



**UNIVERSITY OF GOTHENBURG**  
**SCHOOL OF BUSINESS, ECONOMICS AND LAW**

**Master Degree Project in Marketing and  
Consumption**

**Perception of Product Healthiness through Product Package Design:**

*How significant are product package elements (color, visuals and visibility through the package)  
in forming “health expectation” among consumers?*

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### ABSTRACT

Healthy diet trend is becoming more and more popular every day which resulted in tougher competition for food producers around the world. However, tough regulations on the production of food and food related promotional messages are forcing producers to seek new ways to promote healthy aspects of their products. One of the supportive communication strategies that are essential in delivering those messages is the food packaging itself. Hence, this study attempts to identify key design attributes in cod fish fillet product packages and analyze how those attributes can be used to enhance the perception towards the healthiness of a product.

**Keywords:** *packaging; package design; conjoint analysis; total food quality model; product involvement inventory.*

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### INTRODUCTION

For many years, different trends have appeared within food consumption due to changes in economic, social and environmental dimensions that primarily influence the lifestyle of the current consumer in the market (Petzoldt et al., 2008). New work arrangements, increased involvement of women in the labor market, scarcity of time, an increase in wages and other circumstances have established certain trends such as the consumption of fast food, processed food and dining outside without worrying about a price tag (Petzoldt, Joiko & Menrad 2008). Since the early 2000s, consumers in developed countries have started replacing the habits of cooking at home with buying processed food which is less time consuming (Petzoldt et al., 2008). Due to this demand, packaged food companies managed to occupy the widest market share of food consumption in developed countries and are expected to increase their market share in developing countries as well (USDA 2011).

According to Christopher & Paul (2010), the packaging is viewed as a tangible characteristic of a product that serves as a protection and facilitation of the product while it is being transported. In addition, packaging aims to shape the consumer’s perception of the product to persuade the consumer to purchase the item. Therefore, packaging could be characterized as a tool with multiple features that protects and at the same time promotes the product through its colors, design, shape, and size (Christopher & Paul, 2010).

The long production chains and constant scandals around the production process of the food in news made consumer uncertain and insecure about their food purchases (Meziane 2007). In addition, new scientific discoveries and healthy lifestyle advice from nutritionists have increased attention to a healthy diet which implies a careful selection of daily meal that has all necessary nutrition. This development shifted the focus of the consumer’s preference scale from “tasty” to “healthy” (Petzoldt, Joiko & Menrad 2008). According to Meziane (2007), the trend of the healthy lifestyle has been announced as the most effective driver of

innovation and progress making it the most important element in the worldwide food consumption (Meziane 2007). This specific aspect has attracted interests of a lot of researchers and initiated public discussions since healthy consumption is promoted by different organizations, private companies and political programs. Consumers are very open to changes related to their health. According to Niva (2007) two, simultaneously functioning, directions can be observed within the development of consumer habits. The first direction has more promotional characteristics and concentrates on spreading the information about healthy consumption (ibid). These actions have led to the increased awareness and knowledge of consumers about ways how product components affect their health. This direction promotes eating more fruits and vegetables, consuming less sugar, less fat and avoiding unhealthy food (Niva 2007). The second direction has started a few years ago and can be explained as an attempt of food producers to increase the healthiness of their products in the production stage. This goal can be achieved by either eliminating harmful and less valuable chemicals or adding healthier ingredients to the products (Navy 2007). Within legal promotional frames, food producers are successfully integrating these changes in their production line to stretch the significance and healthiness of their products as much as possible (Bech-Larsen & Grunert 2003; Bech-Larsen & Scholderer 2007; Chrysochou et al. 2010). The authorities, organizations and producers combine the efforts to educate the public about healthy eating and possible harm of some ingredients. Therefore, consumers do not only gain knowledge about the food that they consume but also enjoy the convenience of buying healthier products in the supermarket (Meziane 2007).

The term “health” has started to be more popular across various categories of products such as food, beverages, household chemicals etc. (Ahmed, Ahmed & Salman 2005). Therefore, marketing departments of those companies work hard to design new ways to promote “health consciousness” as a part of their brand (ibid). The primary goal is to make the product stand out among competitors and convince consumers that this product is the healthiest option they can get in the market (ibid). One of the effective ways to deliver this message is the food package. The marketing specialists use it as a communication tool which can deliver multiple messages: the product, price, ingredients, nutritional values and even recipe advice (ibid.). The well-designed package must deliver all necessary messages to the consumer, which would persuade them to trust the product and purchase it (ibid.) The higher the attention towards healthy diet gets, the more important packaging becomes for attracting those concerned buyers (Bone & France 2001). Although the significance of packaging for marketing is clear, wrong packaging could create misunderstanding. For example, huge amounts of text, misleading description, or inaccurate design could transmit a wrong message to the customer. (Silayoi & Speece 2007). In addition, some food producers use a very small font to fit as much text as possible which makes it hard to read and causes a confusion among buyers. On the other hand, food producers do not want to lose potential consumers and attempt to differentiate their product designs and product labels with short but valuable and iconic messages (Bech-Larsen & Scholderer 2007). This forced the state authorities around the world to set standards on nutritional information for all companies with which consumers will be able to understand all the information clearly (ibid).

Saba et al., (2010) states that the importance of health is different in various countries and depends primarily on expectations towards the product category, the background of the buyer, his culture and his lifestyle (Saba et al. 2010; van Trijp & van der Lans 2007; Verbeke, Scholderer & Lähteenmäki 2009). These differences make one product design and its message to be accepted positively in one country and very negatively in another (Lähteenmäki et al. 2010).

Different ways of designing the package used by companies, in some cases, do not match the verbal promotions attached to them. This mistake leads to the less favorable perception of the product from consumers (Bone & France 2001). Once characterized as nonverbal elements, they become very important for consideration of marketing experts. Even though it is hard to maintain creativity with tight regulations on food production, marketers still thrive to design food packages that deliver most effective “health” messages to consumers (ibid)

## STUDY PURPOSE

The purpose of this study is to audit if various nonverbal elements of package design influence consumer perception of the product healthiness. To reach this objective, the research seeks to determine key design attributes that form the packaging of a food product from a certain product category and investigate the impact of those attributes respectively. This design manipulation approach has been implemented in various product studies such as milk products (Ares et al. 2010), juice products (Mizutani et al. 2010) and cereal products (Marshall, Stuart & Bell 2006). “Health” will be the core component of analysis and will be examined as a part of a whole product image. To achieve this purpose the following research questions have been generated:

*Q1: How significant are product package elements (color, visuals and visibility through the package) in forming “health expectation” among consumers?*

*Q2: Which design attribute (color, visuals, and visibility through the package), has the most influence on the “health expectation” of consumers towards food products?*

*Q3: Is there any relation between the participation level of consumers with certain food products and their response towards various package design characteristics within their “health expectation”?*

The last aim of this study is to assist food producers, marketing experts, and designers to discern desires of buyers on the presentation of healthy aspects of food packages and adjust those designs to build trust and reliability towards their products.

To cover the research questions, the theoretical framework will be analyzed and hypothesis will be established based on the specific literature. Then the methodology and analysis will be determined and investigated. Finally, the findings will be matched with the theoretical framework and implications for enhancing product package designs options for producers will be discussed.

## THEORETICAL FRAMEWORK

### The importance of package design

Many admissible types of research have been conducted on consumer inclinations of package design for food products where package designing elements were associated with consumer expectations. Despite a large amount of research, very few authors have studied the influence of package design on consumer perception of “healthiness” of the food product. In an article released by Bone and France in 2001, researchers claim that the visual elements (image and color) of a food label can drastically affect consumer buying intentions even if the consumer was already exposed to a verbal information about a specific product. This advises that visual elements could be ambiguous and influence the purchase behavior of consumers both: positively or negatively (Bone & France 2001).

An important finding was made by Blog Catalpha (2016) within the processing time of information by consumers. The researcher had discovered that consumers need only 20 seconds to scan and absorb visually everything on any shelf in the store. The finding makes it important for marketers to think through the design of the package such as color, visuals and size to make it more appealing and eye-catching to consumers (ibid).

## Package Design Attributes

Ares and Deliza (2010) have conducted an interesting study on consumer behavior via manipulations in the design of a food package. Together with Besio and Gimenez (2010) researchers have examined the influence of various label design elements on consumer purchase intentions of chocolate milk desserts and compared if the affection of a certain element is occurring due to consumer involvement with that product. The level of involvement demonstrated by consumers towards the product influenced their enthusiasm in the examined food product and their attitude to studied variables, leading to a conclusion that design elements could be a useful tool to consider in the food industry (Ares et al. 2010). The only two design elements that remained constantly important to consumers with different product involvement level were package color and a visual image on the label. Consumers were influenced by these design elements to such extent, that they voted them above other attributes, such as the type of dessert. Substituting brown color with black color and adding a visual picture to the dessert package demonstrated a positive attitude of consumers, leading to an increased purchase intention towards that product. Some other elements of package design such as product shape (rectangular, triangle or round) did not influence purchase intentions of consumers at all (Ares et al. 2010). A purpose of a different research of Marshall's, Stuart's & Bell's study (2006) was to examine the influence of package color on preschool children based on their gender and age. Cereals, biscuits and drinks were used as three product categories during the experiment. All products in these categories had their logos and brand related information erased and offered to children in 9 different colors. Boys and girls were asked to pick only one product from each category for their own consumption. Children were then interviewed to find out the reason behind their choices. The findings indicated a high relation between product category and color, rather than individual color preferences. As per the study, favorite colors of children were pink (24%), followed by the second preference of purple (11.4) and the third choice of yellow and blue (both 9%). However, among selected products most preferred choices were pink (40.9%), purple (15%) and yellow (15%) (Marshall, Stuart & Bell 2006). This leads the authors to their first assumptions:

*H1: The color of the package is an influential factor that affects the consumer "health expectation".*

*H2: Consumers' level of association with specific food types will influence their response towards different package healthiness design attributes.*

*H3: If consumers already have an interest and attention toward healthy eating lifestyle, their "health expectation" will be more affected by different package design elements.*

A different research by Mizutani et al. demonstrates that visuals on juice bottles have an impact on the perception of flavors. The study reveals that nice and beautiful images of fruits create an image of freshness and juiciness of a product even if those images do not contain specific fruits. It also discovered that juice products with coinciding images were associated with better smell compared to juice products without coinciding images. The results of his research provided an insight that positive and pleasant images on products are highly accepted by consumers and they are willing to purchase juice products that look fresh and nice from the outside (Mizutani et al. 2010). On the other hand, researchers as Underwood and Klein have also conducted a study where they found out that a visual image of a product on the package increases consumer attitude towards the product and the brand and positively influences purchase intentions of buyers (Underwood, Robert L. & Klein 2002). Their empirical studies have demonstrated that having images on the package increases the attention and hype towards the product. Despite the level of influence, this effect is accidental and happens only with less known brands that offer different inexperienced benefits. Their study targets the usefulness of package design for those specific less known brands who are attempting to increase their product images, sales and enter the consideration group in the mind of consumers (ibid). The third assumption can be derived from here:

***H4: Visuals/images related to the product have an influence over consumers' healthiness expectations.***

Three studies conducted by Madzharov & Block (2010) reveals that the presence of a transparent part on the package creates an impression for consumers about the product quality (chocolate snacks in a chocolate box). More closely, the study shows that when consumers see a bigger part of the real product through the package, they tend to trust it more and choose it over other products. Author indicates the importance of anchor judgement in this case and underlines high frequency of usage of this approach among consumers. This consumer behavior traits are linked to their visual abilities and, thus, sometimes ignores verbal messages, making the decision based only on what they see (Madzharov & Block 2010). The fourth hypothesis can be defined as:

***H5: A transparent package generates a better health expectation than a non-transparent package.***

## **Packaging in decision making**

The package itself has a power that can distinguish or differentiate products through consistency that appear on the cover. Therefore, sometimes the cover is more important than the product itself, (Silayoi & Speece, 2007) Jesper Clement (2007) argued that there are many internal and external factors that are involved in the process of decision making. Based on his arguments, one can state that packaging design plays a big role in creating visual impacts which in terms affects the decision-making process of a consumer, especially in an in-store environment, where the lack of time and fast tempo of shopping leave consumers in vulnerable condition against hundreds of designed packages. In other words, consumers need an effective and effortless tool that can facilitate their choices to satisfy their needs (Clement, 2007).

In the same context, we see that Silayoi and Speece stressed out the fact that packaging can deliver a lot of useful information about the product such as the content, ingredients, how to use, the expiry date of the product, food labeling and the country of origin. Especially with the increase of reliance on self-service in a lot of modern retail stores, information can affect consumer behavior through helping them to identify the wanted product. In other words, one can use the cover of a product to communicate with consumers to facilitate their decision-making and give them an opportunity to choose their products among a lot of alternatives cautiously. In addition, the packaging information can have negative effects through conveying either a lot of information that can confuse consumers or by providing them with wrong or inaccurate information to encourage them to buy those products which in term leads to negative perceptions and low trust level (Silayoi & Speece, 2007).

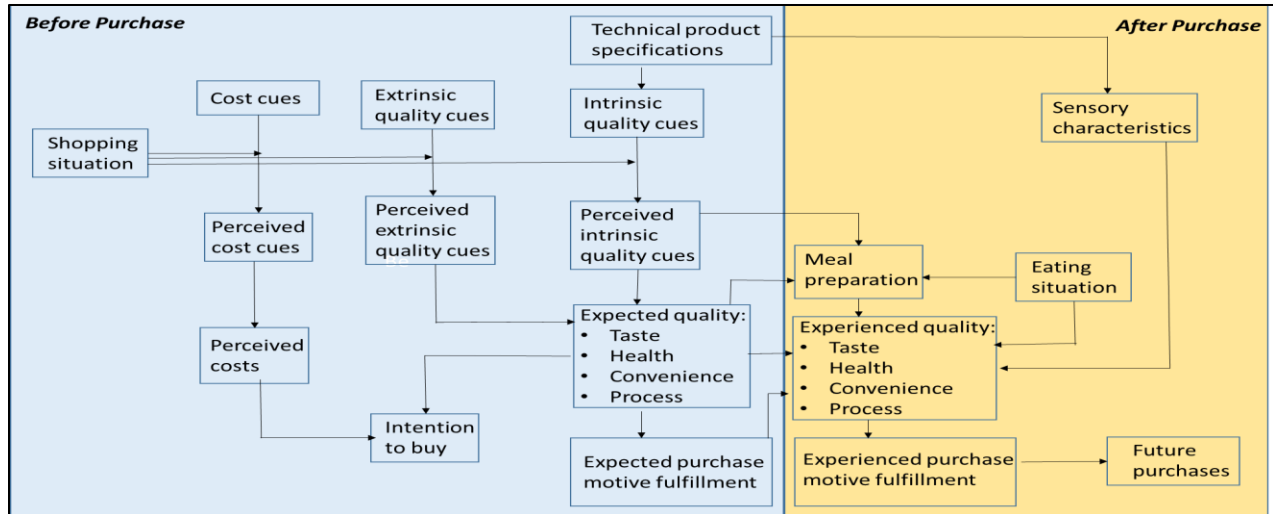
## **The Total Food Quality Model**

“Health” dimension within food quality is the core factor in enhancing a positive perception about the product and influencing final purchases. *The Total Food Quality Model* was initially presented by Grunert, Larsen, Madsen and Baadsgaard (1995) where it was described as the structure of how the food quality is perceived by consumers in different stages of a purchasing process. Besides that, the model combines two major theories where the first is the purchase intention as an opportunity cost of paying and receiving the benefits coming with the product and the second theory as the definition of consumer satisfaction as a difference between consumer expectations and the actual benefits received. It is important to mention that the same model and models as this one were presented in different articles analyzing consumer trends and behavior towards different products and services (Andersen 1994).

The biggest distinguishment of the Total Food Quality Model is that it covers both, before and after purchase analysis. Since most of the elements of food quality can only be experienced after the purchase,

the model becomes essential in generating the whole picture of product consumption. Buying intentions of consumers start with identifying their expectations towards the product quality, however that quality can be identified only after the purchase. Therefore, the difference between “prior” and “post” purchase behavior in both stages construct the Total Food Quality Model (Grunert, Larsen, Madsen and Baadsgaard, 1995).

*Figure 1: The Total Food Quality Model*



In the “before purchase” section of the table, perceptions about the quality of the store item are constructed upon all available quality cues during the moment of the purchase. In the same context, it is important to mention the *cue utilization theory* and its effects on consumer behaviors while taking purchasing decisions. Starting with the definition of the cue, as it is presented in the Oxford dictionary website, is an external tool that is used by marketers to encourage consumers to involve in the brand community and influence their decision making (Oxford dictionaries, 2016). In addition, according to “cue utilization process” consumers will collect the information about specific cues (extrinsic and intrinsic), and then process it to evaluate the product. The use of these cues is connected to the level of awareness and experience within consumers which they use to evaluate a service or a product (Brady et al, 2005).

A major conclusion from the Total Food Quality Model is that the quality is not a goal, but instead, it is means of desire since it helps to fulfill the feeling of satisfaction and value, which motivates purchases. For that reason, the model uses motive fulfillment and value fulfillment demonstrating how food products with their characteristic can add to the accomplishment of a wanted aftereffect and values. Extrinsic cues such as the text on the package and visuals can, for instance, form expectations about a luxury eating quality, making a consumer feel more prestigious in life. The values consumers form in their mind are prone to determine which specific food quality dimension they will prefer above others. This will lead to strengthening certain intrinsic and extrinsic cues and motivate buyers to make more purchases of those products that fulfill their lifestyle as it is visualized in their imagination. The order from which cues are transformed into quality and then into purchase intentions is a highly complex phenomenon. That is why the Total Food Quality Model brakes that phenomena into categories and builds a clear process of consumer behavior from beginning to the end (Andersen 1994; Poulsen et al. 1996; Steenkamp & van Trijp 1996).

## METHOD

For the purpose of the study, an experimental approach was conducted with between subject designs. The study was conducted in Gothenburg, Sweden using the quantitative approach with randomly sampled data. Every third buyer entering ICA store located in Bergsjön Centrum was given a tablet with manipulated pictures of different products which they had to evaluate. If the person refused to participate, we have moved to another third person. People were considered for the experiment based on their wish to participate. Buyers who did not involve in household shopping at all were not allowed to participate in the experiment. A field experiment was launched; respondents were exposed to different pictures of food packages and requested to fill out the questionnaire (Appendix 1). Everyone participating in the experiment was requested to evaluate 8 designed images of cod fillet product based on the “health” perception they were getting from the product. Pictures were put in a random order and given to participants with a description: “Look at all these product packages carefully and mark the extent of how healthy they appear to you”. After the explanation, they were given papers to evaluate products. After the survey was filled, participants were questioned on how involved they are with that type of a product. It took 8-10 minutes on average to examine and question each participant.

### The products

Processed food products considered for the experiment shall have attributes related to consumer perception of product healthiness. To avoid misleading associations with existing brands, a new brand name will be created to label the product. The product type of frozen processed food must be the one that is popular among consumers and bought on an occasional basis. Those products are very debatable on being healthy or not, which is good for the experiment in terms of available design options to position the product on both sides in the mind of the consumer. For instance, potato chips products are perceived as unhealthy a priori and thus are a bad example to choose for the experiment. At last, products used in the experiment must be on the shelves of super market stores placed in a presentable package.

Considering all the criteria above, it was decided to select a frozen processed food of cod file (fish product). The package shape and other attributes mentioned above perfectly fit the product and give opportunities to add design changes.

### Attributes and Design Options

It is important to examine all the attributes of the package design within the experiment. A lot of literature such as Silayoi & Speece 2007 and Madden, Hewett & Roth 2000 argued that color is a significant factor that can play a big role in package design. According to Madzharov & Block 2010; Silayoi & Speece 2007; Underwood, Robert L. & Klein 2002 all images and other graphics that exist on the package can be considered as an important factor that can influence consumers’ decision. On the other hand, it is important to mention that there are some additional design effects that can influence consumers’ decision such as using transparent part so that people can see the content of the product. As a conclusion, there are three attributes that are going to be considered within this experiment which are the color, visuals and the usage of a transparent part.

In order to understand exactly the effects and variation levels of each one of those attributes, it is important to study at least two level of variation for each (Madden, Hewett & Roth 2000). For instance, red and green have a lot of colors between each other on the spectrum of colors meaning that the green color is more related to nature, healthiness and quietness while red color is considered as an eye-catching and powerful



color with a lot of happiness and stimulation (ibid). Therefore, it is important to examine those two colors and see how it can influence health expectations of consumers.

Next attribute is visuals and images perspective and while the subject is talking about processed fish we decided to examine two different pictures which are a picture of the sea with a live cod fish in it, and the second one is a picture of nicely cut cod fish fillets.

The last attribute which is the transparent part of the package will be examined on different outcomes of whether we have this transparent part or not. Table 1 represents all the design options that were examined.

**Table 1: Package Design Options**

Product Design Components	Design options
Colour	Red
	Green
Visuals	Image of the processed product
	Image of a sea with live fish
Transparency	Transparent part on the package to see the product inside
	No transparent part is used, the package is fully covered

## Designing the incentives

Once the package design, color, shape and transparency have been analyzed and determined, the next stage of the experiment is to produce real product designs using Table 1 as a guideline. Authors have generated 8 available images (2(color: green/red) x2(visuals: product image/image of the sea) x2(transparency: yes/no) =8) based on the given design options. The results of the selection are indicated in Table 2, where each combination of the product design is coded from A1 to A8.

**Table 2: Package Design Images**

Product	Colour	Visuals	Transparent
A1	Green	Product image	Transparent
A2	Red	Image of a sea	Transparent
A3	Green	Image of a sea	Transparent
A4	Red	Product image	Not transparent
A5	Green	Product Image	Not Transparent
A6	Red	Product image	Transparent
A7	Green	Image of a sea	Not transparent
A8	Red	Image of a sea	Not transparent

Actual designs of product packages aimed to be used in the experiment were designed by authors. All final package design images were prepared based on Table 2. Designs were made using the Adobe Illustrator program and downloaded to an Apple tablet in high quality. These images are listed in Figure 2 “Experiment material”.

*Figure 2 Experiment material*

## Participants

In total one hundred and fifty people participated in the survey (N=150). According to Creyer (1997), this sample indicators fit the purpose of the research and are sufficient to gain significant results. (Table 3).

*Table 3: Basic data of the sample*

	Frequency	%		Frequency	%
<b>Gender</b>			<b>Age</b>		
Male	65	43.3	18-25	23	15.3
Female	85	56.7	26-30	56	37.4
Total	150	100	31-40	41	27.3
			41-50	18	12
<b>Educational level</b>			>50	12	8
No school	0	0	Total	150	100
Primary school	8	5.3			
Gymnasium	27	18	<b>Responsible for food shopping</b>		
Bachelor's degree	76	50.7	Me	98	65.3
Master's degree	34	22.7	Me and another	52	34.7
Postgraduate studies	5	3.3	Another	0	0
Total	150	100	Total	150	100

## Conjoint analysis

In the first section of the questionnaire, participants of the experiment were asked to evaluate the product “health” perception based on images presented making “health” a dependent variable in this study. The answer to the question was given in Likert scale (one to ten) where one is “not healthy” and ten means “very healthy”. To investigate the data gathered from this part of the survey, conjoint analysis approach was decided to be taken.

In order to analyze the gathered data and identify the importance of each design attribute, conjoint analysis has been implemented. *Conjoint analysis* is a specific type of multivariate technique originated in mathematical psychology and is used to calculate the significance of various elements that make up the analyzed item (Green and Wind 1975). Since our study is not aimed to reveal the best packaging option, but instead to go deeper in evaluating each attribute and its importance compared to other design attributes provided, conjoint analysis is the most suitable path to gain insights.

As a rule, four to six elements can be analyzed through conjoint analysis (Churchill 1991), therefore, design elements used in this study (color, visuals, the existence of transparent part) were selected carefully based on their importance and impact on consumer perception of product healthiness. The preference of a combination evaluated by consumers will reveal the preference score (*part-worth utility*) of individual design attributes. It means that all preference scores of individual attributes can be calculated through the ranking of the set of combinations.

To do proper calculations using conjoint analysis, the first step is to identify design attributes. (Green and Wind 1975) As mentioned above 8 combinations have been generated using three design attributes with 2 levels in each (color: green, red; etc.) To implement mathematical calculations within conjoint analysis, those attribute levels must be coded and written as 1 and -1 (color: green (1), red (-1); etc...). The table resulting from the listing of design combinations using numeric coding is called the *design matrix* (Green and Wind 1975). In a graphical illustration, each design combination is represented as a point in a corner of a cube and part worth utilities within the cube stretching towards relative corners. Within this study, one dimension of the cube shows the color (X1), the second shows the visuals (X2) and the third the existence of the transparent part (X3). The next step in the conjoint analysis is to gather all the ranking for design combinations. Since the linear model function with part worth utilities has the following formula:

$$Y = \beta_{color} * X1 + \beta_{visual} * X2 + \beta_{transparent} * X3 + \mu$$

where  $Y$  is the ranking score for the design combination,  $\beta$  is the preference score and  $\mu$  is a constant, all it takes is to put the meanings for each of the variables in the equation and calculate for the part-worth (Joseph Curry, 1996) (Orme B, 2010) These equations can be solved using *multivariate linear regression* with any statistical software (Orme B, 2010).

## Product Involvement Inventory

The second part of the survey is used to measure the involvement level of participants with the product. To do so, a smaller version of *Product Involvement Inventory* (PII) was conducted. It is a very effective method for measuring the involvement level of consumers. According to Zaichkowsky (1994), the reliability of PII can be as high in measuring ten items as in twenty items, since 10 item measurements will have Cronbach Alphas > 0,9 in all occasions. Therefore, participants of the experiment had to answer evaluate their involvement using ten involvement measures on a 7 Likert Scale. Results of the survey with their mean scores are illustrated in Table 4.

## Food Related Lifestyle

The third part of the survey consists of three questions regarding healthy eating lifestyles of buyers. This method introduced by researchers as Grunert, Brunsø and Bisp (1993) when they were studying *Food Related Lifestyle* (FRL), an instrument which can measure the extent of a typical lifestyle towards food (Grunert, KG, Brunsø & Bisp 1993).

## ANALYSIS

### Importance of the elements of package design/Conjoint Analysis

The main question asked during the research was about impressions of each design element (color, visuals and transparency) on buyers. The experiment conducted in the paper has answered those questions through quantitative analyses and conjoint analysis.

To calculate the results using conjoint analysis we need to start with estimating average ranking for each image. Table 4 demonstrates the listing of all design combinations with their mean scores ranking scores. If matched with the Figure 2, one commonality in design attributes and rankings can be noticed. This can be explained as the three highest ranked images have the presence of a transparent part.

*Table 4 Evaluation of designed images*

Image	Mean Score	Gradation
A1	5.80	8 <sup>th</sup>
A2	5.90	4 <sup>th</sup>
A3	9.65	1 <sup>st</sup>
A4	7.36	3 <sup>rd</sup>
A5	5.79	5 <sup>th</sup>
A6	5.85	6 <sup>th</sup>
A7	5.92	7 <sup>th</sup>
A8	8.19	2 <sup>nd</sup>

Further on, the design matrix (Table 5) is constructed where attribute dimensions (X1, X2 and X3) are identified and design levels (green/red, product image/sea image, transparent/not transparent) are coded with 1 and -1.

**Table 5: Design Matrix**

Conjoining Attributes	Color(x1)	Visual (x2)	Transparent part (x3)
Red, Product image, Not transparent	-1	-1	-1
Green, Product image, Not transparent	1	-1	-1
Green, Image of the sea, Transparent	1	1	1
Red, Image of the sea, Transparent	-1	1	1
Red, Image of the sea, Not transparent	-1	1	-1
Green, Image of the sea, Not transparent	1	1	-1
Green, Product image, transparent	1	-1	1
Red, Product image, Transparent	-1	-1	1

Once the coding is clear, the next step is to calculate the part-worth utility (Table 6) for each design option (transparency, visual and color) using the conjoint formula ( $Y = \beta_{color} * X1 + \beta_{visual} * X2 + \beta_{transparent} * X3 + \mu$ ). Since  $\beta$  are part-worth utilities, for our example we will calculate them in few steps. To find the main effect for attribute 1 (color), we take the average ranking (Table 4) for all model combinations with  $X1 = +1$  and subtract all average rankings for  $X1 = -1$ . According to Orme B (2010) the easiest way to understand this stage is to picture a cube with the vertical plane in the middle. Here we could say that our part-worth utility corresponds to the sum of ranking values for all points on the right side of the vertical plane minus the sum of ranking values for all points on the left side of the vertical plane. The vertical plane then shifts indicating which half of the cube is bigger. As the next step, we divide the result by 4 as we take the average of 4 points each and set in in relation to total variation of the X value (-1 to +1) which means that we divide also by 2 (Orme B, 2010). Thus, we get part-worth utility for color equaling 0.005. In the same way, we proceed with other 2 dimensions where as a result we will get wanted part-worth utilities for color, visuals and the existence of the transparent part. (Table 6)

The ranking calculated with the model function fits the actual ranking as the formula becomes clearer:  $Y = 0.005 * X1 + 0.09 * X2 + 0.24 * X3 + 4.5$ . To calculate the importance score for the individual attribute we derive the percent values of each part-worth utility from their total sum. Once the importance score for each attribute is clear, conclusions can be interpreted from those results presented in Table 6.

**Table 6: Part worth utility**

Category	Part worth	Importance score (%)
Color	0.005	2%
Visual	0.09	26%
Transparent	0.24	72%

Conjoint analysis has resulted in the existence of the transparent part being the most effective design attribute in health perception of the cod fish products, compared to other design attributes.

## Product involvement level and its effect on consumer perception

The third question in the research investigation is aimed to cover the involvement level of consumers with the examined product. The idea was to find out if the involvement level influences the perception towards the product healthiness. As described in the “Method” part of the paper, the product involvement level is examined through *Personal Involvement Inventory Tool* (PII) which is then calculated to find the involvement level for each category provided.

Analysis of the product involvement level has divided participants of the experiment into two groups: involved participants (Group 1) and uninvolved participants (Group 2). Calculations show that the members of Group 2 represent the majority with 53% of the sample. Group 1 is formed by participants who have marked mostly positive numbers in the PII and Group 2 representatives has indicated negative figures instead. Average indicators for each group of participants is indicated in Table 6. It is important to notice that some elements of PII are scored backward meaning that 1 is positive and 10 is negative. The table demonstrates results from ANOVA analysis with numbers showing different results for each of the group.

*Table 7. ANOVA test on PII (\* - values with reverse indicators)*

	Group 1	Group 2	F	Sig
Important - unimportant*	1.55	3.81	82.300	0.00
Boring - interesting	5.50	3.45	50.845	0.00
Relevant – irrelevant*	2.47	4.15	19.220	0.00
Exciting – unexciting*	2.40	4.36	48.110	0.00
Means nothing – means a lot	5.79	4.20	41.515	0.00
Appealing – unappealing*	2.79	4.25	23.365	0.00
Fascinating – mundane*	3.5	4.80	26.821	0.00
Worthless – valuable	6.40	4.69	42.050	0.00
Involving – uninvolving*	1.75	4.15	60.479	0.00
Not needed - needed	6.55	5.17	49.730	0.00

Once the participants were divided into groups, it became necessary to match them with demographic indicators in order to create two profiles of consumers. Table 7 demonstrates those profiles with only one difference between two groups in whether the consumer male or a female (chi-square test with  $p < 0,05$ ) Most consumers with higher involvement scores are females and with fewer involvement scores are males.

Now that we have identified consumer involvement groups, we can use the conjoint analysis on both groups and analyze the difference in part-worth utilities for each of them. The results indicate that the most important attributes for involved consumers are “Transparency” at a rate of 68%, followed by “Visuals” 21%. “Color” has an extremely importance score with 1,851% respectively. On the other hand, consumers who are not involved with the product, have evaluated “Transparency” as a significant attribute with 75%,

followed by the “Visuals” with 26,31%. The last attribute - “Color” is the least important design attribute for uninvolved consumers (2.012%) Cluster analysis have indicated no difference in design attribute preferences among both groups, meaning that both involved and uninvolved consumers would like to see a transparent part on the cod fish product package and the image of the live cod fish in the sea and a very little effect of color on the “health perception”.

### Healthy eating lifestyle analysis

The method implemented to analyze this section of the survey was conducted based on Food Related Lifestyle research technique. The initial plan was to calculate part-worth utilities for people who follow the healthy lifestyle and compare it with people who do not, for the reason of comparing the differences and observe which group values which design attributes the most. Attempting to divide participants into two groups based on this section has ended negatively since the proportions of the groups were 142 indicating all answers as part of their healthy lifestyle and only 8 consumers have provided negative answers (Table 8). Thus, it was decided to not go in depth on this section of the paper since numbers are not distributed properly.

*Table 8: Healthy eating lifestyle segmentation*

	Group A (N= 142)	Group B (N=8)	F	sig
I prefer to buy natural products, ie products without preservatives	7.4	2	96.473	0.00
To me the naturalness of the food that I buy is an important quality.	6.5	1.6	122.768	0.00
I try to avoid food products with additives	6.3	3.7	15.233	0.00

## DISCUSSION

The purpose of this study is to clarify and understand the relationships between consumer perspectives about healthy food and packaging. To answer our research questions, we did an experiment, and we use Total Food Quality Model that can give us a good explanation about the relationships between packaging factors that can influence consumers' expectation towards food quality.

### Testing the hypothesis

Once the results of the study are matched with a hypothesis, the following statements can be made.

**H1:** *The color of the package is an influential factor that affects the consumer “health expectation”.* **Rejected**, since conjoint analyses have proved that the attribute is less powerful compared to other design options within this study. “Color” attribute came in last with the importance score of only 2% while “Visuals” and “Transparency” were evaluated with 26% and 72% respectively.

**H2:** *Consumers' level of association with specific food types will influence their response towards different package healthiness design attributes.* **Rejected.** Consumer involvement level has very little to do with the perception of product package healthiness. Involved and uninvolved consumers have both marked the “Transparency” as the most important attribute (68% and 75%) and “Visuals” as the second most important

(21% and 26.31%) leaving “Color” as the least influential design attribute (1.851% and 2.012%). This means that representatives of both groups are equally affected by the package design and form the same perception on product healthiness.

**H3:** *If consumers already have an interest and attention toward healthy eating lifestyle, their "health expectation" will be more affected by different package design elements.* **Unclear.** This hypothesis cannot be supported or tested by any measures within this research due to extreme and inaccurate indicators. 142 respondents have marked healthy lifestyle as a part of their eating routine leaving eight respondents with the opposite indicator. The difference in groups is so high that proceeding with conjoint analysis will not provide accurate results.

**H4:** *Visuals/images related to the product have an influence over consumers' healthiness expectations.* **Accepted.** Visuals do influence consumer perceptions, and careful selection of the image can enhance the consumer attitude towards the product healthiness. Although it does not have an as strong impact as the “Transparency” (26%<78%) it was still evaluated as the second highest design attribute among the given three options.

**H5:** *A transparent package generates a better health expectation than a non-transparent package* **Accepted.** In fact, the study has shown that presence of a transparent part in the package design of cod fish products has the highest influence on the perception of food healthiness making it a super attribute when it gets to the product healthiness perception. This conclusion has been based on positive part-worth utilities score from conjoint analysis which originated from the higher-ranking score in pictures with transparent design levels (coded as 1) compared to the lower score of images with non-transparent levels (coded as -1)

## Discussions on research questions

As mentioned above, the first question aims to examine various package design elements such as color, visual and existence of transparent part and their influence on consumer perceptions regarding the health benefits of the product. The key focus is the “before” purchase part within the total food quality model. Andersen (1994) has stretched the importance of extrinsic cues as important factors in determining the purchase intention. Design attributes selected for this research (color, visuals, transparency) are all part of the extrinsic cue functioning together to form a positive decision in the mind of the consumer. The study has found that the most significant attributes are the presence of transparent part and visuals which allow a consumer to see what is inside the package. The visuals were scored with (26%), and at the same time, transparency indicators received (72%). The color element that was implemented in the study has demonstrated less importance throughout the experiment. This specific design element takes the last place in the gradation of the importance of package design components scoring only 2% of the total sample. Deliza (2010) and Ares et al., (2010) have indicated color as the most significant factor in product selection, however, our study has proven that this attribute has nothing to do with the perception of product healthiness. Color as a package design attribute has been presented as a significant element of the product, however, the study has proven the opposite. The best possible explanation for this would be the product category which is food, where other elements as visuals and existence of transparent part are perceived much more important compared to color. In addition, color is one of compatible characteristic aimed to enhance the visual appearance of the products (Deliza 2010). The experiment shows that green color is more appealing to consumers instead of red because they consider green as a natural and healthy color. This can also be concluded in the process of conjoint analyses where green coded levels (1) have higher rankings than red coded levels (-1). When it gets to “Visual” attribute, Underwood et al., (2002) has underlined the importance of the presence of images and visuals on the product. Our study has also revealed the relative importance of the presence of the image on the product in order to form a positive perception towards the healthy image of the product.



Our second research question covers the strongest attribute in establishing the health perception towards the product. Madzharov & Block (2010) through their studies have proven that “Transparency” element is important in determining food quality. However, when it gets to the health perception of the product, it is a super important attribute (76%). The presence of the transparent part takes the biggest cake in not only showing the quality of the product but also building the trust and positive attitude towards the healthy signals that the product is spreading.

Moving to our third research question which is covering the relationships between consumers’ level of participation with certain food products and their response regarding the various characteristics of the package design. According to Besio and Gimenez (2010) highly involved consumers in their studies tend to be more influenced by design attributes of preferred products. However, when it gets to health aspect of the product both – involved and uninvolved consumers were affected equally by the proposed design attributes. This is due to the purpose of the experiment. Since this paper aims to find influences on product healthiness, the questions at the survey were very specific (*How healthy is this product seem to you?*). Therefore, within “health” dimension of the food area consumers has the same basic criteria on how to judge if the product is good for their health and, for that reason, design attributes have an equal effect on involved and uninvolved consumers.

## CONCLUSION

The conclusion of this research is that the existence of the transparent part of the product’s package and the visuals should be considered by the companies since they deliver a hidden positive message associated with healthy lifestyle. Even if package design is not the key tool to deliver health-related messages, it still plays a significant supportive role in the promotion. It can be concluded that one of the most valued design strategies are not just beautifying the product but also enhancing its functionality. The existence of the transparent part does not simply allow consumers to see the real product but also builds trust and positive attitudes towards the quality and healthiness of the product. In the study, the respondents did not just mark transparency based on their personal preferences, but due to their belief in the functionality of the transparent design. The same applies to the visual attribute of the package design. Some people like to see the image of a live fish in the sea while others prefer to see the product on the plate in its ready-made condition. However, this does not occur with a less important attribute in the product, which in this case is the color. Despite being the last in the gradation of attributes, green color had a slightly higher effect on the perception of the healthiness of the food product since consumer associated this color with nature and freshness.

## Limitations

For the objective of this study and experiment was conducted on frozen cod fish products. The design of the package for these products involves three major elements: – colors, visuals and insertion of a transparent part. Therefore, since products from different food categories have different package designs the results of the same experiment could lead to different results. The study did not generalize the results on the whole food production industries. Another visible limitation is that the quality of all images of food products that were presented to participants during the experiment depend highly on author’s designing skills. At last, the results will be formulated based on data gathered from Swedish population and, thus are relevant to analyze consumption practices in this specific region and cannot be generalized to all countries around the world.

## Marketing Implications

There is an intense competition in how companies sell “healthy” trend as a part of their products. The food market is constantly developing with new goods appearing in the markets every day. The Food producers should come up with the most suitable strategies to be able to compete in such competitive and dynamic market. The biggest obstacles for the companies are government regulations and standards that determine the format of information which has to be delivered to consumers to isolate and protect them from harmful promotional campaigns. This forces companies to utilize all sources and strategies on hand to be able to deliver proper messages. The package design is one of the tools that fits the purpose. The creativity in designing the package is limited only by the imagination of designers.

This study underlines the importance of such tool and suggests companies to use packaging to achieve price premium through proper positioning of “health” in their products. Indeed, first and foremost the package has the functional utility but with the right marketing decisions, it can deliver “healthy message” which on its own might become a face of the product and the company.

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## Appendix 1. Experiment Survey

You will see eight pictures of cod fish fillet product. Please take a closer look at those images and fill in your answers to questions below:

**To which extent would you evaluate “health” attribute of the cod fish fillet product based on images?**

Please mark the number on the scale of 1 to 10, where 1 is “Not healthy” and 10 represents “Very healthy.”

Product	Not Healthy									Very Healthy
A1	1	2	3	4	5	6	7	8	9	10
A2	1	2	3	4	5	6	7	8	9	10
A3	1	2	3	4	5	6	7	8	9	10
A4	1	2	3	4	5	6	7	8	9	10
A5	1	2	3	4	5	6	7	8	9	10
A6	1	2	3	4	5	6	7	8	9	10
A7	1	2	3	4	5	6	7	8	9	10
A8	1	2	3	4	5	6	7	8	9	10

Please refer to cod fish products and mark your preferences towards it. Mark a number on the scale 1 to 7 that describes your relation to the product, (1 = “I agree with description on the left” and 7 = “I agree with description on the right”)

***For me cod fish fillet products are:***

Important	1	2	3	4	5	6	7	Unimportant
Boring	1	2	3	4	5	6	7	Interesting
Relevant	1	2	3	4	5	6	7	Irrelevant
Exciting	1	2	3	4	5	6	7	Unexciting
Means nothing	1	2	3	4	5	6	7	Means a lot
Appealing	1	2	3	4	5	6	7	Unappealing
Fascinating	1	2	3	4	5	6	7	Mundane
Worthless	1	2	3	4	5	6	7	Valuable
Involving	1	2	3	4	5	6	7	Uninvolving
Not needed	1	2	3	4	5	6	7	Needed

To which extent do you agree or disagree with statements below. Give your answer marking a square from 1 to 7 (1 = “Disagree” and 7 = “Agree”)

	Disagree						Agree
<b>I prefer to buy natural products, ie products without preservatives</b>	1	2	3	4	5	6	7
To me the naturalness of the food that I buy is an important quality.	1	2	3	4	5	6	7
I try to avoid food products with additives.	1	2	3	4	5	6	7

<b>Who is responsible for food shopping in your household?</b>	<input type="checkbox"/> Me	<input type="checkbox"/> Some one else	<input type="checkbox"/> Me and someone else
What is your age?			
What is your gender?	<input type="checkbox"/> Male	<input type="checkbox"/> Female	
What is your education level?	<input type="checkbox"/> No school <input type="checkbox"/> Primary school <input type="checkbox"/> Gymnasium <input type="checkbox"/> Bachelor’s Degree	<input type="checkbox"/> Master’s Degree <input type="checkbox"/> Postgraduate studies	

*Thank you for your time and participation in the survey!!!!*