of consumers' behavior (Hoek et al., 1996), which is a problem that can persist even though segments are compact and widely separated (Assael and Roscoe, 1976).

2.3 Segmentation bases

Similarly to the choice of a segmentation method, the choice of a segmentation base involves subjective decisions that may not be empirically verifiable (Alford, 1990 in Hoek et al., 1996). Therefore the proper choice of the countless possible segmentation bases depends on the purpose of the study (Chisnall, 1985 in Tynan & Drayton, 1987, Green, 1977; Wedel & Kamakura, 2000).

Traditionally, directly observable segmentation bases were most common. These bases included specific variables such as usage frequency (Twedt, 1967), brand loyalty (Boyd & Massy, 1972) and usage situation (Dickson, 1982; Loudon & Della Bitta, 1993 in Wedel & Kamakura, 2000). In addition, these directly observable bases included general variables such as demographic and socio-economic variables, e.g. geographical location, household/firm size, household/firm life cycle, age, gender and media usage (Blattberg, Peacock, & Sen, 1976; Michel Wedel & Kamakura, 2000).

Despite the usefulness of general directly observable variables, such as demographics, to produce highly accessible, and identifiable segments (Wedel & Kamakura, 2000), application of such variables has been criticized for the lack of responsiveness and actionability of the produced segments. This is because variables such as demographics and socio-economics have generally turned out to have only weak or no predictive value of consumer behavior (Carpenter & Moore, 2006; Fennell, Allenby, Yang, & Edwards, 2003; Gupta & Chintagunta, 1994). This led market researchers to turn to psychological models and theories about human motivations and behavior, in hope to find ways to increase the actionability and responsiveness of produced segments in segmentation researches. Consequently, psychographic segmentation bases, providing better insights into consumers' motivations, were developed (Wedel & Kamakura, 2000).

2.3.1 Motivation & needs

Consumer researches relating to motivations, defined as the result of unmet needs, generally involve the challenge of understanding the relationship between motives and specific behavior (Foxall & Goldsmith, 1994 in Funk, Ridinger, & Moorman, 2004). Many motivational theories have been put forward in order to explain this relationship (for an overview, see Pincus, 2004). Most motivational theories divide human motivations into biological motivations (desire for survival and equilibrium of body functions) and social-cognitive motivations (desire for power and respect in the society, fun, enjoyment, and other more abstract and subjective phenomena than the mere need for biological survival) (Pincus, 2004). However, magnetic resonance imaging (MRI) studies have suggested that social and cognitive needs, abilities and their consequential behaviors can be traced to purely biological causes in brain anatomy (Kanai & Rees, 2011), rooted in human nature (Eibl-Eibesfeldt, 1997; Maslow, 1943; Palmer, 2012; Pincus, 2004; White, 1959). This leads to the conclusion that needs are all but impossible for marketer to change or affect. However, needs are believed to translate into wants, defined as the desire to satisfy particular needs in specific ways. The core mission of marketers is to affect those wants by convincing consumers that a certain satisfier, e.g. product, is superior to other available satisfiers of particular needs (Kotler & Keller, 2006).

2.3.2 Motivation theories and models

Perhaps both the most basic and the most recognized motivation theory is Abraham Maslow's (1943) theory of human motivations. The theory divides human needs into five universal levels (Figure 1), often presented and referred to as a hierarchy of needs (Cervone & Pervin, 2007; Palmer, 2012). The hierarchy represents the idea that needs are of different importance to the individual, which causes people to put more emphasis at satisfying lower level needs before they satisfy needs at higher levels of the hierarchy. A recent study by Taormina & Gao (2013) supported this theory.

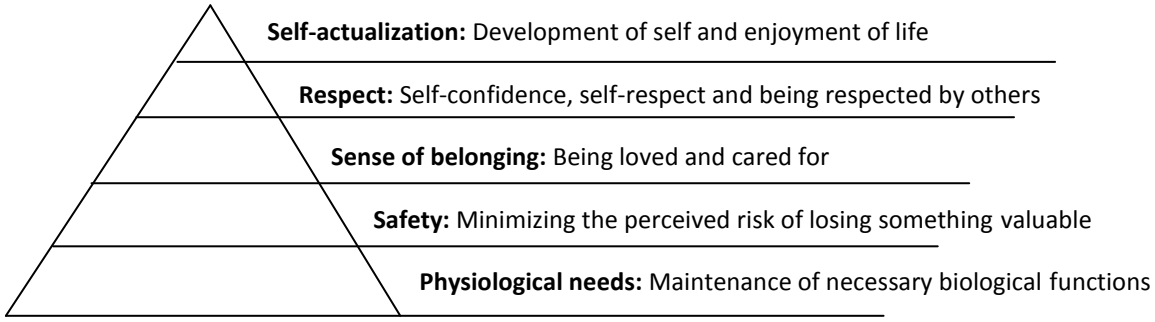

Figure 1: Maslow's theory of human motivations. Based on Palmer (2012).

In the marketing context, single satisfiers are believed to be able to satisfy multiple needs, in different levels of the hierarchy, simultaneously (Grant, 1999; Palmer, 2012). Functional food products could be an example of such satisfiers. For example, they could satisfy physiological needs by giving the body energy to efficiently carry out necessary physiological functions. They could satisfy the need for safety by lowering the perceived risk of disease (Frewer et al., 2003). They might satisfy the need for sense of belonging if their consumption would promote an individual to feel as a part of a social group. They could satisfy the need for respect if people find admirable to choose functional food products as a part of a disciplined and healthy lifestyle. Lastly, functional foods could satisfy the need for self-actualization by enhancing an individual's ability to engage in physical hobbies or by positively affect one's self image (Carducci, 2009; Cervone & Pervin, 2007; Maslow, 1943; Palmer, 2012).

The theory has been criticized for a variety of reasons (Strauss & Sayles, 1980), not least for its imperfection when it comes to explain individual differences in behavioral motivation (Pincus, 2004). However, MRI studies have suggested that inter-individual

differences in behavior can be traced to a biological differences in brain anatomy with consequent differences in cognitive functions such as perception, memory, consciousness and the ability to introspect, which in turn cause the before mentioned inter-individual behavioral differences (Kanai & Rees, 2011). Therefore it can be concluded that there are in fact universal human motivations, encoded in their biological nature, but due to differences in brain anatomy (Kanai & Rees, 2011), the extent to each of those universal needs differs between cultures and individuals (Kanai & Rees, 2011; Maslow, 1943; Taormina & Gao, 2013; White, 1959).

Although Maslow's theory has been directly employed in market segmentation researches (Brooker, 1975), other general motivational theories that were developed to bridge the gap between needs and behaviors have been much more directly influential in the market segmentation literature. Of those theories, two have been dominant; Fishbein and Ajzen's (1975) theory of planned behavior (Figure 2), and Homer and Kahle's (1988) values→attitudes→behavior hierarchy.

According to the theory of planned behavior, individuals possess beliefs regarding the nature of all phenomena. By evaluating these beliefs, people develop attitudes toward the phenomena, which then determine people's intentions to behave toward the phenomena. The intentions, accompanied by contextual factors, finally determine whether the individual actually performs the behavior or not. A meta analysis provided support for the efficacy of the theory by predicting of intentions and behavior in a variety of situations (Ajzen, 2012; Armitage & Conner, 2001).

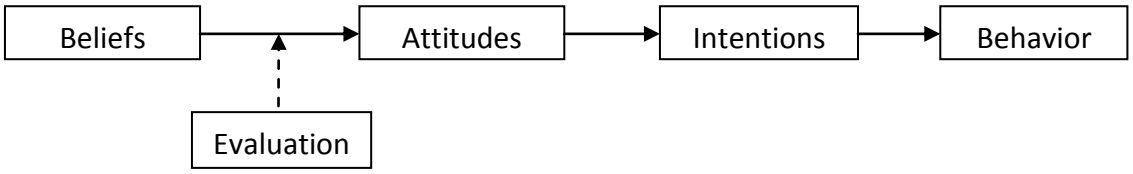

Figure 2. Simplified model of the theory of planned behavior. Based on Armitage & Conner (2001) and Ajzen (2012).

According to Homer and Kahle's (1988) Values→Attitudes→Behavior hierarchy, attitudes are derived from deeply held personal values. Similar to the theory of planned behavior, the attitudes are believed to determine people's behavioral intentions. The theory was cross culturally validated in the context of environmental concern (Milfont, Duckitt, & Wagner, 2010). The model has e.g. been successful to predict behavioral intention of environmental preservation (Vaske, 1999), mall shopping behavior (Shim & Eastlick, 1998) and the shopping of organic foods (Grunert & Juhl, 1995).

According to both theories, the relationship between needs and behaviors is mediated by additional cognitive constructs (i.e. beliefs, attitudes and intentions). Other cognitive constructs, such as personality, involvement and lifestyle, have in addition frequently been suggested as mediators of the relationship between needs and behaviors. In the subsequent chapters the before mentioned constructs; their relationships and relevance to market segmentation, will be reviewed and discussed.

2.3.3 Values

Schwartz (1994, p. 21) defined values as "*desirable trans-situational goals, varying in importance, that serve as guiding principles in the life of a person or other social entity*". Similarly, Rokeach et al. (1973) defined the concept as an "*enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end-state or existence along a continuum of relative importance"*. This means that values prioritize goals in life and modes of conduct and are therefore used as guidance by individuals in their decision processes and behavioral actions (Rokeach, 1973; Williams, 1968 in Alwin & Krosnick, 1985). Like most other definitions of values, those definitions suggest that values are *"concepts or beliefs about desirable end states or behaviors that transcend specific situations guide selection or evaluation of behavior and events and are ordered by relative importance*" (Schwartz & Bilsky, 1990, p. 551).

These definitions entail that values motivate individual behavior by functioning as standards for judging alternative actions and justifying selected options (Grunert & Juhl, 1995; Schwartz, 1994). Hence, they are individually held, vary in importance and guide individual cognitions and behaviors such as evaluations of products. Therefore, values

can be viewed as general individual expressions of human motivations (Grunert & Juhl, 1995; Schwartz, 1994). Values determine the importance of products to the self. In fact, products express and communicate individual values to others (Hye-Shin, 2005). Individual values are however not solely developed through individual learning experiences but individuals are also affected by dominant group values through socialization. Consequently, in addition to facilitating responses to individual needs, values facilitate coordinated social interaction and the smooth functioning and survival of groups (Schwartz, 1994). Despite that values are assumed to be central to the cognitive organization of the individual (Rokeach, 1970 in Alwin & Krosnick, 1985), the process of weighing and combining value priorities, when applying values, is generally not believed to be precise and self-conscious process, but rather an automatic response to specific situations and stimuli (Alwin & Krosnick, 1985; Schwartz, 1994).

It is generally accepted that people hold a substantially stable set of global values (Eagly & Chaiken, 1993; Rokeach, 1973; Schwartz, 1994). Two attempts to identify those value sets have been widely recognized; the List Of Values (Kahle, 1983; Verhoff, Douvan, & Kulka, 1981) and Schwartz' value types (1994).

The List Of Values was developed from a theoretical base of Feather's (1975), Maslow's (1943) and Rokeach's (1973) work on values and motivations (Beatty, Kahle, Homer, & Misra, 1985). The approach modified the Rokeach value survey's terminal values into a smaller subset of nine values generalizable across important life roles and situations. It is primarily person-oriented and was especially developed for consumer research by Veroff, Douvan and Kulka (1981). Homer and Kahle's (1988) concluded that the list of values divided into three dimensions (Table 1), thereof two internal and one external dimensions of values (Kahle, 1983).

Schwartz (1994) developed a similar framework by identifying ten value types (Table 2). The instrument has been cross-culturally validated and is considered to be a valid instrument for consumer behavior research (Grunert & Juhl, 1995). According to Schwartz (1994), the values either derive from the organism itself, its interactional groups or both. This is similar to Homer and Kahle's (1988) conclusion that values can be divided to internal and external dimensions.

Table 1: The List of values (Homer & Kahle, 1988, left) and Schwartz value types (Schwartz, 1994, right)

List Of Values	Schwartz value types
Individual values (internal)	**Organism**
Self-fulfillment	Hedonism
Sense of accomplishment	Stimulation
Excitement	**Organism / interaction group**
Self respect	Security
Social values (external)	Self direction
Sense of belonging	Universalism
Being well respected	Benevolence
Security	**Interaction group**
Interpersonal values (internal)	Power
Fun and enjoyment in life	Tradition
Warm relationships with others	Conformity
	Achievement

Although values are generally not believed to have a strong relationship with behavior (McCarty & Shrum, 2000 in Watkins & Gnoth, 2010; Feather, 1990 in Honkanen & Verplanken, 2004), research has suggested that such relationships does exist (Bardi & Schwartz, 2003; Beatty, Kahle, & Homer, 1991; Becker & Connor, 1981; Karp, 1996; Khadija & SAF, 2013; Rogers & Williams, 1990). However, the relationship is believed to be indirect (Cai & Shannon, 2012; Honkanen & Verplanken, 2004; Kahle, 1983; Moyano & Lengler, 2013; Muzikante & Reņģe, 2011). Following a theoretical debate (Gundelach, 1992), Thøgersen & Ölander (2002) studied the direction of the relationship between values and behavior. Results showed that values predominantly caused behavior, at least in a short term or medium term perspective. Furthermore, values proved to be very stable over time. It is believed that even with a concentrated effort, changing values takes a very long time (Eagly & Kulesa, 1997 in Thøgersen & Ölander, 2002). Nevertheless, behavioral patterns also proved to be very stable, which suggests that behavior is not an immediate and direct response to ones value priorities (Thøgersen & Ölander, 2002), which makes changes in behavior a lagging response to changes in values or value priorities.

Values have been successfully used in market segmentation research to divide consumers into different consumer types (i.e. segments) (Beatty et al., 1991; Hye-Shin, 2005; Pitts & Woodside, 1986), and thereof in the context of functional foods (Szakály, Balogh, Jasák, Szabó, & Szente, 2014). However, due to the general nature of values,

they can only be assumed to be feasible segmentation bases for the identification of general segments, but not for specific and narrowly defined purposes. For example, values are not viable in market researches addressing a specific product category or a specific context, but rather when addressing general cognitions or behavior, regardless of the exact stimuli.

2.3.4 Personality

The concept of personality is closely related to values and has in fact been defined as a system of values (Rokeach, 1973). The existence of five universal human personality dimensions (Table 2) is widely accepted and dominant in the personality literature (Gurven, von Rueden, Massenkoff, Kaplan, & Lero Vie, 2013; Marsh et al., 2010), but the theory has been cross-culturally validated in over 50 societies across six continents (Schmitt, Allik, McCrae, & Benet-Martínez, 2007). Experience sampling studies have revealed that the factors of the five factor theory is a good predictor of behavior as response to eliciting stimuli (Fleeson, 2001 in DeYoung et al., 2010).

Table 2: The five factor theory of human personality (see (Schmitt et al., 2007), Aaker's brand personality dimensions (Aaker, 1997) and Geuen's brand personality dimensions (Geuen's et al., 2009)

Human personality	Aaker's brand personality	Geuen's brand personality
Extraversion	**Excitement**	**Activity**
Activity level	Daring	Active
Excitement-seeking	Spirited	Dynamic
Cheerfulness	Imaginative	Innovative
Friendliness	Up-to-date	
Agreeableness	**Sincerity**	**Responsibility**
Trust	Down to earth	Down to earth
Modesty	Honest	Stable
Sympathy	Wholesome	Responsible
Cooperation	Cheerful	
Emotional stability	**Ruggedness**	**Aggressiveness**
Anger	Outdoorsy	Aggressive
Self-consciousness	Tough	Bold
Openness	**Sophistication**	**Simplicity**
Imagination	Upper class	Ordinary
Emotionality	Charming	Simple
Conscientiousness	**Competence**	**Emotionality**
Orderliness	Reliable	Romantic
Achievement-striving	Intelligent	Sentimental
Self-discipline	Successful	

In the context of marketing, personality is relevant from the perspective that consumer decisions partly play the part of enacting their social identities, i.e. defining and maintaining their self concept. The more consistent a product is to one's self concept, the more attractive is the product in the eyes of the consumer (Kleine, Kleine, & Kernan, 1993; Phau & Lau, 2001), so in cases where the product image is consistent with the consumer's personality, the symbolic meaning of the product can affect the consumer's behavior (Holbrook, 1992; Zinkhan & Hong, 1991).

To facilitate practical application of the idea that consumers seek products that are congruent with their personality (Aaker, 2004; Holbrook, 1992), Jennifer Aaker (1997) defined dimensions of brand personality, which is defined as *"the set of human characteristics associated with a brand"* (p. 347). Parallel to human personality, Aaker's research concluded that brand personality had five dimensions (Table 2), which proved to be reliable after test-retest measures. Following criticism toward e.g. the cross-cultural and construct validity of Aaker's brand dimensions (Azoulay & Kapferer, 2003), Geuens et al. (2009) defined new dimensions of brand personality (Table 2), which proved to be reliable and valid after cross-cultural and test-retest measures.

However, neither Aaker's (1997) nor Geuens' (2009) brand personality dimensions correspond directly to the human personality dimensions (Table 2), although some of the dimensions (Aaker's Excitement, Sincerity and Competence and Geuens' Activity and Responsibility) have similar meaning as the factors of the five factor theory (Extraversion, Agreeableness and Conscientiousness), which decreases the practical value of brand personality with respect to trying to achieve congruence between brand personality and personality of consumers. However, brand personality has shown to drive consumer behavior (Ahmad & Thyagaraj, 2015; Freling & Forbes, 2005). Due to that personality measures in marketing are typically applied on the basis of the idea of self-congruency, personality measures are first and foremost applied on the brand-level. However, reported market researches on functional foods have usually been on the product- or product category level instead of the brand level. Personality measures have therefore rarely been the variables of choice for functional food marketing researches.

2.3.5 Beliefs

Beliefs are defined as one's subjective judgments regarding the likelihood of a relationship between two concepts (Fishbein, 1967 in Olson & Dover, 1976). These concepts can be either cognitive or affective. However, those should not be seen as two unrelated groups of beliefs, but either that some beliefs are more cognitive and some more affective. Most or all beliefs include some degree of cognition and some degree of affection (Eagly, Mladinic, & Otto, 1994; Trafimow & Sheeran, 1998).

Since beliefs are linkages between an object and another phenomena (Ajzen, 1991) they are conceptually based on the same ideology as semantic network models, which conceptualize thinking as linking two or more nodes stored in memory (Ratcliff & McKoon, 1988). When individuals obtain new information they integrate the information with their current set of believes, if the new information does not oppose the current belief system to a too great extent to be accepted (Ajzen & Fishbein, 1975).

A key characteristic of beliefs is *confidence* (sometimes referred to as certainty). Confidence "*is a cognitive construct that reflects one's conviction in one's beliefs"* (Bennett & Harrell, 1975 in Smith & Swinyard, 1988). Confidence has been shown to increase with increased quantity (Dover & Olson, 1977), credibility (Ajzen & Fishbein, 1975) and consistency (Heslin, Blake, & Rotton, 1972 in Smith & Swinyard, 1988) of information. With increased confidence in their believes, consumers become more persistent to new information that contradict their present believes and therefore become less likely to change their believes (Eagly, 1981; Wright, 1975) in (Yi, 1988). Insights into consumer beliefs, and the characteristics of their beliefs, can therefore be useful to determine if individuals can qualify as potential customers, and indicates how much effort would be needed to convert an inactive consumer to a customer.

In the context of functional foods, belief questionnaires have been utilized in order to evaluate people's knowledge about the health benefits and qualities of various functional foods (Ding, Veeman, & Adamowicz, 2013; Nolan-Clark, Neale, Probst, Charlton, & Tapsell, 2011; Patch, Tapsell, & Williams, 2005; Wansink, Westgren, & Cheney, 2005), but it has been suggested that those who are more knowledgeable about functional food products are more likely to consume such products (Wansink et al., 2005).

However, no segmentation bases that have been used in the context of functional foods are solely based on belief items. This is probably due to lack of motivational meaning of the concept, which causes lack of behavioral predictability. However, belief items are known to account for some part of segmentation bases items (Urala & Lähteenmäki, 2004) since beliefs regarding consequences of food consumption can provide insights into the relationship between values or preferences and products or product attributes (Grunert, Grunert, & Sørensen, 1995; Urala & Lähteenmäki, 2004).

For example, belief items make up the main part of a scale by Urala and Lähteenmäki (2004) that was developed to estimate cognitive associations toward functional foods. The scale divides cognitive associations toward functional foods into seven dimensions (Table 3). The instrument has been showed to be valid in several different cultures (Carrillo, Prado-Gascó, Fiszman, & Varela, 2013; Chen, 2011; Urala & Lähteenmäki, 2004) and has been partly included for segmentation purposes (Bechtold & Abdulai, 2014; de Barcellos & Lionello, 2011).

Table 3. Urala and Lähteenmäki's dimensions of beliefs toward functional foods (2004)

Dimension	Meaning
Reward from functional foods	The belief that using functional foods improves one's health and performance and thus gives a tool to take care of oneself
Confidence in functional foods	Believability of claims and information about functional foods and/or their health effects
Necessity of functional foods	How essential consumers believe that functional foods are for people in general
Functional foods as medicine	The belief whether or not functional foods can be used for same purposes as medicines
Functional foods as a part of a healthy diet	Beliefs regarding if the use of functional foods can be seen as a part of a normal, healthy diet and if functional foods may counteract otherwise unhealthy food choices
Absence of nutritional risk in functional foods	Beliefs about possible harmful effects of functional foods
Taste of functional foods	Beliefs regarding the possible conflict between a pleasant taste and the health benefit of functional foods

2.3.6 Attitudes

Attitudes are lasting, general evaluations of a phenomena as either favorable or unfavorable to some extent (Katz, 1960; Baron & Byrne, 1987 in Solomon, Bamossy, Askegaard, & Hogg, 2010). The concept of attitudes are closely related to opinions, which have simply been defined as a verbal expressions of attitudes (Katz, 1960). Attitudes are considered to encompass both affective and cognitive evaluations (Katz, 1960). Furthermore, it is believed that single attributes and characteristics of phenomena are viewed by each individual to some extent as positive or negative, making attitudes toward the phenomena as a whole an aggregative evaluation of its characteristics (Ajzen, 1991; Fishbein, 1967; Lutz, 1975), which individuals are believed to form immediately when beliefs are formed, whether it is done consciously or unconsciously (Ajzen, 2012). Individuals access their attitudes by the sole presentation of a topic or an object (Fazio, Powell, & Herr, 1983).

According to Fishbein and Ajzen's (1975) theory of planned behavior and expectancy value model of attitudes, attitudes develop from the beliefs people hold about the object (Ajzen, 1991). Namely, when individuals have evaluated a belief they hold, an attitude has been formed. This has been put forward mathematically as Attitude = Belief * Evaluation, which generally means that attitude is the multiplication of the likelihood of a behavioral outcome and the degree of positivity or negativity of that particular outcome. This relationship has been validated since changes in beliefs have shown to be accompanied with changes in attitudes (Lutz, 1975).

Empirical evidence has suggested that values also influence attitudes (Feather, Norman, & Worsley, 1998; Homer & Kahle, 1988; Hurst, Dittmar, Bond, & Kasser, 2013; Maio & Olson, 1995). This is not included in the theory of planned action, which claims that attitudes are formed by *evaluating beliefs* (Ajzen, 1991; Ajzen & Fishbein, 1975; Fishbein, 1967). Evaluation has for example been defined as *"the comparison of an object of interest against a standard of acceptability"* (Green, 1974), *"A process of determining the quality or worth of something"* (Worthen & Sanders, 1987) and *"The determination of congruence between performance and objectives"* (Mehrens & Lehmann, 1991). However, by looking at these definitions of *evaluation* it becomes clear that evaluating is determining the value or worth of outcomes or end-states by

estimating congruence between with some standards or points of reference (Green, 1974; Mehrens & Lehmann, 1991; Worthen & Sanders, 1987). In the view of beliefs being the likelihood of specific outcomes (Ajzen, 1991, 2012; Ajzen & Fishbein, 1975) and values determining which outcomes are preferable to others (Homer & Kahle, 1988; Schwartz & Bilsky, 1990) it is possible that the two concepts are interrelated in the way that attitudes are formed when beliefs about an attitude object are compared to one's values, which then serve as an evaluation criteria. This is consistent with the findings of Pitts and Woodside (1983) which study concluded that among a variety of dependent variables, people's value structures had highest correlations with people's product choice criteria.

Even though attitudes change (Katz, 1960) they are significantly stable over time, i.e. change at a considerably slow rate (Bishop, Hamilton, & McConahay, 1980; Solomon et al., 2010). Katz (1960) claimed that one of two conditions had to exist for the possibility of an attitude change; dissatisfaction with values, where the attitude change consequently stems from changes in personal values, or dissatisfaction with attitudes due to their inconsistency with the personal values. In the second situation the attitude change might stem from new information or experiences, or even merely by more extensive thinking about the attitude object (Tesser, Martin, & Mendolia, 1995). However, by looking at the theory of planned action, new information or experiences is exactly what is necessary to change one's beliefs, which again underpins the idea of values as evaluation criteria. Hence, attitude changes are subsequent either to changes in personal values or in beliefs about the attitude object.

Attitudes have been found to predict behavior (Homer & Kahle, 1988), and a meta-analysis revealed that correlations between attitudes and behavior has usually been of moderate strength (Cohen, 1988; Greenwald, Andrew, Uhlmann, & Banaji, 2009 in Ajzen, 2012). The strength of the relationship has however varied considerably (Cook & Flay, 1978; Festinger, 1964; Petty, Haugtvedt, & Smith, 1995), but the strength of this relationship is believed to increase with increased attitude strength and its sub-characteristics (Kallgren & Wood, 1986 in Tesser et al., 1995; Petty et al., 1995).

Attitude strength is determined in terms of a few key consequential features; persistency over time, resistance to change and their impact on judgments and behavior (Krosnick & Petty, 1995; Petty et al., 1995; Petty & Krosnick, 1995). Several characteristics are considered to influence those features, such as valence (i.e. whether they are positive or negative) and extremity (the degree of the valence, the deviation from neutrality) (Judd & Brauer, 1995; Petty & Krosnick, 1995). Centrality is another important characteristic of attitudes. Centrality refers to how important a phenomenon is to an individual. Centrality is concerned with attitudes' relations with values and is thereby believed to moderate the relationship between values and attitudes (Honkanen & Verplanken, 2004; Judd & Krosnick, 1982). More central attitudes tend to be more extreme, i.e. polarized (Judd & Krosnick, 1982). Attitude strength is a wide concept that, in addition to extremity, valence and centrality, comprises characteristics like level of confidence in the attitude and accessibility in memory (Honkanen & Verplanken, 2004). Those characteristics mediate the relationship between values and attitudes (Honkanen & Verplanken, 2004).

In addition, the relationship between attitudes and behaviors can be distorted by various situational factors (Epstein, 1983 in Ajzen, 1991). For example, Feather et al. (1998) found that the relationship between elicitation of values and perceived attractiveness of foods is mediated by the context that the food is presented in. Consequently, certain values might have stronger relationship with behavior in some situations compared to other situations. Therefore, the predictive value of attitudes' can only be viewed with respect to aggregative, i.e. general, behavior (Epstein, 1983 in Ajzen, 1991). Furthermore, it is worth noting that in researches which are intended to link attitudes and behaviors, it is important that the questions relating to attitudes on one hand and behavior on the other hand are equally general or specific (Armitage & Conner, 2001). General attitudes only cue general behaviors and specific attitudes only cue specific behaviors. Therefore, general attitudes cannot predict a specific behavior in a specific situation (Epstein, 1983 in Ajzen, 1991).

The Food Choice Questionnaire developed by Steptoe, Pollard and Wardle (1995) addresses general consumer attitudes toward various food characteristics. The instrument divides the general consumer attitudes in nine dimensions (Table 4). The instrument has been proved to be cross-culturally valid (Pieniak, Verbeke, Vanhonacker, Guerrero, & Hersleth, 2009) and it has been successfully used as a market segmentation basis (Honkanen & Frewer, 2009).

Table 4. The dimensions of the Food Choice Questionnaire (Steptoe, Pollard & Wardle, 1995).

Dimension	Meaning
Health	Attitudes toward healthiness of food
Mood	Attitudes toward emotional consequences of food consumption
Convenience	Attitudes toward the amount of effort needed to obtain and prepare food products before consumption
Sensory Appeal	Attitudes toward sensory characteristics of food products
Natural content	Attitudes toward the naturalness of food
Price	Attitudes toward the pricing of food products
Weight control	Attitudes toward the consequences that consumption of food products has on one's weight
Familiarity	Attitudes toward familiar and unfamiliar food products
Ethical concern	Attitudes toward the ethical aspects of food products, such as political and environmental factors that people connect with the products

2.3.7 Involvement

Involvement refers to the extent of relevance of a phenomenon to one's needs, values and interests, which degree is dependent on the individual's internal state of motivation, partly subject to point in time and context (Funk et al., 2004; Rothschild, 1984; Zaichkowsky, 1985). Involvement has been showed to have five dimensions (Kapferer & Laurent, 1993): 1) the personal interest a person has in an object, personal meaning or importance, 2) the hedonic value of the product; its ability to provide pleasure and enjoyment, 3) the sign value of the object, the degree to which it expresses the person's self, 4) the perceived importance of the potential negative consequences associated with a poor choice of the object (risk importance) and 5) the perceived probability of making such a poor choice (risk probability). Based on this division, Kapferer & Laurent's (1993) Consumer Involvement Profile (CIP) measurement has been used in market segmentation (Hye-Shin, 2005).

In addition, specific types of involvement have been defined. Examples are product involvement, which refers to consumers' enthusiasm with products or product categories (Goldsmith & Emmert, 1991 in Hye-Shin, 2005) and purchase-decision involvement, which dimensions are degree of caring, perceived brand differences, importance of right brand selections and concern with the purchasing outcome (Mittal, 1989). Such specific involvement measures have also been successfully used as a market segmentation basis (Lockshin, Spawton, & Macintosh, 1997). Involvement has been used in segmentation researches concerning food products (Pieniak, Verbeke, Olsen, Hansen, & Brunsø, 2010; Verbeke & Vackier, 2004) and functional food products (Ares, Besio, Giménez, & Deliza, 2010).

2.3.8 Lifestyle

Lifestyle is a broad concept that which definitions have generally comprised both patterns of overt behavior and cognitive processes. Consequently the concept encompasses wide range of sub-concepts such as values, attitudes, opinions and interests (Anderson & Golden, 1984). Despite being a separate concept, lifestyle is asymmetric with behavioral theories such as the theory of planned behavior (Ajzen & Fishbein, 1975) and the values→attitude→behavior hierarchy (Homer & Kahle, 1988). In fact, the concept integrates the key aspects of such theories into one concept, or at least requires harmony among the concerning concepts, i.e. values, beliefs, attitudes and actions.

General lifestyle measurements, such as the VALS (Values, Attitudes and Life Styles) survey (Mitchell, 1983) and the AIO (Attitudes, Interests, Opinions) approach (Wells & Tigert, 1971) have frequently been utilized as bases in market segmentation studies (Wedel & Kamakura, 2000). However, Brunsø and Grunert (1995) developed a specialized lifestyle instrument for the context of food; the Food Related Lifestyle instrument, commonly referred to as the FRL instrument. Food related lifestyle is defined as *"a system of cognitive categories, scripts and associative networks relating a set of food-related behaviors to a set of values"* (Brunsø, Scholderer, & Grunert, 2004b, p. 196). The instrument consists of 69 Likert-type items dividing food related lifestyle into 23 dimensions, each belonging to one of five interrelated aspects (Table 5).

Table 5. Dimensions and sub-dimensions of the FRL instrument (Brunsø and Grunert, 1995)

Ways of shopping	Quality Aspects	Cooking methods	Consumption situations	Purchasing motives
Importance of product information	Health	Interest in cooking	Snacks vs. meals	Self-fulfillment in food
Attitudes to advertising	Price/quality relation	Looking for new ways	Social event	Security
Enjoyment from shopping	Novelty	Convenience		Social relationships
Specialty shops	Ecological products	Whole family		
Price criteria	Taste	Planning		
Shopping list	Freshness	Woman's task		

The first aspect is *ways of shopping*, which concerns shopping habits and decision-making processes. The second aspect, *quality aspects,* concerns the extent of desirability of various food characteristics. The third aspect, *cooking methods*, concerns the time, methods, attitudes and habits usually involved when individuals prepare meals at home. The fourth aspect, *consumption situations,* concerns how often, how many, and how important meals are to the individual. The fifth aspect, *purchasing motives,* addresses the expected consequences of meals and importance of those. The FRL instrument has been developed and tested in several European countries with regard to cross-cultural validity, has proved stable over time, and has been used to derive pan-European food consumer segments (Brunsø & Grunert, 1995; Scholderer, Brunsø, Bredahl, & Grunert, 2004).

Various other instruments that measure specific aspects that are included in the Food Related Lifestyle instrument have been developed. One of those is the Food Neophobia scale (Pliner & Hobden, 1992), which estimates people's tendency or aversion to try novel foods and therefore addresses similar constructs as the *security* and *novelty* subscales of the Food Related Lifestyle instrument. Another example is the Health and Taste Attitude Questionnaire (Roininen et al. 1999). Despite being titled as an attitude questionnaire, the Health and Taste Attitude Questionnaire includes various items that address e.g. beliefs and general behavior, perhaps making the title misleading. Nevertheless, the instrument includes two categories: *Health* and *Taste*, both of which include three sub-dimensions (*general health interests, light product interest, natural product interest* sub-dimensions of *Health* and *craving for sweet foods, using food as reward* and *pleasure* sub-dimensions of *Taste*) (Roininen, 2001).

2.3.9 Intentions

Individuals' intentions to perform a specific behavior in believed to be the strongest predictor of behavior (Ajzen, 1991) and indicates how much effort they are ready to put into performing the specific behavior. Intentions are a direct consequential successor of attitudes, which generally are found to be the strongest predictor of behavioral intention (Ajzen, 2012; Eagly & Chaiken, 1993 in Honkanen & Verplanken, 2004). It is important to note that to achieve a valid measure of intention it is important to give respondents a specific behavior in a specific situation (Ajzen, 1991).

Although behavioral intention have been used as a part of segmentation bases (Chen, 2003), intentions are more commonly used as a dependent variable, e.g. to determine what motivational constructs are important in a specific context (Brown, Pope, & Voges, 2003; Hollebeek, Jaeger, Brodie, & Balemi, 2007; Vermeir & Verbeke, 2006).

2.3.10 Using different segmentation bases

Because different segmentation bases have different advantages, using multiple segmentation bases can been beneficial and provide better solution since they can create synergies for one another (van der Zanden, van Kleef, de Wijk, & van Trijp, 2014; Wedel & Kamakura, 2000). General observable variables, such as demographic and socio-economic characteristics aid in the identifiability and accessibility of segments, e.g. by guiding media selection (Blattberg & Sen, 1974; Wedel & Kamakura, 2000). Furthermore, functional variables with motivational meaning, such as values, beliefs, attitudes and lifestyle enhance segments' responsiveness to the marketing mix and actionability (Blattberg & Sen, 1974; Pincus, 2004; Wedel & Kamakura, 2000). Since there is no one correct way to segment a population, the segmentation base has to be matched to the study's objectives to provide the most meaningful results (van der Zanden et al., 2014).

3 Methodology

This section starts with a review and justifications for the measurements that were used in the study. Some aspects of the questionnaire (Appendix 2; SME1a-SME4b) are excluded because of confidentiality matters and/or that they are not relevant to this study, despite having been relevant to the research project as a whole. Following the measurements, the data collection process and demographic characteristics of the sample are reviewed. Finally, the data analysis process is described and justified.

3.1 Measurements

The questionnaire aimed at providing a basis fit to divide the respondents into segments including at least one segment that could be considered as a viable target market for functional ready-to-eat seafood products. This included measuring and quantifying various aspects of food purchasing behavior and its predictors. These are complicated phenomena which can be difficult to measure. Therefore it was found to be appropriate to use multiple scales that measure the extent to which respondents disagree or agree to multiple expressions that represent the topic that was to be measured, which is the most common method when conducting this type of research (Costell, Tárrega, & Bayarri, 2010; van der Zanden et al., 2014).

The questionnaire was based on various known and empirically tested and validated scales (for the questionnaire, see Appendix 2). The scales can be divided into two categories based on their purpose and usage in the study; scales used in segmentation and scales used to describe and further characterize the segments. Since every additional segmentation variable requires relatively big increase in number of responses to ensure valid results (Mooi & Sarstedt, 2011), only scales that were believed to be fundamental for the creation of clusters that would be highly relevant to the study's aim were used in the actual segmentation analysis, as recommended by Milligan (1996 in Everitt, Ladau, & Leese, 2001). All scales that were used in the segmentation were on a seven point Likert scale where 1 equaled "completely disagree" and 7 equaled "completely agree". The segmentation scales measured six aspects:

1) **Attitudes, beliefs and behaviors toward novel foods.** This was considered important as the food products that are intended to be developed are novel and

unknown to consumers. Thus, it was deemed necessary to identify such consumers who hold positive attitude towards novel foods in general, but consumers who are novelty seeking are more likely to accept a new food product than those who are novelty avoidant (Henriques, King, & Meiselman, 2009). Attitudes, beliefs and behaviors towards novel foods were measured with three scales. Two of those were subscales of the food related lifestyle instrument (*novelty* and *security*, see Appendix 2: S1a-S2c) (Brunsø & Grunert, 1995; Grunert, Brunsø, & Bisp, 1993; Scholderer et al., 2004). The instrument has been cross culturally validated among various European cultures (Brunsø & Grunert, 1995) and has been used before as a basis for market segmentation (Kesic & Piri-Rajh, 2003; Ryan, Cowan, McCarthy, & O'sullivan, 2004; Wycherley, McCarthy, & Cowan, 2008). The other scale was the Food neophobia scale (see Appendix 2: S3a-S3j) developed by Pliner and Hobden (1992), which has also been used in market segmentation (Barrena & Sánchez, 2013; Henriques et al., 2009). However, there have been some concerns about the unidimensionality and cross-cultural validity of the original instrument (Koivisto & Sjödén, 1996; Ritchey, Frank, Hursti, & Tuorila, 2003) but Ritchey et al. (2003) suggested a shortened version of the instrument that proved to be valid across three cultures. Nevertheless, since validity would be checked in the data analysis in the present research, the whole original instrument was included in the questionnaire.

2) **Importance of healthiness of food, attitudes and behaviors toward healthy foods**. The functional food products that are to be developed are considered to be healthy foods and are more likely to be accepted by consumers who are health concerned and appreciate healthy foods (Roininen et al., 1999; Urala & Lähteenmäki, 2007). Therefore measuring the importance of healthiness of food and the attitudes and behaviors toward healthy foods was considered to be relevant and was measured with the General health interest subscale (see Appendix 2: S5a-S5h) of the Health and Taste Attitudes Questionnaires developed by Roininen, Lähteenmäki and Tuorila (1999), which has been showed to be valid across various Western-European cultures (Roininen et al., 2001) and has been used

for segmentation purposes (Chrysochou, Askegaard, Grunert, & Kristensen, 2010; Onwezen et al., 2012).

3) **Beliefs and attitudes toward functional foods**. Because beliefs and attitudes have been found to influence behaviors it was considered likely that consumers who in general hold positive attitudes toward functional foods and believe in their health promoting effects might be the most interested in the functional food products that are to be developed in this project (Homer & Kahle, 1988). Therefore it was considered critical for the study to use such measures as a part of the segmentation basis. Two of the seven scales developed by Urala and Lähteenmäki (2004, 2007) were used to measure beliefs and attitudes toward functional foods. The first one was *Reward from using functional foods* (see Appendix 2: S7a-S7i), which turned out to have the best predictor of willingness to use (Urala & Lähteenmäki, 2004) among the seven scales. The second scale was *Necessity of functional foods* (see Appendix 2: S6a-S6h), which also had a positive relationship with willingness to use (Urala & Lähteenmäki, 2004). Before responding to the scales, participants were given a short information text that explained the meaning of the term functional food since the product category is fairly new (Diplock et al., 1999 in Urala & Lähteenmäki, 2004) and therefore it was not considered safe to assume that the respondents were familiar with the term.

4) **Price awareness** was considered to be a relevant factor since it would indicate what segments would be most profitable and what price strategies would be most relevant, since consumers with lower price awareness can be charged with higher prices, which in turn increases profits (Evanschitzky, Kenning, & Vogel, 2004). Price awareness was measured with two subscales of the Food related lifestyle instrument (*Price criteria* and *Price/quality relation,* see Appendix 2: S8a-S9c) (Brunsø & Grunert, 1995; Grunert et al., 1993; Scholderer et al., 2004).

5) **Taste.** When developing functional foods, it is possible that taste has to be compromised for the additional health benefits (Verbeke, 2006). Taste has been found to be one of the most influential factors when it comes to buying intentions of functional food products (Bech-Larsen et al., 2001; Urala & Lahteenmaki, 2003).

However, some are prepared to compromise on taste for potential health benefits (Verbeke, 2006), so measuring importance of taste to the respondents was considered to be helpful to identify such segments, since less perceived importance of taste would suggest more willingness to compromise taste for health benefits. To measure importance of taste the *Taste* subscale (see Appendix 2: S4a-S4c) of the Food related lifestyle instrument was used (Brunsø & Grunert, 1995; Grunert et al., 1993; Scholderer et al., 2004). In addition, two other items concerning taste were added on SME request (see Appendix 2: S4d-S4e).

6) **Attitudes and behaviors toward naturalness of food.** The products that are intended to be developed are not natural as such. It has been suggested that perceived unnaturalness of functional foods can cause distrust in the product category (Jonas & Beckmann, 1998 in Bäckström, Pirttilä-Backman, & Tuorila, 2003), which in turn decreases willingness to buy (Urala & Lähteenmäki, 2004). Thus, it was deemed important to measure consumers' attitudes and behaviors toward the naturalness of foods. For this purpose, three scales were used; two subscales of the Food related lifestyle instrument (*Organic products* and *Health,* see Appendix 2: S10a-S11c) (Brunsø & Grunert, 1995; Grunert et al., 1993; Scholderer et al., 2004) and the *Environmental protection* scale (see Appendix 2: S12a-S12c) by Lindeman & Väänänen (2000), which is a complementary scale to the Food Choice Questionnaire (Steptoe et al., 1995), which has been used as a basis for market segmentation (Honkanen & Frewer, 2009) and has furthermore been proven to be a cross-culturally valid measurement (Pieniak et al., 2009).

Seven aspects were used to describe the segments:

1) **Demographic and socio-economic factors** (age, gender, living area, household type, education, occupation, income level; see Appendix 2: B1-B7) were considered to provide information that would be useful in determining how to approach the segments, but clear demographic characteristics can make market communication relatively unproblematic (Wedel & Kamakura, 2000), e.g. by facilitating media selection (Blattberg & Sen, 1974). Demographic and socio-economic variables have been identified as the most common variables that are utilized in segmentation studies (Ming-Chih, Yi-Ting, & Ching-Wei, 2011).

2) **Food purchasing habits** (shopping locations, frequency of shopping, factors that influence purchasing decisions, food diets, participation in planning and buying foods for household). Participation in planning and buying foods for household (see Appendix 2: B8) was considered to aid in evaluating if the segments were feasible since involvement in the purchasing process is necessary for the responsiveness of segments (Kotler, 1997; Wedel & Kamakura, 2000; Yankelovich & Meer, 2006). Shopping locations and frequency of shopping (see Appendix 2: B12a-B12h) were considered to provide information about the most suitable distribution channels. Food diets (see Appendix 2: B13) were believed to aid in product development since it provided information about ingredients that were generally avoided or especially sought after. Three scales from existing instruments were used to describe factors that influence purchasing decisions. Two of those scales were subscales of the Food related lifestyle instrument (*Importance of product information* and *Attitudes towards advertising,* see Appendix 2: B9a-B10c) by Grunert et al. (1993; Brunsø & Grunert, 1995; Scholderer et al., 2004). Importance of product information to the consumer was considered to be important because the main advantage of the functional food products is the health function of their ingredients, so with consumers more involved in product information those functionalities would be easier to communicate to the consumers through packaging. Consumers' beliefs in advertising were considered to provide insights into how consumers gathered information about food products and thereby be helpful in deciding how to communicate the products' qualities to the consumers. Furthermore, attitudes toward advertisements have been proved to have effect on advertising efficiency and purchasing behavior (Brown & Stayman, 1992; MacKenzie, Lutz, & Belch, 1986) and therefore it can be assumed that consumers who hold positive attitudes toward advertisements in general are more likely to be affected by such marketing activities. In addition to the before mentioned scales, one subscale of the Food choice questionnaire (*Convenience*, see Appendix 2: B11a-B11e) by Steptoe et al. (1995) was utilized. This was considered to be relevant since the to-be-developed food products will be ready-to-eat products, so appreciation of convenience in food consumption was deemed to be necessary for the products to be relevant to the consumers.

3) **Relevance of enriched products.** Questions regarding cardiovascular diseases, physical health and physical activities were deemed to be helpful to estimate if and why the to-be-developed products would be relevant to the consumers and what could motivate them to buy functional food products. Questions regarding cardiovascular diseases (see Appendix 2: B14-B16) were considered helpful to estimate relevance of the products to the consumers since Omega 3 is considered to have a beneficial effect on cardiovascular functions (Mozaffarian, 2008; Murphy et al., 2007; Stark & Holub, 2004; Ueshima et al., 2007). Those questions were based on Dean, Lampila, Shepherd, Arvola, Saba, Vassallo, Claupein, Winkelmann and Lähteenmäki (2012), but in addition to having a health disorder oneself, the likelihood of acceptance of functional foods are believed to increase with the presence of an ill family member (Dean et al., 2012; Verbeke, 2005). In addition to the questions that were adapted by Dean et al. (2012), one item *(Does someone in your household suffer from cardiovascular diseases*) was added since it was considered to influence purchasing behavior. Further, consumers were asked to assess their physical health and their exercising habits (see Appendix 2: B17-B18c), which were believed to further indicate the reasons for interest in healthy foods and the relevance of functional food products. Such questions have been used before for similar purposes (Hailu, Boecker, Henson, & Cranfield, 2009) and were for example considered useful to indicate whether functional foods would be consumed for general well-being or to improve physical performance, but functional foods can be beneficial for both (Binns & Howlett, 2009).

4) **Familiarity with ingredients and attitude toward enriching food products with ingredients** (see Appendix 2: B19a-B20n). It was deemed necessary to understand how familiar consumers within segments were with different ingredients since it becomes more important to educate the consumers about lesser known ingredients (Lähteenmäki et al., 2010), which influences the marketing of the products. In addition, a product with a familiar ingredient is believed to be more likely to be accepted than a product with an unfamiliar ingredient (Ares, Giménez, & Gámbaro, 2009; Grunert et al., 2009). Furthermore, it was considered important to estimate how different segments perceived the idea of enriching food products with the

ingredients relevant to this study. Familiarity was measured on a seven point Likert scale in which 1 equaled *not familiar at all* and 7 equaled *very familiar*. Attitude towards ingredients was measured on a seven point Likert scale in which 1 equaled *very negative* and 7 equaled *very positive*, but respondents were also given the opportunity to select an eighth possibility if they did not know the ingredient. Lastly, respondents were asked about the frequency of their usage of certain supplements that contained ingredients that were relevant to the research (see Appendix 2: B21a-B21h). This was considered to be useful to get insights into the extent of the segments' need of the relevant ingredients, keeping in mind possible substitution effects between functional foods and nutritional supplements (Hailu et al., 2009).

5) **Relevance of SMEs' product categories** (see Appendix 2: B22a-B22f, SME5a-SME5f)**.** This was studied on SMEs' request as they wished to gain information on how common consumption of products belonging to the concerning product category was by different segments. Relevance of SMEs' product categories was measured by asking who in the household consumed products from the concerning category and how often the respondents themselves consumed such products.

The questionnaire was originally conducted in English, and thereafter translated and submitted to respondents in their native language (Icelandic) with only minor country-specific adjustments. In the cases of the Food neophobia scale (Pliner & Hobden, 1992), the Reward from functional foods and Necessity of functional foods subscales (Urala & Lähteenmäki, 2004), and the General health interest subscale of the Health and Taste Attitudes Questionnaire (Roininen et al., 1999), Matís' back-translations (Brislin, 1970) from former research projects were utilized. All other items of the questionnaire were translated by an employee of Matís with expert knowledge of consumer researches regarding food consumption. The translations were then reviewed and modified by two other employees of Matís.

Mishaps in translation processes are common and can often cause functionality differences (Price & Oshima, 1998). Direct translation does not guarantee equivalence of a scale's content (Brislin, 1970; Eun-Seok Cha, Kim, & Erlen, 2007) and even by utilizing bilingual content experts and back-translation methods possible linguistic

problems are not eliminated. Moreover, even though equivalence of a scale's meaning in two languages is achieved, equivalent functionality is not certain (Su & Parham, 2002). However, the utilization of bilingual content experts and back-translation methods are believed to reduce the likelihood of possible functionality differences substantially (Price & Oshima, 1998; Werner & Campbell, 1970 in Su & Parham, 2002). In addition, the likelihood of functionality differences due to mishaps in the translation process was decreased further by the utilization of multiple items for each concept measured in the study.

To ascertain that the questionnaire's installation had been successful in terms of functionality, translations, spelling and grammar, the questionnaire was pretested with four individuals who were chosen with a convenience sample among Matís' employees that had not been involved with the design of the questionnaire or participated in related tasks. Only a few minor typing errors were detected in the pretests. The questionnaire was administered online by using LimeSurvey.

3.2 Data collection and participants

The study's population was defined as 18-80 years old Icelanders living in the capital area (i.e. Reykjavík (including Kjalarnes, Seltjarnarnes and Mosfellsbær), Kópavogur, Hafnarfjörður and Garðabær (including Álftanes)). The capital area was chosen rather than the whole country for the practical reason of the capital area being the focus market of the Icelandic convenience seafood manufacturer that was involved in the study. A random sample of 4000 people meeting the population criteria was obtained from Registers Iceland (Þjóðskrá). However, due to resource constraints at the time, the questionnaire was only sent to 3,700 of the sample. A total of 500 valid responses were received from the sample, equaling a 13.5% valid response ratio. Independent t-tests comparing the first 10% of respondents and the last 10% of respondents did not suggest a non-response bias (Armstrong & Overton, 1977) (Appendix 5). Table 6 shows the sample's distribution in terms of gender, age and living area as well as of the population. Comparison of the two reveals that the main differences are that the sample was biased toward older respondents and included relatively more females than males.

Table 6: Age, gender and living area distribution of the sample and the population (*Hagstofa Íslands - Talnaefni » Mannfjöldi » PX*, n.d.-a, "Hagstofa Íslands - Talnaefni » Mannfjöldi » PX," n.d.-b)

	Sample	Population
Gender		
Male	42.6%	49.6%
Female	57.4%	50.4%
Age		
18-35	26.7%	36.8%
36-50	27.9%	27.4%
51-65	29.9%	23.8%
66-80	15.6%	12.0%
Living area		
Reykjavík	67.3%	65.4%
Kópavogur	17.6%	15.1%
Garðabær & Álftanes	5.0%	6.7%
Hafnarfjörður	10.0%	12.8%

On the 28th of March 2014, a cover letter (Appendix 1) was sent to the registered home address of each individual in the sample. The cover letter included information about the subject and aim of the study in addition to explain how the individual was chosen to be in the sample. In the cover letter respondents were led to the website URL that led to the online questionnaire. Furthermore, respondents were informed that 20-30 minutes were estimated to be needed to complete the questionnaire and the deadline for submitting responses was the 14th of April. Moreover, respondents were informed that responses would not be traced to individual respondents and the study had been reported to The Data Protection Authority (Persónuvernd). They were also told that they had a chance of winning a gift certificate worth 10,000 kr. Finally, respondents were informed about the study's supervisor and given contact information in case they had any questions or comments about the study.

3.3 Data analysis

The analysis had six steps, which are summarized in Table 7.

Table 7. Summary of the analytical procedure

Step	Objective
Step 1. Data screening	To check data and remove outliers
Step 2. Factor analysis	To develop the segmenting variables
Step 3. Reliability analysis	To evaluate the reliability of the segmenting variables
Step 4. Hierarchical cluster analysis	To identify the number of clusters in the data
Step 5. K-means cluster analysis	To identify consumer segments
Step 6. Descriptive analysis	To describe the identified consumer segments

The purpose of step one was to remove outliers and poor answers. This was done by reviewing the data manually and by measuring variance in responses to the segmentation questions (S1a-S12c). 592 people started the survey. The 91 respondents that did not finish large enough part of the survey to finish the segmentation questions were excluded from the analysis. In addition, one response was excluded due to no variance in the questions that were to be used as a segmentation basis and was therefore deemed a poor response, leaving 500 valid responses.

In the second step a factor analysis was performed for the segmentation variables. The method used was principal axis factoring with varimax rotation. Principal axis factoring is the most frequently used common factor method (Conway & Huffcutt, 2003) and has been considered to be a preferable method compared to principal component analysis (Widaman, 1993 in Russell, 2002). Furthermore, principal axis factoring has been recommended when the research purpose is to understand the latent structure of a set of variables (Conway & Huffcutt, 2003). In addition, varimax rotation is by far the most popular orthogonal rotation method and promotes factors with maximum variance of loadings, which aids in interpretation of the results (Kim & Mueller, 1978 in Conway & Huffcutt, 2003; Russell, 2002). Principal axis factoring with varimax rotation has been used in similar market segmentation researches (Tao & Tao, 2008; Williams & Heller, 2007). For the before mentioned reasons a principal axis method with varimax rotation could be considered an appropriate extraction method in this research.

Keyser-Meyer Olkin (KMO) test and Bartlett's test of sphericity were performed to confirm that variables are suitable for factor analysis. KMO is a measure of sampling

adequacy (Kaiser, 1970 in Field, 2013), where values above .5 have been considered acceptable (Kaiser, 1974 in Field, 2013), but values around .8 are considered meritorious and values around .9 are considered to be marvelous (Kaiser, 1974 in Avkiran, 1994; Hutcheson & Sofroniou, 1999 in Field, 2013). Furthermore, Bartlett's test of sphericity tests if the variables correlate (Field, 2013; Zhang, 2006) and is considered to be acceptable and significant when $p<.05$ (Hair, Anderson, Tatham, & William, 1998 in Grace & O'Cass, 2004).

To ensure production of clearly interpretable factors that represented specific constructs, individual items were excluded if they received either communalities less than .3 (DeVellis, 2003) or had factor loadings of less than .4 (Stevens, 1992 in Raylu & Oei, 2004). Furthermore, items that reached similarly high loadings (>.3) on more than one factor and caused ambiguity in interpretation were removed.

Factors which received Eigenvalues higher than 1 were considered (Kaiser, 1956 in Conway & Huffcutt, 2003). However, that is not considered sufficient as a single criteria since it tends to product too many factors (Gorsuch, 1997). Therefore the "simple structure" criteria was also used (Thurstone, 1947 in Conway & Huffcutt, 2003), which basically means that a solution which gave factors where each factor had a few variables with high loadings and the rest with low loadings (Fabrigar, Wegener, MacCallum, & Strahan, 1999 in Conway & Huffcutt, 2003) was chosen.

By following the before mentioned criteria, a six factor solution (KMO=.890, Bartlett's test of sphericity: $p=.000$) was found to be most suitable. To reach the six factor solution, twenty two items (S1c, S2a-S2c, S3b-S3c, S3e, S3g-S3i, S4a-S4b, S4d-S4e, S5a, S5d, S5g-S5h, S7e-S7g, S7i) were excluded due to low communalities (<.3) and one additional item was excluded due to high loadings on two factors, which caused ambiguity in interpretation. The rotated factor matrix is presented in Appendix 3. Additionally, the same analysis was performed by including the descriptive variables B9a to B11e, which were used to further describe the segments. The analysis yielded three factors (KMO=.775, Bartlett's test of sphericity: $p=.000$).

In the third step, reliability analysis (Cronbach's alpha) was performed and new variables, based on the results of the factor analysis, were computed. The new variables equaled the unweighted average of the input variables, which has been recommended

by Russell (2002) since it increases test-retest reliability, compared to methods including weights. All factors proved to be highly reliable, with the Cronbach's alpha value for each factor exceeding the minimum recommended value of .7 by far (Nunnally & Bernstein, 1994 in Ko & Stewart, 2002). The computed variables' labels and reliabilities are shown in Table 8.

Table 8. Labels and reliabilities of the computed variables that were used in the segmentation analysis

Variable	Cronbach's alpha
1. Organic, natural, environmental	.924
2. Reward from functional foods	.934
3. Novelty aversion	.886
4. Functional foods are unnecessary	.893
5. Price awareness	.849
6. Healthy food importance	.841

In addition, three variables, based on the factor analysis with the descriptive variables, were computed. Again, all factors exceeded the minimum recommended Cronbach's alpha value of .7 and were therefore considered to be reliable (Nunnally & Bernstein, 1994 in Ko & Stewart, 2002). The variables' labels and Cronbach's alpha values are presented in Table 9.

Table 9: Labels and reliabilities of the computed variables that were used to describe the segments

Variable	Cronbach's alpha
1. Convenience	.884
2. Product information (importance)	.886
3. Attitudes to advertising	.742

The fourth step of the analysis included determining suitable of clusters for the study's aim, which later would be used in a K-means cluster analysis, as has been recommended by Punj and Stewart (1983). For this purpose a hierarchical cluster analysis with Ward's method (Ward, 1963) with squared Euclidean distance measure was chosen. Among hierarchical methods, Ward's method has in general demonstrated superior performance (Punj & Stewart, 1983) and is the most common hierarchical cluster analysis method (Tuma, Scholz, & Decker, 2009) in market segmentation

analyses. In addition, Ward's method has been found to be best suited for metric data (Bergs, 1981 in Michelsen & Madlener, 2013). Furthermore, Euclidian distance is the most generally accepted measure of proximity for interval data (Antonenko, Toy, & Niederhauser, 2012; Jain, Murty, & Flynn, 1999). The results from the hierarchical clustering, that included the variables shown in Table 8, suggested that a four, five or eight cluster solution could be feasible (for the dendogram, see Appendix 6). As the hierarchical cluster analysis has been found to be dependent on the sequence of the responses in the data (Everitt, Landau, & Leese, 2001; Sasirekha & Baby, 2013) the analysis was repeated twice with data sorted in different manners. Each time the analysis yielded the same results.

In the fifth step of the analysis a K-means cluster analysis with four, five and eight clusters solutions, as the hierarchical cluster analysis had suggested, was performed. All solutions showed significant differences for all variables (p<.01). All solutions were interpreted with respect to the SMEs' aims with the study. After analysis and interpretation of all solutions, a five cluster solution was found to be the most suitable since it offered the highest number of clearly distinguishable clusters with relevant meaning to the SMEs.

In the final step of the analysis, different analyses were performed to describe the developed segments. For these analysis, either cross tabulation with chi-square or one-way analysis of variance (ANOVA or Kruskal-Wallis) were used to identify statistically significant differences between consumer segments. Differences were considered to be significant when p<.05.

4 Results

This section contains seven chapters where each reports a specific aspect of the results from the final step of the data analysis. The first chapter, *Consumer segments*, reports the cluster analysis which revealed the actual segments. The second chapter addresses the *demographic and socio-economic profile* of the segments. In the third chapter the segments' *food purchasing and consumption habits* are looked into. The fourth chapter concerns the *relevance* of functional foods to the segments. In the fifth chapter the

segments' *familiarity and attitudes toward ingredients and frequency of their consumption* are compared. In the sixth chapter key conclusions are drawn from the main results, which are shortly summarized. Finally, the last chapter addresses the test-retest reliability of the segments.

4.1 Consumer segments

Five consumer segments (Table 10) were identified in the K-means cluster analysis. The segments were labeled based on the average values of the six variables that were included in the analysis. The sample indicates that Icelandic consumers are generally price aware and seek foods that are healthy, natural, organic and environmentally friendly. Despite being fairly positive regarding the general idea of functional foods, they seem rather doubtful regarding personal benefits from their consumption. Nevertheless, their most descriptive quality would be their tendency to seek out and try new foods.

Table 10. The Icelandic consumer segments and their mean values for the segmentation variables.

	Health oriented disbelievers	Health oriented believers	Careless	Habitual skeptics	Average disbelievers	Sample	*F*	*P*
Organic, natural and environmental	5.45	5.33	2.52	4.56	4.54	4.63	103.100	.000
Reward from functional foods	2.77	5.07	3.01	3.68	1.71	3.33	110.833	.000
Novelty avoidance	1.88	2.23	3.05	4.74	2.75	2.82	88.587	.000
Functional foods are unnecessary	3.80	2.03	3.36	2.84	5.46	3.38	65.864	.000
Price awareness	5.00	5.68	4.20	5.15	4.90	5.02	40.334	.000
Healthy food importance	5.33	5.21	2.97	4.54	4.30	4.62	84.369	.000

The first segment was labeled as Health oriented disbelievers. The Health oriented disbelievers put emphasis on healthiness and seek organic, natural and environmentally friendly products. They don't have a negative attitude toward functional foods in general, but they do not believe their consumption is rewarding. Compared to the other segments this segment's price awareness is average. A Tukey post-hoc test revealed

that Health oriented disbelievers are the most novelty seeking segment and accounted for 151 individual from the sample, which equals 30.2%.

The second segment was labeled as Health oriented believers. The Health oriented believers are mostly similar to the Health oriented disbelievers; health concerned and seeking of novel, organic, natural and environmentally friendly food products. However, the most distinctive quality of this segment is its belief in the usefulness of functional foods. However, a post-hoc Tukey test revealed that this is the most price aware segment, which accounted for 102 individuals from the sample, which equals 20.4%.

The third segment was labeled as Careless, which is derived from the segment's disinterest in healthy food and their relative insensitivity prices, which exceeded all other segments according to a post-hoc Tukey test. This segment is furthermore the only segment that does not seem to see any advantage in consuming organic, natural, environmentally friendly or functional food products. Careless have less than average interest in novel foods and accounted for 86 individuals of the sample, which equals 17.2%.

The fourth segment was labeled as Habitual skeptics. This segment's most distinctive characteristic is the relative disinterest in novel food products. Despite that the Habitual skeptics have a positive general attitude toward functional food, they remain doubtful about the reward from their consumption. In terms of price awareness, importance placed in healthiness of foods and preference for organic, natural and environmentally friendly food products, this segment had scores close to the sample means. Habitual skeptics accounted for 98 individuals from the sample, which equals 19.6%.

The last segment was labeled as Average disbelievers. This segment's scores were close to the sample mean for most segmentation variables, which makes this segment fairly price aware and health concerned, considerably novelty seeking, with a slight preference for organic, natural and environmentally friendly food products. However, this segment has one very distinctive quality, which is a very strong negative attitude towards functional foods. This segment accounted for 63 individuals from the sample, which equals 12.6%.

4.2 Demographic and socio-economic profile

Table 11 describes the demographic profiles of the segments.

Table 11. Demographic profile of the segments

	Health oriented disbelievers	Health oriented believers	Careless	Habitual skeptics	Average disbelievers	Sample	Test statistic	*p*
Gender							χ^2	
Male	39.1%	29.4%	64.0%	44.9%	39.7%	42.6%		
Female	60.9%	70.6%	36.0%	55.1%	60.3%	57.4%	24.491	.000
Age group							*F*	
18-35	25.8%	28.4%	40.0%	21.4%	15.9%	26.7%		
36-50	37.7%	21.6%	24.7%	19.4%	31.7%	27.9%		
51-65	25.8%	28.4%	28.2%	32.7%	39.7%	29.9%		
66-80	10.6%	21.6%	7.1%	26.5%	12.7%	15.6%	6.336	.000

Health oriented disbelievers, Health oriented believers are female-dominated while Careless is a male-dominated segment. Gender distributions in the other segments are close to the sample mean. In terms of age distribution, Tukey post-hoc test revealed that Health oriented believers, Habitual skeptics and Average disbelievers were on average older than Careless. In addition, Habitual skeptics were older than Health oriented disbelievers.

The segments' socio-economic profile is shown in Table 12. Chi-square frequency analysis and Kruskal-Wallis one way analysis of variance revealed differences in household type, education level, household income and occupation status, but no significant differences were found with respect to living area.

Table 12. Socio-economic profiles of the segments

	Health oriented disbelievers	Health oriented believers	Careless	Habitual skeptics	Average disbelievers	Sample	Test statistic	*p*
Living area							χ^2	
Reykjavík	66.9%	54.9%	62.8%	56.1%	71.0%	62.1%		
Kópavogur	15.9%	25.5%	11.6%	20.4%	12.9%	17.6%		
Garðabær	4.0%	4.9%	7.0%	5.1%	4.8%	5.0%		
Hafnarfjörður	8.6%	10.8%	10.5%	12.2%	8.1%	10.0%		
Mosfellsbær	4.6%	3.9%	8.1%	6.1%	3.2%	5.2%	14.120	.590
Household size and type							χ^2	
One adult	9.3%	10.8%	12.8%	11.2%	20.6%	12.0%		
Two adults	28.5%	44.1%	36.0%	52.0%	31.7%	38.0%		
One adult and one or more children	5.3%	2.9%	2.3%	1.0%	1.6%	3.0%		
Two adults and one or more children	41.1%	23.5%	26.7%	20.4%	22.2%	28.6%		
Other	15.9%	18.6%	22.1%	15.3%	23.8%	18.4%	35.067	.004
Education							**K-W**	
Comprehensive/ intermediate school	7.3%	10.8%	16.3%	28.6%	3.2%	13.2%		
Secondary school	20.5%	42.2%	50.0%	33.7%	39.7%	35.0%		
Academic degree	37.7%	33.3%	30.2%	26.5%	38.1%	33.4%		
Higher academic degree	34.4%	13.7%	3.5%	11.2%	19.0%	18.4%	60.538	.000
Occupation status							χ^2	
Student	8.6%	6.9%	22.1%	8.2%	3.2%	9.8%		
Employee	51.7%	51.0%	48.8%	48.0%	50.8%	50.2%		
Manager	17.2%	4.9%	7.0%	4.1%	20.6%	10.8%		
Self-employed	11.3%	12.7%	12.8%	11.2%	9.5%	11.6%		
Pensioner	6.0%	13.7%	3.5%	22.4%	9.5%	10.8%		
Other	5.3%	10.8%	5.8%	6.1%	6.3%	6.8%	61.946	.000
Annual household net income							**K-W**	
Less than 2 million kr.	4.2%	8.1%	4.2%	7.2%	0.0%	5.0%		
2-3 million kr.	5.6%	10.5%	6.9%	14.5%	9.1%	8.9%		
3.1-4 million kr.	9.1%	14.0%	12.5%	19.3%	7.3%	12.3%		
4.1-5 million kr.	11.9%	14.0%	13.9%	13.3%	10.9%	12.8%		
5.1-6 million kr.	10.5%	9.3%	12.5%	12.0%	14.5%	11.4%		
6.1-8 million kr.	19.6%	24.4%	25.0%	18.1%	27.3%	22.1%		
8.1-10 million kr.	17.5%	11.6%	11.1%	10.8%	14.5%	13.7%		
10.1-12 million kr.	11.2%	4.7%	6.9%	2.4%	10.9%	7.5%		
Over 12 million kr.	10.5%	3.5%	6.9%	2.4%	5.5%	6.4%	25.899	.000

In terms of household type, “Health oriented disbelievers’” household tended to consist of two adults with one or more children. “Habitual skeptics’” household had a tendency to be formed by only two adults and so did Health oriented believers but to a lesser extent. Average disbelievers were by far most likely to live alone, but no prominent distribution tendencies were to be found in “Careless’” household type.

Pairwise comparisons with adjusted *p*-values revealed that Health oriented disbelievers were more educated than Health oriented believers (*p*=.000, *r* =.19), Careless (*p*=.000, *r* =.28), and Habitual skeptics (*p*=.000, *r* =.29). Furthermore, Average disbelievers were more educated than Careless (*p*=.009, *r* =.15) and Habitual skeptics (*p*=.009, *r* =.15).

In terms of occupation status, Careless were by far the most likely to be students and Habitual skeptics were by far the most likely to be pensioners. Health oriented disbelievers and Average disbelievers tended to be managers. Health oriented believers had less prominent distribution tendencies.

Pairwise comparisons with adjusted *p*-values revealed that Average disbelievers (*p*=.009, *r* =.15) and Health oriented disbelievers (*p*=.000, *r* =.20) had higher income than Habitual skeptics. Health oriented disbelievers also had higher income that health oriented believers (*p*=.012, *r* =.14).

4.3 Food purchasing and consumption habits

The segments differed in regard to their participation in planning, buying and preparing food in their households (Table 13).

Table 13. Participation in planning, buying, and preparing food

	Health oriented disbelievers	Health oriented believers	Careless	Habitual skeptics	Average disbelievers	Sample	K-W	*p*
Mainly responsible	53.0%	54.9%	32.6%	45.9%	49.2%	48.0%		
Partly responsible	41.7%	43.1%	54.7%	53.1%	44.4%	46.8%		
Not responsible	5.3%	2.0%	12.8%	1.0%	6.3%	5.2%	15.195	.004

Pairwise comparisons with adjusted *p*-values revealed that Health oriented disbelievers (*p*=.008, *r* =.15) and Health oriented believers (*p*=.004, *r* =.14) were more participative in buying, planning, and preparing food in their households than Careless.

The segments also differed in regard to their attitudes to advertising and the importance they place in product information and convenience (Table 14).

Table 14. Attitudes toward advertising and importance of product information and convenience in food consumption.

	Health oriented disbelievers	Health oriented believers	Careless	Habitual skeptics	Average disbelievers	Sample	*F*	*p*
Importance of product information	5.55	5.72	3.65	4.85	4.98	5.05	30.399	.000
Attitudes to advertising	3.41	4.04	3.55	3.59	3.50	3.61	3.782	.005
Convenience	4.52	5.08	4.73	5.06	4.69	4.80	3.660	.006

In general, product information was considered to be rather important. As a Tukey post hoc test revealed, Health oriented disbelievers and Health oriented believers placed the highest importance in product information but Careless the least. Convenience was also generally considered to be fairly important, with Health oriented believers and Habitual skeptics finding it more important than Health oriented disbelievers, according to a Tukey post hoc test. Attitudes toward advertising were generally slightly negative. Tukey post hoc test revealed that Health oriented believers had more a positive attitude toward advertising than Health oriented disbelievers.

Table 15 reports the segments' frequencies of shopping in different types of grocery stores. The segments differed in terms of their frequencies of shopping in convenience stores, contrary to frequencies of shopping in supermarkets and discount stores.

Table 15. Frequency of purchasing food from different types of grocery stores

	Health oriented disbelievers	Health oriented believers	Careless	Habitual skeptics	Average disbelievers	Sample	K-W	*p*
Supermarkets								
Never	3.3%	4.9%	9.3%	10.2%	4.8%	6.2%		
Seldom	40.4%	42.2%	38.4%	50.0%	46.0%	43.0%		
1 - 3 times a month	31.1%	38.2%	33.7%	24.5%	31.7%	31.8%		
Weekly	25.2%	14.7%	18.6%	15.3%	17.5%	19.0%	8.749	.068
Discount stores								
Never	1.3%	2.0%	2.3%	0.0%	0.0%	1.2%		
Seldom	1.3%	7.8%	4.7%	6.1%	6.3%	4.8%		
1 - 3 times a month	17.2%	8.8%	19.8%	11.2%	22.2%	15.4%		
Weekly	80.1%	81.4%	73.3%	82.7%	71.4%	78.6%	4.529	.339
Convenience stores								
Never	29.1%	39.2%	44.2%	45.9%	38.1%	38.2%		
Seldom	33.1%	43.1%	36.0%	34.7%	39.7%	36.8%		
1 - 3 times a month	27.2%	10.8%	9.3%	11.2%	14.3%	16.0%		
Weekly	10.6%	6.9%	10.5%	8.2%	7.9%	9.0%	14.855	.005

Discount stores are clearly a preferred way of shopping in Iceland, with 78.6% of the sample shopping weekly in such stores, compared to the 19% shopping weekly in supermarkets. Pairwise comparisons revealed that Health oriented disbelievers shop more often in convenience stores than Careless (p=.047, r =.14) and Habitual skeptics (p=.012, r =.13).

The segments also differed with respect to their frequency of shopping in specialty stores, kiosks and cafés (Table 16), contrary to their frequency of shopping in gas stations.

Table 16. Frequency of purchasing food from specialty stores, gas stations, kiosks and cafés

	Health oriented disbelievers	Health oriented believers	Careless	Habitual skeptics	Average disbelievers	Sample	K-W	*p*
Specialty stores								
Never	9.9%	14.7%	43.0%	21.4%	19.0%	20.0%		
Seldom	33.8%	38.2%	32.6%	46.9%	54.0%	39.6%		
1 - 3 times a month	33.8%	36.3%	20.9%	26.5%	22.2%	29.2%		
Weekly	22.5%	10.8%	3.5%	5.1%	4.8%	11.2%	52.633	.000
Gas stations								
Never	62.9%	52.9%	51.2%	59.2%	61.9%	58.0%		
Seldom	31.1%	40.2%	33.7%	30.6%	33.3%	33.6%		
1 - 3 times a month	3.3%	4.9%	7.0%	9.2%	3.2%	5.4%		
Weekly	2.6%	2.0%	8.1%	1.0%	1.6%	3.0%	5.960	.202
Kiosks								
Never	63.6%	54.9%	38.4%	53.1%	63.5%	55.4%		
Seldom	30.5%	38.2%	43.0%	37.8%	31.7%	35.8%		
1 - 3 times a month	5.3%	4.9%	12.8%	6.1%	3.2%	6.4%		
Weekly	0.7%	2.0%	5.8%	3.1%	1.6%	2.4%	19.803	.001

Gas stations are an uncommon location to purchase food products in Iceland, with less than 10% purchasing snacks and/or groceries in such locations once a month or more frequently. Kiosks are also a very uncommon location for shopping groceries and/or snacks. Nevertheless, pairwise comparisons with adjusted *p*-values revealed that Careless shopped more often in kiosks than Health oriented disbelievers (p=.000, r =.19) and Average disbelievers (p=.006, r =.15).

Shopping in specialty stores is however fairly frequent, with around 40% of the sample shopping once a month or more frequently in such locations. Pairwise comparisons with adjusted *p*-values revealed that Health oriented disbelievers shopped more often in specialty stores compared to Careless (p=.000, r =.30), Habitual skeptics (p=.000, r =.19), and Average disbelievers (p=.001, r =.18). In addition, Health oriented believers shopped more frequently in such locations than Careless (p=.000, r =.20).

Comparison of the segments' frequencies of ready-to-eat fish dishes consumption did not return significant differences (Table 17).

Table 17. Frequency of consuming ready-to-eat fish dishes

	Health oriented disbelievers	Health oriented believers	Careless	Habitual skeptics	Average disbelievers	Sample	K-W	*p*
Less than once a month	47.7%	40.2%	34.9%	49.0%	46.0%	44.0%		
Once a month	11.3%	9.8%	23.3%	14.3%	15.9%	14.2%		
Two or three times a month	13.9%	19.6%	14.0%	15.3%	20.6%	16.2%		
Once a week	13.2%	13.7%	20.9%	12.2%	14.3%	14.6%		
Two times a week	13.9%	16.7%	7.0%	9.2%	3.2%	11.0%	4.862	.302

In general, consumption of ready-to-eat fish dishes is rather common, with over 25% of the sample consuming ready to eat fish dishes once a week or more frequently.

4.4 Relevance of enriched products

The segments differed substantially in regard to which kind of diet they followed (Table 18).

Table 18. Whether or not the respondents follow a specific diet

	Health oriented disbelievers	Health oriented believers	Careless	Habitual skeptics	Average disbelievers	Sample	χ^2	*p*
Organic	21.2%	24.5%	2.3%	10.2%	14.3%	15.6%	23.496	.000
Biodynamic	5.3%	4.9%	0.0%	1.0%	4.8%	3.4%	7.429	.115
Vegetarian	17.2%	27.5%	1.2%	14.3%	14.3%	15.6%	25.006	.000
Low lactose or lactose free	9.3%	9.8%	3.5%	1.0%	4.8%	6.2%	10.560	.032
Gluten free	7.9%	4.9%	2.3%	3.1%	4.8%	5.0%	4.841	.304
Low carbohydrate	13.9%	13.7%	3.5%	10.2%	9.5%	10.8%	7.335	.119
None of these	57.0%	50.0%	86.0%	77.6%	66.7%	65.8%	38.266	.000

Overall, Careless were the least likely segment to follow a certain diet, followed by Habitual skeptics. On the contrary, Health oriented disbelievers and Health oriented believers were most likely to follow a special diet and thereof an organic, vegetarian, low carbohydrate or low lactose diet were most common. Following a certain diet is

rather common in Iceland, but almost 35% of the sample followed at least one of the diets that were mentioned in the study.

Frequency analysis of respondents suffering from a cardiovascular disease or living in a household where someone suffered from a cardiovascular disease did not return significant differences. However, whether or not the respondents had a relative or a close acquaintance differed between the segments (Table 18).

Table 19. Cardiovascular diseases (CD) of self, someone at household and close relatives/acquaintances

	Health oriented disbelievers	Health oriented believers	Careless	Habitual skeptics	Average disbelievers	Sample	χ^2	*p*
Suffering from or having high risk of CD	11.9%	17.6%	10.5%	21.4%	9.8%	14.5%	12.003	.151
Relative or close acquaintance has CD	42.0%	50.0%	33.7%	52.0%	33.3%	43.1%	21.541	.006
Someone in household suffers from CD	12.7%	19.0%	11.8%	22.4%	12.7%	15.7%	12.9%	.116

Habitual skeptics and Health oriented believers were most likely to have a relative or a close acquaintance that suffered from a cardiovascular disease, but Careless and Average disbelievers were least likely

Respondents were generally positive regarding their own physical condition, with over 75% of the sample describing their physical condition as either “good” or “excellent” (Table 20).

Table 20. The segments‘ stated physical condition

	Health oriented disbelievers	Health oriented believers	Careless	Habitual skeptics	Average disbelievers	Sample	K-W	*p*
Bad	0.7%	0.0%	1.2%	1.0%	0.0%	0.6%		
Not so good	5.3%	6.9%	4.7%	8.2%	1.6%	5.6%		
So, so	12.6%	15.7%	23.3%	22.4%	14.3%	17.2%		
Good	42.4%	51.0%	51.2%	49.0%	65.1%	49.8%		
Excellent	39.1%	26.5%	19.8%	19.4%	19.0%	26.8%	15.967	.003

Pairwise comparison with adjusted *p*-values revealed that Health oriented disbelievers’ stated physical condition was better than that of Careless’ (p=.024, r =.14) and Habitual skeptics’ (p=.004, r =.16).

The segments' frequency of physical activities differed between the segments (Table 21).

Table 21. Frequencies of the segments' physical activities

	Health oriented disbelievers	Health oriented believers	Careless	Habitual skeptics	Average disbelievers	Sample	K-W	*p*
Vigorous-intensity physical activity								
5 times per week or more	12.2%	12.1%	9.3%	10.3%	3.3%	10.2%		
3 - 4 times per week	27.7%	24.2%	14.0%	15.5%	19.7%	21.2%		
1 - 2 time per week	27.7%	29.3%	34.9%	28.9%	23.0%	28.9%		
Less frequently/ never	32.4%	34.3%	41.9%	45.4%	54.1%	39.7%	14.033	.007
Light/moderate-intensity physical activity								
5 times per week or more	11.1%	12.4%	8.3%	13.7%	8.2%	11.0%		
3 - 4 times per week	31.9%	21.6%	19.0%	22.1%	11.5%	23.1%		
1 - 2 time per week	38.2%	45.4%	31.0%	27.4%	49.2%	37.6%		
Less frequently/never	18.8%	20.6%	41.7%	36.8%	31.1%	28.3%	15.894	.003
Walking								
5 times per week or more	21.4%	25.3%	16.7%	22.9%	21.7%	21.7%		
3 - 4 times per week	26.9%	27.3%	14.3%	18.8%	13.3%	21.5%		
1 - 2 time per week	33.8%	31.3%	39.3%	28.1%	41.7%	34.1%		
Less frequently/never	17.9%	16.2%	29.8%	30.2%	23.3%	22.7%	10.529	.032

Pairwise comparisons with adjusted *p*-values revealed that Health oriented disbelievers conducted in physical activities of vigorous intensity more often than Average disbelievers (p=.018, r =.14). Pairwise comparisons also revealed that Health oriented disbelievers conducted in physical activities of moderate or light intensity more often than Careless (p=.007, r =.15). Lastly, the pairwise comparisons revealed that Health oriented believers walked for exercise more frequently than Careless (p=.046, r =.13).

4.5 Familiarity and attitudes toward ingredients and frequency of their consumption

The segments differed in regard to their familiarity with different ingredients in foods or supplements (Table 22).

Table 22. Familiarity of ingredients.

	Health oriented disbelievers	Health oriented believers	Careless	Habitual skeptics	Average disbelievers	Sample	*F*	*p*
Omega 3	5.77	5.85	4.09	4.84	5.00	5.22	18.268	.000
Antioxidants	4.86	4.80	2.86	3.50	3.87	4.11	21.402	.000
Seaweed	3.29	3.70	1.80	2.41	2.52	2.85	16.561	.000
Fish oil	6.42	6.42	5.86	6.07	6.32	6.24	4.160	.003
Vitamin D	6.21	6.29	5.09	5.82	5.87	5.91	10.725	.000

Careless always had the lowest mean score while either Health oriented disbelievers or Health oriented believers always had the highest mean score and were thereby most familiar with the concerning components. In general, fish oil, Omega 3 and vitamin D received high scores for familiarity but seaweed by far the lowest.

Differences in attitudes towards different components followed a similar pattern as the familiarity did (Table 23).

Table 23. Attitudes toward different ingredients in foods.

	Health oriented disbelievers	Health oriented believers	Careless	Habitual skeptics	Average disbelievers	Sample	*F*	*p*
Omega 3	6.56	6.76	5.71	6.33	6.11	6.37	13.171	.000
Antioxidants	5.97	6.41	4.95	5.72	5.34	5.81	10.384	.000
Seaweed	5.32	5.41	4.18	4.34	4.51	4.93	8.447	.000
Fish oil	6.47	6.66	6.23	6.37	6.33	6.43	1.635	.164
Vitamin D	6.60	6.82	6.08	6.57	6.24	6.51	8.078	.000

Careless had the lowest mean score for attitude toward the ingredient in all cases and the highest mean score always belonged to Health oriented believers or Health oriented disbelievers. In general, consumers' attitudes toward the ingredients were positive. Vitamin D, fish oil and Omega 3 received the highest scores but seaweed the lowest.

The segments differed in regard to frequency consuming supplements including the different ingredients mentioned in the study (Table 24).

Table 24. Frequency of consumption of supplements containing Omega 3

	Health oriented disbelievers	Health oriented believers	Careless	Habitual skeptics	Average disbelievers	Sample	K-W	*p*
Omega 3								
Never	15.9%	12.7%	41.9%	23.5%	36.5%	23.8%		
Occasionally	13.2%	8.8%	14.0%	29.6%	15.9%	16.0%		
Monthly	1.3%	2.9%	4.7%	3.1%	3.2%	2.8%		
Weekly	14.6%	14.7%	14.0%	6.1%	4.8%	11.6%		
Daily	55.0%	60.8%	25.6%	37.8%	39.7%	45.8%	43.488	.000
Fish oil								
Never	19.2%	14.7%	29.1%	18.4%	27.0%	20.8%		
Occasionally	9.3%	8.8%	19.8%	15.3%	11.1%	12.4%		
Monthly	2.6%	2.0%	3.5%	3.1%	1.6%	2.6%		
Weekly	10.6%	5.9%	7.0%	9.2%	7.9%	8.4%		
Daily	58.3%	68.6%	40.7%	54.1%	52.4%	55.8%	16.202	.003
Vitamin D								
Never	11.9%	10.8%	27.9%	15.3%	23.8%	16.6%		
Occasionally	11.9%	14.7%	16.3%	17.3%	22.2%	15.6%		
Monthly	2.6%	2.0%	9.3%	3.1%	4.8%	4.0%		
Weekly	13.2%	13.7%	10.5%	10.2%	9.5%	11.8%		
Daily	60.3%	58.8%	36.0%	54.1%	39.7%	52.0%	24.198	.000
Seaweed								
Never	72.8%	78.4%	95.3%	85.7%	87.3%	82.2%		
Occasionally	19.9%	12.7%	3.5%	11.2%	11.1%	12.8%		
Monthly	4.6%	2.9%	1.2%	2.0%	1.6%	2.8%		
Weekly	1.3%	3.9%	0.0%	0.0%	0.0%	1.2%		
Daily	1.3%	2.0%	0.0%	1.0%	0.0%	1.0%	22.402	.000

Pairwise comparisons with adjusted *p*-values revealed that Health oriented believers consumed Omega 3 supplements more frequently than Careless (p=.000, r =.24), Habitual skeptics (p=.003, r =.16), and Average disbelievers (p=.022, r =.16). Furthermore, Health oriented disbelievers consumed such supplements more frequently than Careless (p=.000, r =.22), Habitual skeptics (p=.028, r =.14), and Average disbelievers (p=.022, r =.14)

Consumption of supplements including fish oil was very common, with over half of the sample consuming such supplements daily. Pairwise comparisons also revealed that Health oriented believers (p=.001, r =.17) and Health oriented disbelievers (p=.046, r =.13) consumed Fish oil supplements more frequently than Careless.

Consumption of supplements containing vitamin D was also quite common; with over half of the sample using such supplements daily. Pairwise comparisons with adjusted *p*-values revealed that Health oriented believers consumed such supplements more frequently than Careless (p=.004, r =.16) and Average disbelievers (p=.047, r =.13). Furthermore, Health oriented disbelievers consumed vitamin D supplement more frequently that Careless (p=.001, r =.18) and Average disbelievers (p=.006, r =.14)

The sample's consumption of seaweed was very rare, with less than 5% of the sample using any of the ingredients as supplements weekly or more frequently. However, pairwise comparisons with adjusted *p*-values revealed that Health oriented believers (p=.018, r =.14) and Health oriented disbelievers (p=.000, r =.19) consumed seaweed supplements more often than Careless.

4.6 Conclusions

The study revealed five consumer segments which differed in regard to their evaluation of several important aspects from the perspective of the study's aim. The segments were labeled as Health oriented disbelievers, Health oriented believers, Careless, Habitual skeptics and Average disbelievers, but their key characteristics are summarized in Table 25.

Table 25. Summary of the segments' key characteristics.

	Health oriented disbelievers	Health oriented believers	Careless	Habitual skeptics	Average disbelievers
Appreciate functional foods	3.49	5.52	3.83	4.42	2.13
Health concerned	5.33	5.21	2.97	4.54	4.30
Novelty seeking	6.12	5.77	4.95	3.26	5.25
Insensitive to prices	3.00	2.32	3.80	2.85	3.10
Find product information important	5.55	5.72	3.65	4.85	4.98
Seek convenience in food consumption	4.52	5.08	4.73	5.06	4.69
Familiar with Omega 3	5.77	5.85	4.09	4.84	5.00
Familiar with seaweed	3.29	3.70	1.80	2.41	2.52
Attitude toward Omega 3 as a food ingredient	6.56	6.76	5.71	6.33	6.11
Attitude toward seaweed as a food ingredient	5.32	5.41	4.18	4.34	4.51

Health oriented believers were definitely the most promising segment and is therefore most suitable as a target segment. The main reason for that is the positive attitude toward functional foods, and in fact this was the only segment with a substantially positive attitude toward functional foods. In addition, Health oriented believers have a few key characteristics that make them a viable target market for the to-be-developed functional food products. For example this segment is novelty seeking and places great importance in the healthiness of food, which makes novel functional food products very relevant to individuals belonging to this segment. Furthermore, Health oriented believers are very familiar toward the ingredients that were mentioned in the study and hold a positive attitude toward those. In addition, they find product information to be important.

4.7 Test-retest reliability

The items that were used in the cluster analysis to determine the segments were included in another survey, as a part of another questionnaire, that was carried out on the 31st of September to 14th of October. For that survey, a random sample of 4,000 individuals was received from Registers Iceland (Þjóðskrá). However, due to resource constraints, only 3,700 of the cover letters which invited the respondents to participate in the study were sent to the individuals of the sample. The cover letters were delivered on the 31st of September. First responses were delivered on the same day. Finally, the survey was closed on the 14th of October.

A total of 379 valid responses were received, equaling a response rate of 10.2%. As shown in Table 26, the test-retest sample differed substantially from the original sample. The test-retest sample was more representative of the population in terms of age distribution, but less in terms of gender and living area.

Table 26. Age, gender, and living area distributions of the original sample, test-retest sample and population

	Sample	Test-retest Sample	Population
Age			
18-35	26.7%	34.1%	36.8%
36-50	27.9%	30.2%	27.4%
51-65	29.9%	25.0%	23.8%
66-80	15.6%	10.7%	12.0%
Gender			
Male	42.6%	37.1%	49.6%
Female	57.4%	62.9%	50.4%
Living area			
Reykjavík	67.3%	77.6%	65.4%
Hafnarfjörður	10.0%	0.3%	12.8%
Garðabær	5.0%	5.5%	6.7%
Kópavogur	17.6%	16.6%	15.1%

The test-retest sample was factor analyzed and clustered with the K-means method, identical to the original sample. The results from the K-means clustering are presented in Table 27.

Table 27. The results from the K-means clustering analysis of the test-retest sample

	Health oriented disbelievers	Health oriented believers	Careless	Habitual skeptics	Average disbelievers	Sample	*F*	*p*
N	66	49	67	44	68	294		
Novelty avoidance	1.84	2.48	2.30	4.66	1.76	2.43	68.951	.000
Healthy food importance	5.37	5.74	3.83	3.77	4.92	4.74	45.003	.000
Functional foods are rewarding	3.80	5.42	3.18	3.19	1.63	3.31	110.482	.000
Functional foods are unnecessary	3.72	2.15	2.94	4.05	5.64	3.76	85.022	.000
Price awareness	4.48	6.02	5.22	4.42	5.05	5.07	15.919	.000
Natural, environmental and organic	5.74	5.77	4.13	3.38	5.31	4.97	55.546	.000

Despite that some values in the retest analysis differed substantially from the original analysis, similar meaning could be derived from the test-retest analysis since similar trends emerged. The main differences between the original sample and the retest sample were that Health oriented disbelievers seem indifferent toward functional foods

in the retest sample, as opposed to having negative attitudes. Similarly, Careless seem to be rather indifferent toward healthy, organic, natural, and environmentally friendly food products as opposed to having negative attitudes. Habitual skeptics went from having fairly positive attitudes in the original analysis to seemingly having fairly negative attitudes in the retest analysis. Differences between single values were further looked into by determining Cohen's d effect sizes, using the standard deviation of the original sample as recommended by Field (2013), as presented in Table 28.

Table 28. Cohen's d effect sizes of all computed segmentation variables

	Health oriented disbelievers	Health oriented believers	Careless	Habitual skeptics	Average disbelievers
Novelty avoidance	0.32	0.38	1.55	1.12	0.58
Healthy food importance	0.94	0.34	0.13	0.45	0.10
Functional foods are rewarding	0.06	0.28	0.60	0.08	0.85
Functional foods are unnecessary	0.09	0.14	0.34	1.21	0.18
Price awareness	0.43	0.31	0.70	0.61	0.14
Natural, environmental and organic	0.04	0.55	0.84	0.79	0.58

According to Cohen (1988 in Field, 2013), it is possible to interpret fifteen of the effect sizes as small, eight as of medium size and seven as large. The number of large effect sizes gives a substantial reason to worry about the sample's test-retest reliability.

5 Discussion

Icelandic consumers were segmented and a suitable target market for functional ready-to-eat seafood products identified, which was the study's objective. The results can be utilized to adjust marketing effort to the target market's wants, which increases the efficiency of the marketing function (Rosen, 1974; Smith, 1956; van Raaij & Verhallen, 1994). Identifying a target segment is furthermore desirable in the early stages of product development because it can guide the product development process (Day &

Wensley, 1988) and thereby reduce market risk by enhancing likelihood of consumer acceptance (Lee & Yoo, 2011).

Health oriented believers turned out to be the most suitable target market for functional food products, largely due to having by far the most positive beliefs and attitudes toward functional foods, despite including the biggest consumers of supplements, which does not provide support for Hailu et al.'s (2009) suggestion of a substitution effect between the two categories. They were also among the most health concerned segments, making the health benefits of functional food products very relevant to their general preferences in food consumption. In addition, they were the second most novelty seeking segment, so it can be assumed that they readily try new food products if they correspond to their preferences. Moreover, Health oriented believers had among the most preference for convenience in food consumption, making the product category of convenience foods very relevant to the segment. These characteristics all make Health oriented believers' acceptance of a new functional convenience seafood product more likely (Grunert et al., 1993; Roininen et al., 2001; Roininen, 2001; Scholderer et al., 2004; Urala & Lähteenmäki, 2004, 2007). Furthermore, they were most familiar and had the most positive attitude toward Omega 3 and seaweed. This is a very important quality since they are planned to be the source of the soon to be developed products' functionality, and familiarity with functional ingredients increases food acceptance (Ares et al., 2009; Grunert et al., 2009). Health oriented believers were among the most concerned about the naturalness of foods, which suggests that negative evaluations of functional food products due to perceived unnaturalness is not a major problem, contrary to Poulsen (1999) and Bech-Larsen et al. (2001). However, the appreciation of natural foods is consistent with the fact that around one quarter of the segment followed an organic and/or vegetarian diet. Therefore it is preferable that the subsequent product development and promotional efforts will underline the natural aspects of the products in order to achieve associations with natural products, even though functional products are not natural as such. This segment was most enthusiastic about product information, which could suggest that the segment is largely self-educating and consequently less effort needed by the company to promote the health benefits of the functional ingredients. However, this segment had the undesirable characteristic of being the most

price sensitive segment. This suggests that functional food products must be reasonably priced to be accepted, which is consistent with prior research which has suggested that price is one of the key predictors of food acceptance (Cullen & Kingston, 2009; De Steur et al., 2010; Kihlberg & Risvik, 2007). Overall, the segment's size, consumption of ready to eat fish products, appreciation for convenience in food consumption, and beliefs & attitudes toward functional food products, suggest a good market potential for functional ready to eat seafood products.

Health oriented disbelievers were similar to Health oriented believers in terms of most aspects that were measured in the study, making the segments health concerned, novelty seeking and appreciative of naturalness of foods & convenience in food consumption. Although one would think that a segment with those characteristics would be an ideal target market for functional foods, Health oriented disbelievers have negative beliefs and attitudes toward functional food products, which could derive from distrust in functional foods because they are perceived unnatural (Jonas & Beckmann, 1998 in Bäckström et al., 2003). Nevertheless, this could also be interpreted as despite having a preferable value structure, their beliefs associated with functional foods are evaluated in a negative manner (Ajzen, 2012; Ajzen & Fishbein, 1975; Schwartz & Bilsky, 1990). If such incongruence exists, it is possible that with more information about the benefits of functional food products, Health oriented disbelievers' attitude toward functional foods will turn to the positive side (Katz, 1960; Tesser et al., 1995). However, the success of such activities depends on the characteristics of their beliefs, such as their confidence (Eagly, 1981; Wright, 1975 in Yi, 1988). However, since Health oriented disbelievers' beliefs and attitudes do not seem to be very extreme, it is quite likely that the confidence of those beliefs and attitudes is not that high, which allows for the possibility for attitude change due to new information (Judd & Krosnick, 1982). Therefore it can be assumed that Health oriented disbelievers are a possible target market in the future, but due to negative beliefs toward functional food, they would not be a suitable group to target immediately since they need more information and time to change their attitudes to the more positive side. Other segments could not be interpreted as viable for functional food products.

5.1 Segmentation effectiveness

The instrument used in this study was made up of various parts of other validated measures, which was considered suitable to the study's objectives (Green, 1977; Wedel & Kamakura, 2000; Chisnall, 1985 in Tynan & Drayton, 1987). Furthermore, it has been suggested that using different segmentation bases can create synergies and provide better solution (van der Zanden et al., 2014).

All scales that were used as a segmentation basis have been validated in multiple cultures (Brunsø & Grunert, 1995; Carrillo et al., 2013; Chen, 2011; Ritchey et al., 2003; Roininen et al., 2001; Urala & Lähteenmäki, 2004). In addition, they had all been utilized for similar purposes before (Barrena & Sánchez, 2013; Bechtold & Abdulai, 2014; Chrysochou et al., 2010; de Barcellos & Lionello, 2011; Henriques et al., 2009; Honkanen & Frewer, 2009; Kesic & Piri-Rajh, 2003; Onwezen et al., 2012; Pieniak et al., 2009; Ryan et al., 2004; Wycherley et al., 2008) and were all on a Likert scale where respondents stated the extent of which they agreed or disagreed with various statements, which is the most common method in this type of research (Costell et al., 2010; van der Zanden et al., 2014). Therefore it can be concluded that the segments were identifiable (Kotler, 1997; Wedel & Kamakura, 2000; Yankelovich & Meer, 2006).

The demographic and socio-economic information was collected to further describe the segments could be used to guide media selection for promotional purposes (Blattberg & Sen, 1974; Wedel & Kamakura, 2000). In addition, information about shopping locations were gathered, revealing that between 70 and 85 percent of each segment bought snacks and/or groceries weekly in discount stores, making the segments easy to reach through distributional efforts. Therefore it can be concluded that the segments were very accessible (Kotler, 1997; Wedel & Kamakura, 2000; Yankelovich & Meer, 2006).

The target segment had a very distinct attitude toward functional foods and was of the substantial size of one fifth of the sample. Consequently it can be assumed that it can be profitable to focus on this segment when marketing functional ready-to-eat seafood products. Therefore it can be concluded that the requirement of segment substantiality is satisfied (Kotler, 1997; Wedel & Kamakura, 2000; Yankelovich & Meer, 2006).

All variables in the segmentation basis measured cognitive constructs that affect behavior according to proven psychological theories (Ajzen, 1991; Ajzen & Fishbein, 1975; Homer & Kahle, 1988). In addition all variables belonged to instruments which predictive value of behavior and/or behavioral intention has been validated (Brunsø et al., 2004a; Honkanen & Frewer, 2009; Pliner & Hobden, 1992; Roininen, 2001; Roininen et al., 1999; Urala & Lähteenmäki, 2007). Therefore it can be concluded that the responsiveness criterion is satisfied (Kotler, 1997; Wedel & Kamakura, 2000; Yankelovich & Meer, 2006).

The scales that were used as a segmentation basis suggest whether various aspects, such as healthiness, naturalness and functionality, of food products are desirable in the eyes of the consumers and can therefore be used as guidance in product development (Grunert et al., 1993; Roininen et al., 1999; Urala & Lähteenmäki, 2004). Variables that were used to further characterize the segments, e.g. those which relate to purchasing habits, familiarity & attitudes toward single ingredients and whether specific diets are followed also suggest what aspects make products attractive to consumers, and in addition can guide promotional and distributional efforts. Therefore it can be concluded that the segments are actionable.

Test-retest reliability analysis revealed several segment characteristic differences between the original analysis and the retest analysis. The fact that half of the values analyzed with a Cohen's d effect size could be interpreted as medium or strong effect (Cohen, 1988 in Field, 2013) does at best suggest fairly stable segments in a short term perspective. However, it is possible that the differences in the segments' characteristics derive from the fact that the samples differed substantially. Therefore, estimations of the stability of the segments are imperfect.

5.2 Limitations

Compared to the population, the sample was fairly biased toward women and older respondents, which suggests that individuals who are older and female are more willing to participate in studies of this kind, but the response ratio was around 13.5%.

The fact that only 3,700 of the 4,000 individuals in the sample received an invitation to participate in the retest study seemingly caused bias in the retest sample, reducing the validity of the retest study.

Lastly, fact that the questionnaire was not submitted to respondents in its original language is a possible shortcoming due to possible functionality differences. Although the likelihood of functionality differences was reduced by back-translating a part of the questionnaire, functionality differences are possible even though equivalent meaning was achieved (Price & Oshima, 1998; Werner & Campbell, 1970). However, in addition to the back-translation, the use of cross-culturally validated scales which included multiple items to measure each aspect, the factor analysis and reliability tests should have kept the risk of functionality differences to the pure minimum.

5.3 Future research

It would be advisable to follow up this research with a more specific research in order to determine what kind of ready-to-eat seafood products the target market would appreciate the most. A concept test, examining attitudes toward single product concepts and single product characteristics would for example give insights into this matter. A concept test could furthermore measure specific purchasing intentions, which is the best known predictor of behavior (Ajzen, 1991).

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Appendix 1 – Cover letter

Kæri viðtakandi,

Nú er að fara í gang könnun á neyslu og viðhorfi fólks til matvæla. Könnunin er hluti af samevrópsku rannsóknarverkefni sem Matís tekur þátt í og stýrir og verður hún framkvæmd samtímis á Íslandi, Þýskalandi, Hollandi, Finnlandi og Noregi. Rannsóknin er jafnframt hluti af meistaranámsverkefnum nemenda við Háskóla Íslands.

Nafn þitt kom upp í 4000 manna slembiúrtaki fólks úr þjóðskrá á aldrinum 18-80 ára. Okkur þætti vænt um ef þú gætir séð þér fært að svara könnuninni. Könnunin fer fram **á netinu** með því að fara á slóðina www.vidhorf2014.matis.is. Að jafnaði tekur um **20-30 mínútur** að svara. Vinsamlegast fylltu út spurningalistann **fyrir 14. apríl 2014**.

Þessi könnun er um venjur þínar og skoðanir. Það eru engin rétt eða röng svör. Búið er að tilkynna könnunina til Persónuverndar og ekki verður hægt að rekja svör til einstaklinga. Nafn þitt mun hvergi koma fram við úrvinnslu könnunarinnar.

Þátttaka í könnuninni gefur möguleika á að vinna gjafabréf að verðmæti 10.000 kr. Þú getur tekið þátt í happdrættinu með því að skrá netfangið þitt í lok könnunarinnar. Dregið verður úr innsendum svörum og tölvupóstur sendur til vinningshafa 16. apríl 2014.

Ábyrgðarmaður könnunarinnar er Kolbrún Sveinsdóttir, verkefnastjóri hjá Matís. Ef einhverjar spurningar vakna í sambandi við þátttöku er hægt að hafa samband við Þóru Valsdóttur í síma 4225143 milli 8 og 16 á virkum dögum eða á netfanginu thora.valsdottir@matis.is

Með von um góð viðbrögð,

_____ _____

Kolbrún Sveinsdóttir,
verkefnastjóri hjá Matís

Guðjón Þorkelsson,
dósent við Háskóla Íslands

Appendix 2 – Questionnaire

Part 1: Background information for segment description

Demographics

B1. Gender O Male O Female

B2. Age (years) OPEN

B3. Living area (postal code) OPEN

B4. Household size and type

O one adult
O two adults
O one adult and one or more children (under 18 years of age)
O two adults and one or more children (under 18 years of age)
O other, OPEN

Socioeconomics

B5. WHAT IS THE HIGHEST LEVEL OF EDUCATION YOU HAVE COMPLETED?

O comprehensive school
O intermediate school
O secondary school
O academic degree
O higher academic degree

Note: the answering options were modified according the education system of each country

B6. WHICH OF THE FOLLOWING DESCRIBES YOUR OCCUPATIONAL STATUS BEST?

O student
O employee
O officer
O manager
O self-employed
O pensioner
O other, OPEN

B7. WHAT IS YOUR TOTAL ANNUAL HOUSEHOLD NET INCOME AFTER TAXES?

O under 10 000 euros
O 10 000 – 20 000 euros
O 20 001 – 30 000 euros
O 30 001 – 40 000 euros
O 40 001 – 50 000 euros
O 50 001 – 60 000 euros
O 60 001 – 70 000 euros
O 70 001 – 80 000 euros
O 80 001 – 90 000 euros
O Over 90 000 euros

Note: Options were modified to each country

Food purchasing

Note: The aim of this section was to find out how involved consumers are in food purchasing, to describe their purchasing habits and attitudes toward several aspects related to shopping food.

B8. HOW MUCH DO YOU PARTICIPATE IN PLANNING, BUYING AND PREPARATION OF FOODS YOU EAT?

O I'm mainly responsible for planning, buying and preparation of foods
O I'm partly responsible
O I'm not responsible

CHOOSE THE ALTERNATIVE THAT BEST DESCRIBES YOUR OPINION FOR EACH OF THE STATEMENTS

	Completely disagree						Completely agree
Source: FRL: (SC1) importance of product information							
B9a *To me product information is of high importance. I need to know what the product contains*	1	2	3	4	5	6	7
B9b *I compare labels to select the most nutritious food.*	1	2	3	4	5	6	7
B9c *I compare product information labels to decide which brand to buy*	1	2	3	4	5	6	7
Source: FRL: (SC2) attitudes to advertising							

B10a *I have more confidence in food products that I have seen advertised than in unadvertised products*	1	2	3	4	5	6	7
B10b *I am influenced by what people say about a food product*	1	2	3	4	5	6	7
B10c *Information from advertising helps me to make better buying decisions*	1	2	3	4	5	6	7

IT IS IMPORTANT TO ME THAT THE FOOD I EAT ON A TYPICAL DAY…

	Completely disagree						Completely agree
Source: FCQ: (3. Convenience)							
B11a *Is easy to prepare*	1	2	3	4	5	6	7
B11b *Can be cooked very simply*	1	2	3	4	5	6	7
B11c *Takes no time to prepare*	1	2	3	4	5	6	7
B11d *Can be bought in shops close to where I live or work*	1	2	3	4	5	6	7
B11e *Is easily available in shops and supermarkets*	1	2	3	4	5	6	7

B12. HOW OFTEN DO YOU PURHCASE GROCERIES OR SNACKS FROM…

B12a Hypermarkets

O Never
O Seldom
O 1 – 3 times a month
O Weekly

B12b Supermarkets

O Never
O Seldom
O 1 – 3 times a month
O Weekly

B12c Discount stores

O Never
O Seldom
O 1 – 3 times a month
O Weekly

B12d Convenience stores

O Never
O Seldom

O 1 – 3 times a month
O Weekly

B12e Speciality stores

O Never
O Seldom
O 1 – 3 times a month
O Weekly

B12f Gas stations

O Never
O Seldom
O 1 – 3 times a month
O Weekly

B12g Kiosks

O Never
O Seldom
O 1 – 3 times a month
O Weekly

B12h Cafés

O Never
O Seldom
O 1 – 3 times a month
O Weekly

Note: Single items were added or excluded depending on the relevance in each country

B13. DO YOU FREQUENTLY OR MOSTLY FOLLOW ONE OR MORE OF THE FOLLOWING DIETS? CHOOSE THE OPTION(S) THAT DESCRIBES YOUR DIET.

O organic
O biodynamic
O vegetarian
O vegan
O kosher
O halal
O low lactose/lactose free
O gluten-free
O low carbohydrate
O other, OPEN
O none of these

Relevance

Note: Aim of this section was to find out the personal relevance of EnRichMar ingredients from health aspect

Source: modified from Dean et al. 2011: relevance		
B14. Do you suffer from cardiovascular disease (e.g. coronary heart disease, heart failure) or do you consider yourself as having a high risk for developing cardiovascular disease?		
	O Yes	O No
B15. Do you have a relative or close acquaintance that has cardiovascular disease?		
	O Yes	O No
B16. Does someone in your household suffer from cardiovascular disease?	O Yes	O No

B17. HOW WOULD YOU DESCRIBE YOUR PHYSICAL HEALTH? CIRCLE THE NUMBER THAT BEST DESCRIBES YOUR HEALTH.

1	2	3	4	5
bad	not so good	so, so	good	excellent

BELOW ARE A FEW QUESTIONS ABOUT PHYSICAL ACTIVITY. CHOOSE THE ALTERNATIVE IN EACH ROW THAT BEST DESCRIBES YOUR HABITS.

B18. How many times a week do you usually do at least…

	5 times per week or more	3-4 times per week	1-2 times per week	Less frequently /Never
B18a *30 minutes of vigorous-intensity physical activity that makes you sweat or puff and pant (e.g. heavy weight lifting, digging, running, aerobics, spinning/fast biking)?*	1	2	3	4
B18b *30 minutes of light/moderate-intensity physical activity that increases your heart rate or makes you breathe harder than normal (e.g. carrying light loads, bicycling at regular pace, or swimming)?*	1	2	3	4
B18c *30 minutes of walking (e.g. walking from place to place for exercise, leisure or recreation)*	1	2	3	4

Familiarity of components and attitudes towards them

B19. HOW FAMILIAR ARE YOU WITH USE OF THE FOLLOWING COMPONENTS IN FOODS OR SUPPLEMENTS

	Not at all			familiar			Very familiar
***B19a** Omega 3 fatty acids*	1	2	3	4	5	6	7
***B19b** Omega 6 fatty acids*	1	2	3	4	5	6	7
***B19c** Antioxidants*	1	2	3	4	5	6	7
***B19d** Seaweed*	1	2	3	4	5	6	7
***B19e** Kelp*	1	2	3	4	5	6	7
***B19f** Algae*	1	2	3	4	5	6	7
***B19g** Fish oil*	1	2	3	4	5	6	7
***B19h** Vitamin D*	1	2	3	4	5	6	7
***B19i** Dietary fiber*	1	2	3	4	5	6	7
***B19j** Lactic acid bacteria*	1	2	3	4	5	6	7
***B19k** Oat protein*	1	2	3	4	5	6	7
***B19l** Beta-glucan*	1	2	3	4	5	6	7
***B19m** Blueberry powder*	1	2	3	4	5	6	7
***B19n** Rye*	1	2	3	4	5	6	7

B20 HOW WOULD YOU DESCRIBE YOUR ATTITUDE TOWARDS THE USE OF THE FOLLOWING COMPONENTS IN FOODS

	Very negative						Very positive	I don't know this component
***B20a** Omega 3 fatty acids*	1	2	3	4	5	6	7	8
***B20b** Omega 6 fatty acids*	1	2	3	4	5	6	7	8
***B20c** Antioxidants*	1	2	3	4	5	6	7	8
***B20d** Seaweed*	1	2	3	4	5	6	7	8
***B20e** Kelp*	1	2	3	4	5	6	7	8
***B20f** Algae*	1	2	3	4	5	6	7	8
***B20g** Fish oil*	1	2	3	4	5	6	7	8
***B20h** Vitamin D*	1	2	3	4	5	6	7	8
***B20i** Dietary fibre*	1	2	3	4	5	6	7	8
***B20j** Lactic acid bacteria*	1	2	3	4	5	6	7	8
***B20k** Oat protein*	1	2	3	4	5	6	7	8
***B20l** Beta-glucan*	1	2	3	4	5	6	7	8
***B20m** Blueberry powder*	1	2	3	4	5	6	7	8
***B20n** Rye*	1	2	3	4	5	6	7	8

B21. HOW OFTEN DO YOU USE SUPPLEMENTS THAT CONTAIN FOLLOWING COMPONENTS

	Never	Occasionally	Monthly	Weekly	Daily
B21a *Omega 3 fatty acids*	1	2	3	4	5
B21b *Omega 6 fatty acids*	1	2	3	4	5
B21c *Seaweed*	1	2	3	4	5
B21d *Kelp*	1	2	3	4	5
B21e *Algae*	1	2	3	4	5
B21f *Fish oil*	1	2	3	4	5
B21g *Vitamin D*	1	2	3	4	5
B21h *Lactic acid bacteria*	1	2	3	4	5

Specific EnRichMar questions concerning consumption habits

Note: The aim of this section was to make sure that the consumers that were recognized to be potential target groups for enriched/functional/nutritious products actually consumed the specific products that the EnRichMar project focused on (fish dishes, cereal snacks, and dairy products)

B22. HOW OFTEN ON AVERAGE DO YOU CONSUME

	Less than once a month	Once a month	Two or three times a month	Once a week	Two times a week	Three times a week or more often
B22a *Ready-to-eat fish dishes*	1	2	3	4	5	6
B22b *Nibbles (chips, nuts etc.)*	1	2	3	4	5	6
B22c *Healthy snacks (high fiber muesli bars etc.)*	1	2	3	4	5	6
B22d *Yoghurt*						
B22e *Milk based desserts*	1	2	3	4	5	6
B22f *Milk*	1	2	3	4	5	6

NOTE: We have used the term "Nibbles" to describe chips, nuts, etc. snacks. The most suitable word was to be found to describe this kind of product category in each country.

WHO IN YOUR HOUSEHOLD CONSUME FOLLOWING PRODUCTS?
You can choose one or more options from each row.

	Adult(s)	Children	Elderly	None
SME5a *Ready-to-eat fish dishes*	1	2	3	4
SME5b *Nibbles (chips, nuts etc.)*	1	2	3	4
SME5c *Healthy snacks (high fibre muesli bars etc.)*	1	2	3	4

SME5d *Yoghurt*	1	2	3	4
SME5e *Milk based desserts*	1	2	3	4
SME5f *Milk*	1	2	3	4

Part 2: Segmentation

Novelty

Note: The aim of the section was to find out if the consumers were interested in trying novel/exotic food products or if they preferred to stick with their current eating habits.

CHOOSE THE ALTERNATIVE THAT BEST DESCRIBES YOUR OPINION FOR EACH OF THE STATEMENTS

	Completely disagree						Completely agree
Source: FRL: (APA3) novelty							
S1a *I love to try recipes from foreign countries*	1	2	3	4	5	6	7
S1b *I like to try new foods that I have never tasted before*	1	2	3	4	5	6	7
S1c *Traditional recipes are indeed the best*	1	2	3	4	5	6	7
Source: FRL: (CO2) security							
S2a *I dislike everything that might change my eating habits*	1	2	3	4	5	6	7
S2b *I only buy and eat foods which are familiar to me*	1	2	3	4	5	6	7
S2c *A familiar dish gives me a sense of security*	1	2	3	4	5	6	7

CHOOSE THE ALTERNATIVE THAT BEST DESCRIBES YOUR OPINION FOR EACH OF THE STATEMENTS

	Completely disagree						Completely agree
Source: Food Neophobia Scale (FNS) (Pliner et al. 1992)							
S3a *I am constantly sampling new and different foods*	1	2	3	4	5	6	7
S3b *I don't trust new foods*	1	2	3	4	5	6	7
S3c *If I don't know what is in a food, I won't try it*	1	2	3	4	5	6	7

S3d *I like foods from different countries*	1	2	3	4	5	6	7
S3e *Ethnic food looks too weird to eat*	1	2	3	4	5	6	7
S3f *At dinner parties, I will try a new food*	1	2	3	4	5	6	7
S3g *I am afraid to eat things I have never had before*	1	2	3	4	5	6	7
S3h *I am very particular about the foods I will eat*	1	2	3	4	5	6	7
S3i *I will eat almost anything*	1	2	3	4	5	6	7
S3j *I like to try new ethnic restaurants*	1	2	3	4	5	6	7

Healthiness

Aim of this section: to find out how important the consumers consider nutritional and health aspects of foods

CHOOSE THE ALTERNATIVE THAT BEST DESCRIBES YOUR OPINION FOR EACH OF THE STATEMENTS

	Completely disagree						Completely agree
Source: FRL: (APA5) taste							
S4a *I find the taste of food products important*	1	2	3	4	5	6	7
S4b *When cooking, I first and foremost consider the taste*	1	2	3	4	5	6	7
S4c *It is more important for me to choose food products for their nutritional value rather than for their taste*	1	2	3	4	5	6	7
S4d *It is more important for me to choose food products for their price rather than for their taste*	1	2	3	4	5	6	7
S4e *It is more important for me to choose food products for their novelty rather than for their taste*	1	2	3	4	5	6	7
S4f *It is more important for me to choose food products for their nutritional value rather than for their price*	1	2	3	4	5	6	7

Note: S4f added as an SME requested.

CHOOSE THE ALTERNATIVE THAT BEST DESCRIBES YOUR OPINION FOR EACH OF THE STATEMENTS

	Completely disagree						Completely agree
Source: Roininen et al. 1999. Appetite: General health interest							
S5a *The healthiness of food has little impact on my food choices*	1	2	3	4	5	6	7
S5b *I am very particular about the healthiness of food I eat*	1	2	3	4	5	6	7
S5c *I eat what I like and I do not worry much about the healthiness of food*	1	2	3	4	5	6	7
S5d *It is important for me that my diet is low in fat*	1	2	3	4	5	6	7
S5e *I always follow a healthy and balanced diet*	1	2	3	4	5	6	7
S5f *It is important for me that my daily diet contains a lot of vitamins and minerals*	1	2	3	4	5	6	7
S5g *The healthiness of snacks makes no difference to me*	1	2	3	4	5	6	7
S5h *I do not avoid foods, even if they may raise my cholesterol*	1	2	3	4	5	6	7

Functional foods

Aim of the section: to find out consumers interest towards functional foods

[this info was showed to consumers] *"Functional food" means food that influence specific functions in the body and thereby offers benefits for health, well-being, or performance beyond their regular nutritional value. Some components might have removed or replaced or nutritionally beneficial components might have added to these products.* [this info was showed to consumers]

TO WHAT EXTENT DO YOU DISAGREE OR AGREE WITH THE FOLLOWING STATEMENTS

Source: Urala & Lähteenmäki 2007. Food Quality & Preference: Reward from using functional foods	Completely disagree						Completely agree
S6a *Functional foods help to*	1	2	3	4	5	6	7

improve my mood							
S6b *My performance improves when I eat functional foods*	1	2	3	4	5	6	7
S6c *Functional foods make it easier to follow a healthy lifestyle*	1	2	3	4	5	6	7
S6d *I can prevent disease by eating functional foods regularly*	1	2	3	4	5	6	7
S6e *The idea that I can take care of my health by eating functional foods gives me pleasure*	1	2	3	4	5	6	7
S6f *Functional foods can repair the damage caused by an unhealthy diet*	1	2	3	4	5	6	7
S6g *I am prepared to compromise on the taste of a food if the product is functional*	1	2	3	4	5	6	7
S6h *I actively seek out information about functional foods*	1	2	3	4	5	6	7

TO WHAT EXTENT DO YOU DISAGREE OR AGREE WITH THE FOLLOWING STATEMENTS

	Completely disagree						Completely agree
Source: Urala & Lähteenmäki 2007. Food Quality & Preference: Necessity of functional foods							
S7a *Functional foods are completely unnecessary*	1	2	3	4	5	6	7
S7b *Functional foods are a total sham*	1	2	3	4	5	6	7
S7c *Growing number of functional foods on the market is a bad trend for the future*	1	2	3	4	5	6	7
S7d *For a healthy person it is worthless to use functional foods*	1	2	3	4	5	6	7

S7e *It is great that modern technology allows the development of functional foods*	1	2	3	4	5	6	7
S7f *I only want to eat foods that do not have any medicine-like effects*	1	2	3	4	5	6	7
S7g *Health effects are not appropriate in delicacies*	1	2	3	4	5	6	7
S7h *Functional foods are consumed mostly by people who have no need for them*	1	2	3	4	5	6	7
S7i *It is pointless to add health effects to otherwise unhealthy foods*	1	2	3	4	5	6	7

Price awareness

Note: The aim of this section was to find out the importance of price in food purchasing

CHOOSE THE ALTERNATIVE THAT BEST DESCRIBES YOUR OPINION FOR EACH OF THE STATEMENTS

	Completely disagree						Completely agree
Source: FRL: (SC5) price criteria							
S8a *I always check prices, even on small items*	1	2	3	4	5	6	7
S8b *I notice when products I buy regularly change in price*	1	2	3	4	5	6	7
S8c *I look for ads in the newspaper for store specials and plan to take advantage of them when I go shopping*	1	2	3	4	5	6	7
Source: FRL: (APA2) price/ quality relation							
S9a *I always try to get the best quality for the best price*	1	2	3	4	5	6	7
S9b *I compare prices between product variants in order to get the best value for money*	1	2	3	4	5	6	7
S9c *It is important for me to know that I get quality for all my money*	1	2	3	4	5	6	7

Naturalness and environment

Note: The aim of this section was to find out what is the importance of environmental aspects when making purchasing decisions

CHOOSE THE ALTERNATIVE THAT BEST DESCRIBES YOUR OPINION FOR EACH OF THE STATEMENTS

	Completely disagree						Completely agree
Source: FRL: (APA1) health							
S10a *I prefer to buy natural products (i.e. products without preservatives)*	1	2	3	4	5	6	7
S10b *To me the naturalness of the food that I buy is an important quality*	1	2	3	4	5	6	7
S10c *I try to avoid food products with additives*	1	2	3	4	5	6	7
Source: FRL: (APA4) organic products							
S11a *I always buy organically grown food products if I have the opportunity*	1	2	3	4	5	6	7
S11b *I make a point of using organic food products*	1	2	3	4	5	6	7
S11c *I do not mind paying a premium for organic products*	1	2	3	4	5	6	7

IT IS IMPORTANT THAT THE FOOD I EAT ON A TYPICAL DAY

	Completely disagree						Completely agree
Source: Lindeman & Väänänen. Appetite 2000: Environmental Protection							
S12a *Has been prepared in an environmentally friendly way*	1	2	3	4	5	6	7
S12b *Has been produced in a way which has not shaken the balance of nature*	1	2	3	4	5	6	7
S12c *Is packaged in an environmentally friendly way*	1	2	3	4	5	6	7

Part 3: SME specific questions

I AM FAMILIAR WITH THE FOODSTUFFS WHICH COME FROM THE FOLLOWING COUNTRY…

	Not familiar at all						Very familiar
***SME1a** France*	1	2	3	4	5	6	7
***SME1b** Finland*	1	2	3	4	5	6	7
***SME1c** Germany*	1	2	3	4	5	6	7
***SME1d** Iceland*	1	2	3	4	5	6	7
***SME1e** Netherlands*	1	2	3	4	5	6	7
***SME1f** Sweden*	1	2	3	4	5	6	7
***SME1g** Italy*	1	2	3	4	5	6	7
***SME1h** Norway*	1	2	3	4	5	6	7

Note: Countries outside the consortium are included to provide variation.

IN MY OPINION THE QUALITY OF THE FOODSTUFFS FROM THE FOLLOWING COUNTRIES IS…

	low			moderate			high
***SME2a** France*	1	2	3	4	5	6	7
***SME2b** Finland*	1	2	3	4	5	6	7
***SME2c** Germany*	1	2	3	4	5	6	7
***SME2d** Iceland*	1	2	3	4	5	6	7
***SME2e** Netherlands*	1	2	3	4	5	6	7
***SME2f** Sweden*	1	2	3	4	5	6	7
***SME2g** Italy*	1	2	3	4	5	6	7
***SME2h** Norway*	1	2	3	4	5	6	7

Note: Countries outside the consortium are included to provide variation.

SME3a What type of qualities you associate with Dutch products? Describe those qualities in the field. OPEN
SME3b What type of qualities you associate with Finnish products? Describe those qualities in the field. OPEN
SME3c What type of qualities you associate with Icelandic products? Describe those qualities in the field. OPEN
SME3d What type of qualities you associate with Norwegian products? Describe those qualities in the field. OPEN
Note: These measure what qualities consumer associate with products with different origins. All measures in all countries.

SME4a Do you recognize the brand [INSERT BRAND]? O Yes O No
IF YES
SME4b What type of qualities you associate with the brand? OPEN

Appendix 3 – Factor analysis for segmentation

Item	Factor				
	1	2	3	4	5
I make a point of using organic food products	.771				
Has been produced in a way which has not shaken the balance of nature (It is important that the food I eat on a typical day...)	.764				
Has been prepared in an environmentally friendly way (It is important that the food I eat on a typical day...)	.759				
To me the naturalness of the food that I buy is an important quality	.743				
I always buy organically grown food products if I have the opportunity	.732				
I prefer to buy natural products (i.e. products without preservatives)	.713				
Is packaged in an environmentally friendly way (It is important that the food I eat on a typical day)	.689				
I do not mind paying a premium for organic products	.632				
I try to avoid food products with additives	.591				
Cronbach's alpha for factor one	**.924**				
My performance improves when I eat functional foods		.872			
Functional foods help to improve my mood		.841			
Functional foods make it easier to follow a healthy lifestyle		.814			
I can prevent disease by eating functional foods regularly		.797			
The idea that I can take care of my health by eating functional foods gives me pleasure		.792			
Functional foods can repair the damage caused by an unhealthy diet		.753			
I am prepared to compromise on the taste of a food if the product is functional		.622			
Cronbach's alpha for factor two		**.934**			
I like to try new foods that I have never tasted before.rec			.833		
I love to try recipes from foreign countries.rec			.813		
I like to try new ethnic restaurants.rec			.802		
I like foods from different countries.rec			.800		
I am constantly sampling new and different foods.rec			.646		
At dinner parties, I will try a new food.rec			.573		
Cronbach's alpha for factor three			**.886**		
Functional foods are a total sham				.847	
Growing number of functional foods on the market is a bad trend for the future				.795	
For a healthy person it is worthless to use functional foods				.765	
Functional foods are completely unnecessary				.765	
Functional foods are consumed mostly by people who have no need for them				.572	

Cronbach's alpha for factor four				**.893**	
I always try to get the best quality for the best price					.823
I compare prices between product variants in order to get the best value for money					.795
It is important for me to know that I get quality for all my money					.697
I always check prices, even on small items					.680
I notice when products I buy regularly change in price					.671
I look for ads in the newspaper for store specials and plan to take advantage of them when I go shopping					.529
Cronbach's alpha for factor five					**.849**
I always follow a healthy and balanced diet					
It is important for me that my daily diet contains a lot of vitamins and minerals					
I eat what I like and I do not worry much about the healthiness of food.rec					
I am very particular about the healthiness of food I eat					
It is more important for me to choose food products for their nutritional value rather than for their price					
It is more important for me to choose food products for their nutritional value rather than for their taste					
Cronbach's alpha for factor six					

Appendix 4 – Factor analysis for descriptive variables

Item	Factor		
	1	2	3
Is easy to prepare (It is important to me that the food I eat on a typical day...)	.914		
Can be cooked very simply (It is important to me that the food I eat on a typical day...)	.927		
Takes no time to prepare (It is important to me that the food I eat on a typical day...)	.881		
Can be bought in shops close to where I live or work (It is important to me that the food I eat on a typical day...)	.577		
Is easily available in shops and supermarkets (It is important to me that the food I eat on a typical day...)	.558		
Cronbach's alpha for factor one	**.884**		
To me product information is of high importance. I need to know what the product contains		.807	
I compare labels to select the most nutritious food		.861	
I compare product information labels to decide which brand to buy		.861	
Cronbach's alpha for factor two		**.886**	
I have more confidence in food products that I have seen advertised than in unadvertised products			.628
I am influenced by what people say about a food product			.561
Information from advertising helps me to make better buying decisions			.897
Cronbach's alpha for factor three			**.742**

Appendix 5 – Non-response bias

Table 29. Comparison of responses to segmentation variables between the first 10% respondents and last 10% respondents

Variable	First 10% mean	Last 10% mean	*t*	*P*
Organic, natural and environmental	4.98	4.88	0.260	.796
Reward from functional foods	3.73	3.43	0.757	.453
Novelty avoidance	2.98	2.79	0.468	.642
Functional foods are unnecessary	3.50	3.60	0.246	.807
Price awareness	5.14	5.01	0.333	.740
Healthy food importance	4.81	5.01	0.604	.549

Appendix 6 – Dendogram