The influence of package elements on consumer's understanding and use of health claims

Niki Kostareli

March 2015
The influence of package elements on consumer’s understanding and use of health claims

Master thesis for the chair group Consumer Behaviour and Marketing

submitted in fulfilment of the degree of the Master in Organic Agriculture

at Wageningen University, The Netherlands

February 2015, Wageningen

Wageningen University and Research Centre

MSc Thesis Marketing and Consumer Behaviour

Course code: MCB-80436

By: Niki Kostareli
Registration Number: 861202469010

Supervisors: drs. YK (Ynte) van Dam
Department of Marketing and Consumer Behaviour
Wageningen University

dr. HWI (Erica) van Herpen
Department of Marketing and Consumer Behaviour
Wageningen University
Acknowledgement

I take the opportunity to express my gratitude and regards to my supervisors Ynte van Dam and Erica van Herpen for their guidance and encouragement throughout the course of this thesis.

I am grateful to Kunalai Ploydanai for our corporation during the experimental part of my thesis and all the participants for taking part to this project.

Lastly, I would like to thank my family and my friends for their constant encouragement without which this assignment would not be possible.
Summary

Non-communicable diseases (NCDs) are responsible for a large number of deaths in Europe. Diet patterns and lifestyle are closely related to health and food consumption is related to NCDs. Part of EU’s policy to improve consumers’ eating patterns is food labelling and the use of health and nutrition claims on foodstuff, which are established way to convey information to consumer to support healthier food choices.

Health claims could play an important role as an additional support to nutrition labels. They can help consumers to go for healthier choices. However, it is a question of whether consumers understand the message of the health claims correctly and whether they use them for making their food choices.

It is analyzed how the presence of health claim can affect consumer’s perception on food choices. Moreover, it was studied how consumer understand and use the health claims and how health claims can influence consumer’s choice on functional foods. Package elements can help consumer to understand and use more readily the health claims. The aim of this study was to examine whether package elements can help consumer to understand and use more readily the health claims. It was hypothesized that the presence of related-to-heart picture and colour and their combination can better facilitate the understanding and the use of the health claims than health claims being alone. Additionally, it was hypothesized that the perception of good-for-heart product can influence the good perception of the overall healthiness of the product.

The data was collected by a survey in Wageningen University in May and July 2013. The study consisted of 103 Dutch university students. They were asked to imagine that they are in a family where the father has cholesterol problem and hence, to choose a pack of breakfast cereals that the participant likes but is also healthy for his/her father’s heart. The experiment was conducted in two parts. Firstly, participants were randomly assigned to see cereals and choose a product from the virtual supermarket in one of the four conditions (graphical condition, picture condition, colour condition and control condition). Secondly, participants were asked to complete a computer-based questionnaire.

There was not sufficient evidence that the graphical components (red colour and heart symbol) can better facilitate the understanding and the use of the health claims. Additionally, the good-for-heart perception was highly associated to the good-for-overall health perception and vice versa.

The findings are relevant for the consumers, policymakers and the researchers, as well as for food companies dealing with functional foods.
## Table of Contents

Acknowledgement ........................................................................................................................ iii
Summary ............................................................................................................................................... iv
Table of Contents .......................................................................................................................... v

1 Introduction ........................................................................................................................................ 1
   1.1 Background .................................................................................................................................. 1
   1.2 Problem statement ......................................................................................................................... 2
   1.3 Research questions ...................................................................................................................... 3

2 How the presence of health claim can affect consumer’s perception and food choices ...... 5
   2.1 Health and nutrition claims ......................................................................................................... 5
   2.2 Consumer’s understanding of health claims ............................................................................... 6
   2.3 Consumer’s use of the health claims ........................................................................................... 6
   2.4 How the presence of health claims can influence consumer’s choice on functional foods 8

3 How package elements can help consumer to understand and use health claims more readily ................................................................................................................................. 11

4 Methodology ...................................................................................................................................... 17
   4.1 Pre-test: colour preference associated to heart-benefit products ............................................. 17
      4.1.1 Methods ................................................................................................................................. 17
      4.1.2 Data Analysis ......................................................................................................................... 18
      4.1.3 Results .................................................................................................................................. 20
      4.1.4 Conclusion ............................................................................................................................. 21
   4.2 Main experiment ........................................................................................................................... 22
      4.2.1 Materials and Methods .......................................................................................................... 22
      4.2.2 Measures .............................................................................................................................. 26

5 Results ............................................................................................................................................... 29
   5.1 Sample properties ......................................................................................................................... 29
   5.2 Testing hypotheses ....................................................................................................................... 30
      5.2.1 Understanding of health claims ............................................................................................ 30
      5.2.2 Use of health claims .............................................................................................................. 32
      5.2.3 Perception of the healthiness of the food product ................................................................. 34
      5.2.4 Food choice in general ........................................................................................................... 37
6 Discussion and Conclusions .................................................................................. 38
Appendices .................................................................................................................... 41
References ..................................................................................................................... 51

Table of Figures

Figure 1. The A4 paper with the palette of colours, as it was shown to the participants......18
Figure 2. The overview of the virtual supermarket; aisle with different product categories. ....23
Figure 3. Virtual supermarket display; product category cereals breakfast. ......................24
Figure 4. Condition 1; graphical condition combining the health claim with the red colour and
the heart image, in four tastes. ..........................................................................................24
Figure 5. Condition 2; pictorial condition combining the health claim with the heart image, in
four tastes. ..........................................................................................................................25
Figure 6. Condition 3; colour condition combining the health claim with the red colour, in four
tastes. ..................................................................................................................................25
Figure 7. Condition 4; control condition having only the health claim, in four tastes. ............26
Figure 8. Histogram of the distribution among the conditions. ..... Error! Bookmark not defined.

Table of Tables

Table 1. Health claim is enhanced by the combinations of pictorial components and colour
formulating four different conditions (Raisin flavour). ....................................................15
Table 2. The preferred colours associated to heart-benefit products, categorized by the colour
and the shades......................................................................................................................19
Table 3. The frequency of the most preferred colours in the general sample (N=42)..............20
Table 4. The frequency of the most preferred colours across gender......................................21
Table 5. Gender, age and field of education .........................................................................29
Table 6. Frequency for participants........................................................................................29
Table 7. Dependent variables, df, $\chi^2$-value and p-value for understanding the health claim
among four conditions (chi square test). ............................................................................31
Table 8. Summary of the data regarding understanding of health claims..............................32
Table 9. Cereal choice in frequency and percentage (%) ......................................................33
Table 10. Summary of the data on the use of health claims. Mean (M), Standard deviation (SD),
F-value for $df_1=3$, $df_2=99$ and p-value............................................................................33
Table 11. Summary of the data on the use of health claims. Mean (M), Standard deviation (SD),
F-value for $df_1=3$, $df_2=59$ and p-value...........................................................................34
Table 12. Correlation table for the 3 items regarding perception of the healthiness on the food product (N=103).

Table 13. Summary of the data on the perception of the healthiness of the Optivita. Mean (M), Standard deviation (SD), F-value for df1=3, df2=99 and p-value.

Table 14. Correlation table for the 3 items regarding healthiness of the food product among those who chose or notice Optivita brand (N=74).

Table 15. Summary of the data on the perception of the healthiness of the Optivita. Mean (M), Standard deviation (SD), F-value for df1=3, df2=70 and p-value.

Table of Appendices

Appendix A. The colour palette with the names of the colours as referred in Microsoft Office Word programme.

Appendix B. All the 42 double individual ladders. Each ladder start with the one and single attribute “colour”. (A) stands for attribute, (C) for consequence and (V) for value.

Appendix C. The relation of the colours to heart-benefit products.

Appendix D. Questionnaire.
1 Introduction

1.1 Background

In 2007, European Commission published a White Paper on "A Strategy for Europe on Nutrition, Overweight and Obesity", suggesting measures to restrain the current trend towards a steady gain in weight by Union citizens and is also focusing on risks associated with poor nutrition and limited physical exercise (European Commission, 2009).

Non-communicable diseases (NCDs), such as obesity, heart disease, stroke, cancer, chronic respiratory diseases and diabetes were responsible for 63% of the total deaths worldwide in 2008 and it is estimated that NCD deaths will be increased by 15% globally in 2010-2020 (WHO, 2012). Complications, disabilities and premature death can be prevented by reducing risk factors like tobacco use, unhealthy diet, physical inactivity and harmful alcohol use (WHO, 2012).

Studies have shown that diet patterns and lifestyle are closely related to health. Non-communicable diseases are related to food consumption (Cecchini et al., 2010). Particular food intake can be beneficial or not beneficial for human health and can reduce or increase the risk factor (Rimm et al., 1996, Meir et al., 2000, Feldman, 2002). For example, salt consumption is responsible for the raise of blood pressure or low saturated fat and fibre intake reduces cholesterol.

Due to the increase of health problems, new consumer segments have been created depending on their dietary needs. Consumers are becoming health-conscious and most agree that eating healthily is a better way to manage illness than using medication (Hasler, 2002). Hence, part of the EU’s policy in order to improve consumers’ eating patterns includes, among others, practices like food labelling and health and nutrition claims on foodstuff. There are claims carried on product packages that are misleading for the consumer. The EU legislation on nutrition and health claims as reported to the Regulation (EC) No 1924/2006 aim to protect consumers by prohibiting any information which:

1. is false, difficult to understand or misleading (e.g. which attributes medicinal properties to food wrongly or without scientific evidence);
2. casts doubt on the safety or nutritional adequacy of other foods;
3. encourages or condones excessive consumption of a food;
4. encourages consumption of a food by stating or suggesting directly or indirectly that a balanced diet does not provide all the nutrients that are needed;
5. attempts to scare consumers by mentioning changes in bodily functions.

Nutrition labelling, nutritional and health claims are established way to communicate information to consumers in order to support health decision making in relation to food purchases. Due to the fact that consumers do not really use the traditional back-of-pack
nutritional label, health claims on the front of the package could play an important role regarding the health benefits of a product, as an additional support to the nutrition label (Nocella and Kennedy, 2012). Current legislation is designed to protect consumers from misleading and false information.

In December 2006, the Regulation on nutrition and health claims made on foods was adopted by the Council and Parliament. EU Regulation 1924/2006 establishes rules aimed at harmonizing nutrition and health claims at a European level for the first time. From now on, this type of claim on food labelling, presentation and advertising must be clear, concise and based on evidence accepted by the whole scientific community (European Commission).

According to EU Regulation 1924/2006, “health claim” means “any claim that states, suggests or implies that a relationship exists between a food category, a food or one of its constituents and health” (i.e. “calcium for strong bones”, “reducing blood cholesterol”). Foods that meet certain nutritional criteria can be labelled with health claims. Moreover, “reduction of disease risk claim” means “any health claim that states, suggests or implies that the consumption of a food category, a food or one of its constituents significantly reduces a risk factor in the development of a human disease” (European Commission). The regulation also aims to protect consumers from all the existing claims, which are not scientifically proven and could mislead, by eliminating them from the market.

1.2 Problem statement

Health claims appear to be a really important and useful tool for enhancing consumer’s ability to make informed and meaningful choices. However, health claims per se are unlikely to have any significant impact on eating behaviour; the potential barriers are many, including lack of notice of the claims, misunderstanding of their meaning, and lack of using it or trust in the claims (Williams, 2006). Additionally, consumers’ perceptions on health benefit of particular products appear to be based mainly on their prior belief about the type of the product rather than on specific information provided by the health claim (Sims, 1999). Therefore, food industry, taking into account the lack of attention to the nutrition label to the back-of-pack, focuses more to the front-pack nutrition labelling, health and nutrition claims, providing more accurate and unique information (i.e. health claims).

It is a question in marketing field, whether the health claims are convincing and able to grab consumer’s attention. Trust in health claims is not necessarily related to the strength of promise made in the claims (Urala et al., 2003) and messages are more likely to be believed when they are frequently repeated by different and trusted sources (National Consumer Council, 1997). Probably the same can happen when for a particular benefit a specific health claim is used and this claim is supported by a specific colour and is presented to different products which carry similar benefits. Then consumers would probably receive and understand more easily the message that the health claim delivers. Hence, consumer can trust the originality of the health claim and therefore evaluate positively particular products for the beneficial attributes of these products.
There is a considerable debate on how the information should be provided to help consumers to make more conscious food choices. It is known that health claims can help consumers to go for healthier choices. It is hardly known to which extent health claims are readily and understandable. There is enough literature on how the health claims affect consumers’ food choices (Lähteenmäki et al., 2010; Aschemann-Witzela and Hammb, 2010; Roe et al., 1999), but little has been done on how other package elements combining with the health claims can affect consumers to understand and use the health claims for better and healthier choices. While consumers may say that health claims are useful, the extent to which they use them is less clear.

Finding ways to help consumers to be more conscious for their food choices is essential for moulding consumers’ behaviour towards healthy and functional products. The aim of the thesis is to investigate if the combination of the health claim and the other package elements (such as colour and pictorial elements) could enhance the legibility of the message that the claim delivers and therefore have positive results on consumers’ choices to go for healthier alternatives. The review will be a useful tool not only for the consumers, but it will also have practical relevance for the food companies who are dealing with functional foods that carry health claims. Health claims can facilitate the innovation of food companies and thus these companies can easily be differentiated from others, in terms of consumer benefits. Hence, a particular company that establishes health claims on its product could be more competitive among others, which do not have health claims on their products.

1.3 Research questions

The research question could be formulated as follows:

**How can food package elements communicate on consumer’s understanding and use of health claims for making healthier food choices?**

In order to answer the research question, the following sub-questions will be addressed:

1. How can the presence of health claim affect consumer’s perception and food choices?
2. How can the package attributes help consumer to understand and use the health claims more readily?
3. How can the combination of health claims and package attributes affect consumer’s understanding and use of them?
2 How the presence of health claim can affect consumer’s perception and food choices

2.1 Health and nutrition claims

According to Article 2 of the EU Regulation No 1924/2006 “claim” means “any message or representation, which is not mandatory under Community or national legislation, including pictorial, graphic or symbolic representation, in any form, which states, suggests or implies that a food has particular characteristics”. There are two categories of claims on food: health claims and nutrition claims; they should not be confused, although consumers do not clearly distinguish between nutrient content, structure-function claims and health claims (Urala et al., 2003; Williams, 2005; Verhagen et al., 2010, Bech-Larsen T and Grunert K, 2003;).

As defined in Article 2 of the EU Regulation No 1924/2006, “health claim” means “any representation that states, suggests, or implies that a relationship exists between a food category, food or one of its constituent and health”. Health claims include the following:

a) Function claims - These claims concern specific beneficial effects of the consumption of foods or their constituents, in the context of the total diet on normal functions or biological activities of the body. Such claims relate to a positive contribution to health or the improvement of a function or to modifying or preserving health.

Examples: “Substance A (naming the effect of substance A on improving or modifying a physiological function or biological activity associated with health). -This product contains calcium; calcium is relevant for the development of strong bones.

b) Reduction claims and claims referring to the growth and development of children - Claims relating to the consumption of a food or food constituent, in the context of the total diet, to the reduced risk of developing a disease or health-related condition. Risk reduction means significantly altering a major risk factor(s) for a disease or health-related condition. Diseases have multiple risk factors and altering one of these risk factors may or may not have a beneficial effect. The presentation of risk reduction claims must ensure, for example, by use of appropriate language and reference to other risk factors, that consumers do not interpret them as prevention claims.

Examples: “Food X is low in nutrient or substance A.”/“A healthful diet low in nutrient or substance A may reduce the risk of disease D. –“Fruits and vegetables may reduce the risk of some cancers”.

Health claims should not be confused with nutrition claims. The latter refers to any claim which states, suggests or implies that a food has particular beneficial nutritional properties due to:
a) **the energy** (calorific value) it provides, it provides at a reduced or increased rate, or does not provide.

b) **the nutrients**\(^1\) or **other substances**\(^2\) (fat and carbohydrates, as well as the content of vitamins and minerals) it contains, it contains in reduced or increased proportions, or does not contain. Examples: “low fat”, “high fibre”, “sugar free with no added sugars”, “low sodium/salt”, “rich in”.

### 2.2 Consumer’s understanding of health claims

Health claims seem to be a useful tool for the consumer to make healthier food choices. When a product features a health claim, respondents view the product as healthier and state that they are more likely to purchase it (Roe et al., 1999). According to EU legislation every product that carries health claims should be scientifically substantiated to protect consumers from misleading claims. Health claims increase consumers’ expectations about the healthiness of a product and produce more positive attitudes toward its nutritional value (Ford et al., 1996; Mazis and Raymond, 1997; Kozup et al., 2003). This influence can result to two effects where health claims are used but are regarded as misleading claims for consumers; ‘halo effect’ and “magic bullet effect”.

The halo effect occurs when consumer perceives the product as generally superior because of the positive impact of the health claim (regarding one single attribute) on the overall perception of the product; it may discourage them from seeking further information. On the other hand, a magic bullet effect occurs when consumers generalize the messages of the health claim from one benefit to another to believe that the product is generally healthy while the health claim is only about a specific benefit (Grunert et al., 2011). For example, in the case of a magic bullet effect the consumer would regard that the promised risk reduction of one disease is transferred to reducing the risk of other diseases as well (Lähteenmäki et al., 2010). Therefore, health claims should be implemented carefully in order for consumers to be able to understand them and use them correctly and effectively and not to be misleading.

### 2.3 Consumer’s use of the health claims

A general question is when does consumer use health claims to make healthier choices. How and when the consumer use the health claims depends on the consumer (personal traits) and the product itself (product category).

Consumers are “cognitive misers” that attempt to limit the time and effort devoted to consumption behaviour. Involvement and prior experience with the product category are two primary determinants of the extensiveness of the decision making process. Involvement is the

---

\(^1\) “nutrient” means protein, carbohydrate, fat, fibre, sodium, vitamins and minerals listed in the Annex to Directive 90/496/EEC, and substances which belong to or are components of one of those categories (Article 2; REGULATION (EC) No 1924/2006).

\(^2\) “other substance” means a substance other than a nutrient that has a nutritional or physiological effect (Article 2; REGULATION (EC) No 1924/2006).
degree of personal relevance a product has to the consumer and to a large extent depends on the perceived financial, functional, social and physical risk associated with consumption of the product (Van Trijp and Meulenberg, 1996).

In high involvement situations, information is processed through the central route in which the content of the message is evaluated extensively in terms of pros and cons of a product. Under low involvement situation the message is processed through the peripheral route; there the cognitive elaboration is limited and consumers form attitudes on the basis of simple cues in the message or the context of the message (Petty and Cacioppo, 1986).

Food is a low involvement product for which consumers are intended to spend a minimum of thought and effort, because food products are not of vital concern nor have a great impact on the consumer’s lifestyle. On the other hand, high involvement products, such as cars, devices and holiday plans have great impact on consumers’ lifestyle and thus consumers spend more time in purchasing them. In high involvement products more information on advantages and techniques are mentioned pointing out the benefits of the product.

In general, the more involved people are, the more motivated they are to pay attention to messages and spend more cognitive effort processing the message (Petty & Cacioppo, 1981). Health is an important buying motive and health claims can have positive impact on purchasing behaviour (Food Standards Agency, 2007). People who are worried about their health due to health problems (personal relevance), tend to pay more attention to health claims and to process the information more carefully. Van Kleef et al. (2005) confirm that health claims, related to a personally relevant illness, are considered more attractive and convincing and have higher purchase intention ratings than health claims, which are not related to a personally relevant illness. In addition, consumers tend to prefer functional food concepts that primarily communicate disease-related health benefits in carriers with a healthy image or health positioning history.

It has been suggested that the impact of claims is greatest on those who already tend to buy a particular type of product; but that people are unlikely to buy a new type of product because of a claim (National Institute of Nutrition, 1999). In 2003, Australian research found that 14% of people reported ever using a health claim (Food Standards Australia New Zealand) and in the United Kingdom, when asked which information they looked for on labels, about 20% mentioned health claims (Food Standards Agency, 2004).

Previous research (e.g. Bech-Larsen and Grunert, 2003; Roe et al., 1999) shows that the evaluation of health claims is partly determined by healthiness perceptions of the base product which would suggest that (some) health claims combine better with some food products. Consumers expect health claims to be on healthier foods and that the food with claims about prevention of serious diseases are more appealing to purchase than those about appearance of psychological benefits or health maintenance (van Kleef et al., 2005; Bech-Larsen and Grunert,

---

3 Functional foods are those foods marketed with scientifically substantiated claims to improve health and wellbeing and are food products to be taken as part of the usual diet in order to have beneficial effects that go beyond what are known as traditional nutritional effects. (Roberfroid, M.B., 2002).
2003; Williams et al., 2008). For example, yoghurt has high perception of healthiness across countries probably because this kind of product has a strong health image conveyed to the consumers by marketing strategies (Östberg, 2003). Thus, this product is a specific food carrier that influences consumer’s perceived healthiness and willingness to try it. Generally, claims are more common in particular food segments such as breakfast cereals, fat spreads and dairy products (Williams, 2006).

2.4 How the presence of health claims can influence consumer’s choice on functional foods

Products that are claimed to have special beneficial physiological effects in the body are usually called functional foods. It is important to study how health claims influence consumers’ intention to try functional foods. Health claims positively influence consumers’ intention to try functional foods (van Kleef et al., 2005), however Saba et al. (2010) claim that there is the case of Italians who preferred to buy foods without health claims; low intention to try functional foods derives from the fact that Italians are not familiar with this type of communication. Moreover, Food Standards Australia New Zealand (2005) conducted an online survey investigating nutrition and health claims. Respondents were significantly more likely to indicate that a product with a claim would provide a health benefit, compared to the same product without a health claim. Additionally, Food Standards Australia New Zealand suggests that a health claim communicates greater health benefits compared to a nutrition claim. In that case, health claims seem to be more readily to be used because they are more explicit and concise and maybe deliver more concrete messages related directly to the function role in the body than just being informative (less salt, a% more fibres).

Additionally, Bech-Larsen and Grunert (2003) found that the appearance of functional ingredient, function and benefit (elements stated all together) on the package had a stronger effect on purchase intention than the combination of the functional ingredient and the function of the product (two elements). In turn, the last combination had a stronger effect than if there was no health claim and only the ingredient was mentioned. Hence, it is important for a product to not only simply carry a health claim but also to carry the appropriate combination.

These findings also agree with Verbeke et al. (2009) study indicating that whether one or another claim appeals to consumers depends on the claim type and the combined carrier product- nutrient concept (either nutritional or health claims). Having all three components in the claim provides consumers with clear information, whereas a short claim containing only one of these elements leads consumers to infer about the product from their existing knowledge (Lähteenmäki, 2013).

Carriers and health claims contribute independently to the perceived attractiveness and intention to try the product; though, carriers and health claims contribute dependently to perceived credibility (van Kleef et al., 2005). According to Lähteenmäki’s et al. (2010) study on how health claims affect consumer’s perception of other product attributes, consumers balance the possible claimed health benefits with the possible negative influences on healthiness caused by the modification of the product in order to include the additional health
component. The same study concludes that responses in Sweden and Finland to yoghurt with omega-3 health claim are perceived as healthier than the yoghurt with no claim, whereas pork chops in Denmark with omega-3 would cause a clear shift into negative direction in perceived healthiness from pork chops with no claim. Health-related claims had the largest impact on perceived naturalness suggesting that consumers perceived added functional components as unnatural.

Health claims on food are seen by consumers as useful and when a product features a health claim they view it as healthier and state that is more likely to purchase it. Even though functional food are regarded as healthier, on Australian study, 82% consumers disagreed that eating them meant it was less important for them to watch what else they ate (TNS Research, 2005). Moreover, consumers do not readily accept the health information in the claim unless it is confirmed by their existing knowledge and beliefs.
3 How package elements can help consumer to understand and use health claims more readily

In this chapter I will talk about how the package element can help consumers understand and use the health claims more readily, promoting the health benefits of the product. “Understand” refers to the comprehension of the actual message that the health claim delivers, whereas “use” refers to consumer’s intention to choose and purchase food with a health claim on it.

As has already been mentioned health claims themselves are not enough to guide consumers to healthy choices. In 2003, in Australian research and in the United Kingdom, when asked which information consumer looked for on labels, a low percentage mentioned health claims (nearly 14% and 20%, respectively); that could be because consumers ignore them or they cannot understand the message and so cannot use it for their food choices (Food Standards Agency, 2004). Therefore, package design elements can enhance the importance of the health claims and the message they deliver.

For low involvement product, as food, consumer’s use of the packaging elements is quite an important issue; informational elements require more mental effort to process than visual elements do, which provoke more of an emotional response (Silaoyi and Speece, 2004). Therefore, package seems to play an important role for understanding and use of health claims and it reinforces the message that a health claim delivers. The elements that can enhance health claims can be pictorial or a given colour.

The extrinsic attributes of a product can depict partly the intrinsic attribute of the product. Intrinsic product attributes are characteristics that are inherent to the product and cannot be changed without altering the physical product itself (e.g. taste, texture). On the other hand, extrinsic attributes are related to the product, but are physically not part of it. These attributes can be changed or removed without changing the core product. For example, brand, price, packaging or health claims are some of the extrinsic attributes of a product (Steenkamp, 1990).

The presence of a verbal health claim (a health –related message) on cereal-based food products had positive influence on respondents’ perception of healthiness and on likelihood to buy the product, whereas pictorial health claims were found to make a weak influence on both healthiness and likelihood (Saba et al., 2010). In contrast, in a study of Bone and France (2001), when very concrete verbal information were used, graphical representations had a significant and long-term effect on product beliefs. Pictures can serve as a framework for interpreting a package’s verbal component since pictures are likely to be processed prior to other components of a communication. Less motivated consumers may initially attend to an ad’s photo but in a second level they may process the verbal claim (Meyers-Levy and Peracchio, 1995). Van Trijp and Van der Lans (2007) found that the benefit of the product itself was more important to the perception of the claims than the type of claim.
The **graphical component** of a front-of-pack label does have the ability to influence important product beliefs and, in turn, affect purchase intentions. Graphics gain attention for more careful evaluation (Silayoi and Speece, 2004) and so it could affect also health claims understanding and use. This may be due to the greater vividness, salience or imagery evoking ability of graphics. Indeed, Kisielius and Sternthal (1984) found that the majority of subjects examined the pictorial component of the communication prior to reading the verbal statements. In other words, pictorial components seem to be more influential to purchase intentions than the health claim itself.

In the present study, the cereal product has benefits on the heart, therefore the pictorial component is a heart symbol. The combination of the verbal health claim and a heart symbol (pictorial condition) could support more readily the health claim and the message that it delivers.

In line with previous research, I expect that:

**H1a**: The heart symbol can better facilitate the understanding of the health claim than the health claim being alone.

**H1b**: The heart symbol can better facilitate the use of the health claim in food choice than the health claim being alone.

The existing literature on colours on food packages, especially on cereals is limited. Colour studies are basically on the psychology field and not in the marketing field (Belizzi and Hite, 1992) nor on food packaging, which focuses on colour preference and the associations of the colours (Taft, 1997). In the marketing field, colour refers to product quality and meanings (Funk and Ndubisi, 2006; Garber et al., 2000) as well as it creates brand identity (Underwood, 2003) and brand meanings (Garber et al, 2000).

Colours convey messages about the products in different levels; they communicate meaning on attribute level (core product itself) and on consequence level (benefits that the product delivers) (Kauppinen-Räisänen and Luomala, 2010). Colour associations are shaped by learning based on connections people make between colours and meanings and they differ among cultures (Grossman and Wisenblit, 1999). Kreitler and Kreitler (1972) state that in the West, green is associated with hopefulness, white with purity, and red with love or revolution, whereas in India red is associated with ambition and desire (cited by Grossman and Wisenblit, 1999). However, according to Eysneck (1941) there are colours that are universally preferred and are ranked in the following order: blue, red, green, purple, orange and yellow.

Consumer’s responses to the colours of the products can be explained by the associative learning (Grossman and Wisenblit, 1999). In Funk and Ndubisi (2006) work is mentioned that “associative learning occurs when individuals make connections among events that take place in the environment” (Shimp, 1991; cited by Funk and Ndubisi, 2006). Classical conditioning is a specific mechanism for creating associations and can explain these connections as well (Grossman and Wisenblit, 1999). According to classical conditioning, a conditioned stimulus (CS) and an unconditioned stimulus (US) were paired and would elicit a conditioned response.
In the present case study, the US consists of cereal package (product) and CS consists of the images (heart) or colours.

As mentioned before, colour preference and meanings are learned by experience and therefore they can be changed during people’s life. Colour association and preferences are product-category depended and context depended. Consumers have different colour preferences for different product categories (Jacobs et al., 1991). For example, different colours are preferred for clothing, cars or furniture creating different associations. In the context of nature, colours are communicated differently; red colour is associated with danger, but in contrary, it may communicate pain in painkiller context (Kauppinen-Rääsänen and Luomala, 2010) or speed in cars (red colour associated with the Ferrari which is a fast car). In terms of strength, health and passion, red is the representative colour (Funk and Nudism, 2006).

Consumers learn about colour associations, which lead them to prefer certain colours for various product categories, based on their former experience (Grossman and Wisenblit, 1999). That is, consumers learn, through association, that certain colours are appropriate for certain product categories and so they choose the preferable product. Meyers-Levy and Peracchio (1995) talking about ads, suggested that colour, which is assumed to be more vivid than black and white, attracts attention and can provide information to support ad claims. At the same time, colour also can attract attention to irrelevant data at the expense of more important and diagnostic information. Package colour is a basic perceptual feature with a prominent role in visual information processing (Quinlan, 2003; Wolfe and Horowitz, 2004). Colour, indeed, is a catchy package element that can enhance any claim, either in an ad or on foodstuffs.

In the context of functional food, the colour of a package can not only draw consumer’s attention towards health claims but can also help consumers to understand the benefit of the food product and enhance their likelihood to buy it. For example, having red colour on the package of cereals could facilitate the health claim that delivers message for the heart. Moreover, colour can play a diagnostic- distinctive role that can help consumers to choose easier and faster the suitable product (Silayoi and Speece, 2004). For example, when a consumer looks for heart-benefit products, he might seek for red coloured packages.

Therefore, I expect that:

H2a: A relevant-to-heart colour can better facilitate the understanding of the health claim than the health claim being alone with a neutral colour.

H2b: A relevant-to-heart colour can better facilitate the use of the health claim in food choice than the health claim being alone with a neutral colour.

Before the main experiment a pre-test will be conducted to indicate which a relevant-to-heart colour is and which the less relevant-to-heart colour (neutral colour) is according to a student sample.

Consumers are more likely to spontaneously imagine different product features while they are looking at the picture of the package (Underwood et al., 2001). When consumers feel no need to carefully consider product characteristics, graphics drive their choice or use the picture on
the pack to compare and differentiate the product attributes (Silayoi and Speece, 2004). However, the concomitance of both could lead to more positive results for consumer choices. Therefore, the third hypothesis is the combination of the verbal health claim, the pictorial component and the colour (graphical condition):

\[ H_{3a} \]: The interaction of the heart symbol and the relevant-to-heart colour can better facilitate the understanding of the health claim than the presence of one of the three each time.

\[ H_{3b} \]: The interaction of the heart symbol and the relevant-to-heart colour can better facilitate the use of the health claim in food choice than the presence of one of the three each time.

Additionally, there is the case where consumers regard a food package with a relevant-to-heart colour or symbol as a product which is beneficial for the overall health. In that case, the halo effect and the magic bullet effect occur; consumers perceive the heart-benefit cereal as generally superior and then they generalize the message of the heart beneficial claim to a message which is good for the general health. Hence, after all, the cereal product is perceived as generally healthy.

Therefore, I expect that:

\[ H_4 \]: The perception of good-for-heart product can influence the good perception of the overall healthiness of the product.

The hypotheses are summarized on the table below (Table 1). The four different packages are shown. According to the combinations of the package elements four conditions emerge that can measure how readily the consumer could understand and use the verbal health claim.

The verbal health claim exists in all conditions and is enhanced by either pictorial components, which is referred as “pictorial condition” or colour, which is referred as “colour condition”, or the coexistence of the two, referred as “graphical condition”. In the control condition only the verbal health claim appears.
Table 1. Health claim is enhanced by the combinations of pictorial components and colour formulating four different conditions (Raisin flavour).

<table>
<thead>
<tr>
<th>Related-to-heart/pictorial component</th>
<th>Related-to-heart colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

[Images of product packaging]
4 Methodology

A pre-test was conducted aiming to test which colours are perceived to be associated to heart benefit products. The results of the analysis indicated the top colour that was used for the different conditions for the main experiment. For the main experiment the top chosen colour was compared to the least chosen colour to investigate/ consumers understanding and use of the health claims.

4.1 Pre-test: colour preference associated to heart-benefit products

4.1.1 Methods

Participants

The experiment was carried out in Wageningen University (The Netherlands) where 42 Dutch participants (N male= 17, N female= 25) were recruited to state which colours were preferred to be used for heart benefit packages.

Materials

In this study, based on literature review on colours and health claims (Wageningen University) as well as the empirical experience in supermarkets, the colours which were tested were blue, red, green, purple, orange, yellow and pink in different shades. The colours were presented in a palette of colours, in printed A4 paper, as is depicted in Figure 1. The 60-colour palette was shown to the participants in person.
Procedure

For checking which colours will be used on the samples of the main experiment, a pre-test was conducted asking participants to choose, among different colours, the two which were more associated with heart benefit products: “Look the colours over. Rank by preference two colours that you associate most with heart benefit products”. After this question participants picked two colours. They were asked to indicate the colour and to name it. Afterwards, for understanding why they choose the particular colour and to find out the association they made to heart benefits product, they were asked why they chose these two colours, following the “laddering technique”\(^4\)

The duration of the interview for each individual lasted a couple of minutes. At the end of the short interview a chocolate bar was given as a reward.

4.1.2 Data Analysis

Taking into account all the responses it was found that each colour is associated with some consequences and then with values. For the analysis, all the preferred colours were named (as referred to Microsoft Office Word programme) as shown to Appendix A. All the ladders start with the one and single attribute “colour”. For each respondent two ladders were created, so

\(^4\) Laddering technique is a qualitative data collection method. It is an in-depth interview technique that allows the researcher to understand “how consumers translate the attributes of products into meaningful associations with respect to self” (Reynolds and Gutman, 1988).
42 double individual ladders (84 ladders in total) of the attribute “colour” are presented as follows. “A” stands for attribute, “C” for consequence and “V” for value. The ladders are presented in Appendix B. Below are presented the attributes, the consequences and the values of the individual ladders:

a) Attributes (A): colours

The colours that were finally selected by the sample were 22 colours out of the 60 colours of the palette. The selected colours are the attributes and are shown clearly in Table 2.

Table 2. The preferred colours associated to heart-benefit products, categorized by the colour and the shades.

<table>
<thead>
<tr>
<th>Colour and shades</th>
<th>Colour</th>
<th>Shades</th>
<th>Colour and shades</th>
<th>Shades</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red and shades</td>
<td>Red</td>
<td>Aqua and shades</td>
<td>Aqua lighter 40%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Red lighter 40%</td>
<td>Green</td>
<td>Green</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Red lighter 60%</td>
<td>Light green</td>
<td>Light green</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Red darker 25%</td>
<td>Olive green and shades</td>
<td>Olive green darker 25%</td>
<td></td>
</tr>
<tr>
<td>Dark red</td>
<td>Dark red Light blue</td>
<td>Orange Orange</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light blue</td>
<td>Light blue Blue and shades</td>
<td>Yellow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blue and shades</td>
<td>Blue lighter 40%</td>
<td>Orange Light green Light green</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Blue lighter 60%</td>
<td>Yellow Yellow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dark blue and shades</td>
<td>Dark blue White</td>
<td>Purple Purple</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dark blue lighter 40%</td>
<td>Purple</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dark blue lighter 60%</td>
<td>Purple darker 25%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

b) Consequences (C)

The consequences are coded in such a way for it to be easier for the analysis. Therefore, each consequence group encompass different responses which refer to the code name.

1. Healthy (Healthy)
2. Healthy for the Heart (Heart benefits, perceived to be good for the heart, For heart)
3. Heart association (Heart colour, Heart, Blood, heart benefits, reminds me the heart, associated with heart)
4. Vegetables and fruits (vegetables and fruits, veggie, fruits)
5. Freshness (Fresh)
7. Trustworthy (trustworthy, safe colour)
8. Sustainability (sustainability, Sustainable)
9. Personal experience (used to paint the aorta purple, Like salmon colour, Full my stomach, recently saw red-white medicine, previous experience with products with this colour that regarded as beneficial when consume them, remind me medicine, pills experience says
that the product with this colour would be beneficial for the heart, seen it on butter pack that was heath beneficial, personal experience, hospital, like the colour)

10. Calmness (calms me, calm you when have burning sensation, blue colour calm it down(C)
11. Organic product (organic product)
12. Positive feelings (Positive feelings, positive feelings about the product, feeling well, positive)
13. Good for me (Sounds good, makes good, good for me, good, cure your heart)
14. Good food (good food)

c) Values (V)
The values are also coded in groups, as referred below:

1. Beneficial for the heart (benefit for heart, good for heart, could be beneficial for my heart, good for (my) heart, benefits my heart, good for your heart, sounds good for the heart, could be good for the heart, regarded good for heart, positive for heart, also good for (my) heart, healthy heart)
2. Feel good (makes me happy, happiness, positive feelings, feel good)
3. Good for health (Good for health and heart, health, not bad for the health, good in general, good for health, when eat them is good for your health, improves my health, also good for (my) health, good health, provide my general health, beneficial overall).

4.1.3 Results

42 participants (males=17, females=25) were asked to choose among colours the two most preferable colours, that could characterize heart-benefit products. The colours that were most preferred for heart-benefit products as first choice was the colour “red” (33.3%) and as second choice was the colour “light green” (11.9%) as shown in Table 3.

<table>
<thead>
<tr>
<th>Choice</th>
<th>Colour</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st choice</td>
<td>1st red</td>
<td>33.3%</td>
</tr>
<tr>
<td></td>
<td>2nd light green</td>
<td>16.7%</td>
</tr>
<tr>
<td>2nd choice</td>
<td>1st light green</td>
<td>11.9%</td>
</tr>
<tr>
<td></td>
<td>2nd red/purple</td>
<td>9.5%</td>
</tr>
</tbody>
</table>

Table 3. The frequency of the most preferred colours in the general sample (N=42).

When they classified across gender, males and females seems to have similar answers. Males chose red as first choice (35.3 %) and as second choice “light green”, “light blue”, “purple” and “olive green darker” having the same percentage (11,8 %). For females, the first choice was the colour “red” (32 %) and as second choice were “red” and “light green” with frequency 12 %, respectively (Table 4).
Chi square test was applied to examine whether there was an association between gender and colour choice. Chi square test showed that there is not a statistical significant association between gender and colour choice \( \chi^2 = 10.080, \text{df}=14, p > .05 \) and \( \chi^2 = 14.537, \text{df}=18, p > .05 \), respectively. Through laddering the linkage that participants did between attributes and consequences/benefits and between consequences/benefits and values it could be seen. Laddering can help to draw how consumers associate the colours with the heart-benefit products. Therefore, through all the ladders is possible to draw a conclusion on how each colour is related to heart-benefit products (Appendix C). Briefly;

Red tints: are closely associated with the heart and products carrying these colours are beneficial to the heart.

Blue tints: reveal trustworthiness and are connected to the environment. At first reveal that the product is good for the health and therefore beneficial to the heart.

Green tints: are connected to freshness, vegetables, fruits, and to organic products. They make you feel good. Products that carry these colours are good for the general health and also for the heart.

Orange: gives the impression of freshness and good food, refers to vegetables and fruits. It is regarded as good for health and heart.

Purple tints: make you feel good and safe, therefore is good for the health and beneficial to the heart.

Yellow: is for something positive so it is good for the health.

White is clear colour so should be good for the health.

### 4.1.4 Conclusion

To conclude, the results showed that consumers do not only associate colours with heart but also with general health. In many cases, respondents associated each colour first with general health and then, as a result of general health, to healthy heart. Certain colours, red and shades, were clearly associated to the heart. Blue and shades were more associated to the environment, the freshness and specifically to heart benefits. Green is the colour of vegetables...
and so is directly connected to heart benefits whereas olive green and its shades are related to both health and heart wellbeing. Overall, the colour that is most associated to heart-benefit products are red and light green. The least heart-associated colour was orange and yellow.

For the main experiment where participants would be asked to choose a good-for-heart product in four different conditions, yellow was chosen as the least associated-to-heart colour. Therefore the control colour, yellow, will be compared to red, a relevant-to-heart colour.

4.2 Main experiment

The aim of the main experiment was to examine whether the presence of related-to heart colour and picture can influence consumer’s understanding and use of the heart-related claim on cereal breakfast products.

The data was collected by a survey in Wageningen University in May and July 2013. The study consisted of 103 Dutch university students, both bachelor and master, male (n= 34) and female (n=69). The survey was among Dutch students to avoid cultural difference. The majority of the participants (52.4%) ranged under 18-21 years old whereas the range 22-25 years old (35.9%) and 26-29 years old (11.7%) were second and third respectively. The majority of the participants belonged to Social Sciences (64.1%), followed by Environmental Sciences (16.5%), Agrotechnology and Food Sciences (12.6%), Animal Sciences (4.9%) and Plant Sciences (1.9%).

The participants were selected to have normal, corrected - to -normal or full vision and no colour blindness (Bialkova and Trijp, 2010). They were asked to imagine that they are in a family where the father has cholesterol problem and hence, to choose a pack of breakfast cereals that the participant likes but is also healthy for his/her father’s heart. The experiment was conducted in two parts; the first part was to choose a product from the virtual supermarket according to the scenario and the second part was to answer the questionnaire. In the end of the experiment participants could get a product of their preference offered.

4.2.1 Materials and Methods

Each respondent experienced on the virtual supermarket and then was asked to fill in a questionnaire. Participants were randomly assigned to see cereal packages in one of the four different conditions. The conditions were designed to explore consumer’s understanding and use of related-to-heart claim. The four conditions were: verbal health claim with a pictorial component and red colour (graphical condition), verbal health claim with a pictorial component in yellow colour (picture condition), verbal health claim with red colour (colour condition) and verbal health claim and yellow colour (control condition).

Procedure

The experiment was based on the programme of the virtual supermarket. Participants were seated in front of three large screens and afterwards were asked to fill in the questionnaire (Appendix D). In that virtual condition each participant could choose the product that s/he is
willing to buy according to the task. Subsequently, participants were exposed to a virtual supermarket with an aisle having different product categories (Figure 2).

![Figure 2. The overview of the virtual supermarket; aisle with different product categories.](image)

Among the different product categories there was also the target product category “cereal breakfast” at the end of the aisle. Within this product category there were 22 cereal products (Figure 3) and among them a “target” breakfast cereal product called “Optivita”.

Optivita was displayed in different tastes (apple, berry, nuts and raisin oat crisp) at the time and altered according to the condition. Optivita was the only product carrying health claim on it. The health claim was specifically for the heart, stating: “Specifically developed with the active part of oats to help lower cholesterol”. The health claim was positioned on the top of the package in a coloured box. The cereal breakfast Optivita was new to the Dutch audience, in order to avoid bias due to brand familiarity. Additionally, price tags where shown but all with the same value to refrain from choosing the final product according to the price and not according to consumer’s understanding of the health claim.
All cereal boxes were designed to represent all the four condition in realistic way, which reminds real products that could be easily found in the market. Participants could spend as much time as they needed to choose the desired product. The four different conditions are described below:

**Condition 1: graphical condition**
In the condition 1, is referred to as “graphical condition”, the packages were designed carrying the verbal health claim in a red box combined with the red heart image and red background (Figure 4).

![Figure 4. Condition 1; graphical condition combining the health claim with the red colour and the heart image, in four tastes.](image-url)
Condition 2: pictorial condition

In the condition 2, is referred to as “pictorial condition”, the packages were designed carrying the verbal health claim in a yellow box combined with the yellow heart image and yellow background (Figure 4). The non-related-to heart colour was yellow (Figure 5).

![Figure 5. Condition 2; pictorial condition combining the health claim with the heart image, in four tastes.](image)

Condition 3: colour condition

In the condition 3, is referred to as “colour condition”, the packages were designed carrying the verbal health claim in a red box combined only with the red background (related-to-heart colour) (Figure 6).

![Figure 6. Condition 3; colour condition combining the health claim with the red colour, in four tastes.](image)

Condition 4: control condition

In the condition 4, is referred to as “control condition”, the packages were designed carrying only the verbal health claim in a yellow box. Neither related-to-heart colour nor heart image was on the package (Figure 7).
4.2.2 Measures

After the end of the experience with the Virtual Supermarket, respondents completed a computer-based questionnaire with which the following constructs were measured.

4.2.2.1 Understanding of health claims

“Understand” consists of two concepts, noticing the health claim and comprehending it.

Noticing the health claim
Noticing the health claim was measured by a 5-item, Yes/no questions.

1. Did you notice that there was "Cruesli" brand?
2. Did you notice that there was "Optivita" brand?
3. Did you notice any health-related information on the cereal packages?
4. Did you notice that the cereal brand "Optivita" had a "low cholesterol" claim on?
5. Did you notice a heart symbol on the packages of the "Optivita" cereals?

Comprehension of health claim
Comprehension of the health claim was measured by a 5-item, 7-point Likert scale from 1 (Very Difficult) to 7 (Very Easy).

1. It was easy to distinguish between the different tastes of healthy heart cereals.
2. It was easy to notice that the good-for-heart cereals were from the same brand.
3. It was easy to notice which brand of cereals were good for the heart.
4. It was easy to find cereals that were good for the heart.
5. It was easy to notice that there were different tastes of good-for-heart cereals.

4.2.2.2 Use of health claims

“Use” refers to the actual cereal choice in the virtual supermarket and upon what they based this choice.
Influence on the choice of food product

The choice of the food product was measured by a 3-item, 7-point Likert scale from 1 (Strongly Disagree) to 7 (Strongly Agree).

1. The picture on the pack first influenced me to choose that particular cereal product.
2. The colour of the package first influenced me to choose that particular cereal product.
3. The message on the pack influenced me to choose that particular product.

4.2.2.3 Perception of the healthiness of the food product

The perception of the overall healthiness of the chosen cereal product was measured by taking into account 3 items in 7-point Likert scale from 1 (Strongly Disagree) to 7 (Strongly Agree).

1. I remember this brand very well.
2. I think that this brand of cereal is good for the heart.
3. I think that this brand of cereal is good for my overall health.

4.2.2.4 Food choice in general

Additionally, participants were asked about which elements influence their food choice in general.

The choice of the food in general was measured by a 5-item, 7-point Likert scale. The first two items were measured in a 7-point Likert scale from 1 (Strongly Disagree) to 7 (Strongly Agree) whereas the next two items were measured in a 7-point Likert scale from 1 (to an extremely small extent) to 7 (to extremely large extent).

1. Usually, nice package design can influence my decision to choose a food product.
2. Health-related information on the package is really important to me to judge if the product is good for the heart.
3. In general, to what extent do the ingredients affect your food product choice?
4. In general, to what extent does the health-related information affect your food product choice?
5. In general, to what extent does the overall healthiness of the product affect your food product choice?

Besides these constructs, participants were asked to answer on other constructs as well as demographics (Appendix D).
5 Results

Results will be first presented for understanding the health claim and then for using them among the different conditions followed by the perception of the healthiness of the cereal product and food choice in general. Before these sections demographics will be presented.

5.1 Sample properties

The research sample consisted of 103 students of Wageningen University. 33 male and 67 female participants, ranging from 18 to 29 years old from different study fields took part in the research. The overview of the sample properties are shown in Table 5.

<table>
<thead>
<tr>
<th>Gender</th>
<th>n</th>
<th>Age</th>
<th>n</th>
<th>Education</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>33</td>
<td>18-21</td>
<td>53</td>
<td>Social Sciences</td>
<td>64.1</td>
</tr>
<tr>
<td>Female</td>
<td>67</td>
<td>22-25</td>
<td>36</td>
<td>Environmental Sciences</td>
<td>16.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>26-29</td>
<td>12</td>
<td>Agrotechnology and Food Sciences</td>
<td>12.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Animal Sciences</td>
<td>4.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Plant Sciences</td>
<td>1.9</td>
</tr>
<tr>
<td>Missing</td>
<td>0</td>
<td></td>
<td>0</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>103</td>
<td>103</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The participants were equally balanced across the four conditions [Levene’s test (3)= .207, p > .05)] (Table 6).

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>26</td>
</tr>
<tr>
<td>2</td>
<td>26</td>
</tr>
<tr>
<td>3</td>
<td>24</td>
</tr>
<tr>
<td>4</td>
<td>27</td>
</tr>
<tr>
<td>Total</td>
<td>103</td>
</tr>
</tbody>
</table>
5.2 Testing hypotheses

5.2.1 Understanding of health claims

The construct “understanding of the health claims” was divided into two concepts, noticing and comprehension of health claims. In order to test H1a, H2a and H3a Chi square test and General Lineal Model was used.

H1a: The heart symbol can better facilitate the understanding of the health claim than the health claim being alone with a neutral colour.

H2a: A red colour can better facilitate the understanding of the health claim than the health claim being alone with a neutral colour.

H3a: The interaction of the heart symbol and the red colour can better facilitate the understanding of the health claim than the presence of one of the three each time.

Noticing the health claim

To test the concept “noticing the health claim” the Chi square test was used.

Participants could easily notice the Cruesli brand among the rest of the brand on the shelves, counting 96.1%. In contrary, 58.3% claimed that they noticed the Optivita brand. This is maybe due to brand familiarity. Cruesli cereals are the most well-known brand in The Netherlands. As expected, there was no association between noticing Cruesli brand and the presence of graphical components on the manipulated packages ($\chi^2 = 2.107$, df = 3, $p > .05$).

Regarding the Optivita brand, no association was found between noticing the Optivita brand and the presence of graphical components ($\chi^2 = 1.162$, df = 3, $p > .05$). In other words, the presence of the red colour and/or the heart did not influence participants on noticing the Optivita brand.

Regarding the health-related information on the package, chi square test showed no association between the presence of graphical components and noticing the health-related information ($\chi^2 = 1.491$, df = 3, $p > .05$). Additionally, there was no association between noticing the “low cholesterol” claim on Optivita brand and the presence of graphical components ($\chi^2 = 3.897$, df = 3, $p > .05$). In other words, the presence of the red colour and/or the heart did not help participants in noticing the health-related information on packages and the “low cholesterol” claim on Optivita.
Regarding the heart symbol, Chi square test showed that there was not a significant difference on noticing the heart symbol on Optivita cereals among the conditions ($\chi^2 = 6.044$, df = 3, $p > .05$). Therefore, red colour did not facilitate noticing the heart symbol. Table 7 shows the dependent variables for understanding the health claim.

### Table 7. Dependent variables, df, $\chi^2$-value and $p$-value for understanding the health claim among four conditions (chi square test).

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>df</th>
<th>$\chi^2$-value</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did you notice that there was “Cruesli” brand?</td>
<td>3</td>
<td>2.107</td>
<td>.55</td>
</tr>
<tr>
<td>Did you notice that there was “Optivita” brand?</td>
<td>3</td>
<td>1.162</td>
<td>.76</td>
</tr>
<tr>
<td>Did you notice any health-related information on cereal packages?</td>
<td>3</td>
<td>1.491</td>
<td>.68</td>
</tr>
<tr>
<td>Did you notice that the cereal brand “Optivita” had a “low cholesterol” claim on it?</td>
<td>3</td>
<td>3.897</td>
<td>.27</td>
</tr>
<tr>
<td>Did you notice a heart symbol on the packages of the “Optivita” brand?</td>
<td>3</td>
<td>6.044</td>
<td>.11</td>
</tr>
</tbody>
</table>

### Comprehension of the health claim

To test the concept “comprehension of the health claim” the General Linear Model (GLM) was used. For all the items, there was no significant difference among the conditions regarding comprehension of the health claim on the package (Table 8).

In details, the test showed that there was no significant difference among the conditions on how easy participants distinguished the different tastes of healthy heart cereals [$F (3, 99) = .146, p > .05$]. Among the conditions, participants, on average, stated that it was slightly easier than difficult to distinguish the different tastes. Indeed the average score was 4.56 which lies between the scores neutral and somewhat easy. Additionally, there was no significant difference among the conditions on how easy participants noticed that the good-for-heart cereals were from the same brand [$F (3, 99) = .917, p > .05$]. Among the conditions, participants, on average, stated that it was slightly easier than difficult to notice that the good-for-heart cereals were from the same brand ($M = 4.49$).

Moreover, there was no significant difference among the conditions on noticing which brand of cereals were good for the heart [$F (3, 99) = .795, p > .05$]. Among the conditions, participants, on average, stated that it was slightly easier than difficult to notice which brand was good for heart ($M = 4.41$). Regarding finding cereals that were good for the heart, again, there was no significant difference among the conditions [$F (3, 99) = .492, p > .05$]. Among the conditions, participants, on average, stated that it was slightly easier than difficult to find cereals which were good for the heart ($M = 4.47$).

Finally, there was no significant difference among the conditions on noticing different tastes of good-for-heart cereals [$F (3, 99) = 1.639, p > .05$]. Among the conditions, participants, on average, stated that it was easier than difficult to notice good-for-heart cereals in different tastes ($M = 4.72$).
Table 8. Summary of the data regarding understanding of health claims.

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>Mean</th>
<th>Std Error</th>
<th>F (3, 99)</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>It was easy to distinguish between the different tastes of healthy heart cereals.</td>
<td>4.56</td>
<td>0.176</td>
<td>.146</td>
<td>.93</td>
</tr>
<tr>
<td>It was easy to notice that the good-for-heart cereals were from the same brand</td>
<td>4.49</td>
<td>0.206</td>
<td>.917</td>
<td>.44</td>
</tr>
<tr>
<td>It was easy to notice which brand of cereals was good for the heart</td>
<td>4.41</td>
<td>0.192</td>
<td>.795</td>
<td>.50</td>
</tr>
<tr>
<td>It was easy to find cereals that were good for the heart</td>
<td>4.47</td>
<td>0.189</td>
<td>.492</td>
<td>.69</td>
</tr>
<tr>
<td>It was easy to notice that there were different tastes of good-for-heart cereals.</td>
<td>4.72</td>
<td>0.199</td>
<td>1.639</td>
<td>.19</td>
</tr>
</tbody>
</table>

Overall, the red colour and/or the heart symbol did not influence participants on noticing the Optivita brand, the health-related information and the “low cholesterol” claim on the packages. Moreover, the presence of these graphical components did not help participants to distinguish more readily the different tastes and to notice that the good-for-heart cereals are from the same brand. Likewise, the presence of these graphical components did not help participants to notice more easily the good-for-heart cereal brand and the different tastes of it.

Hence, H1a, H2a and H3a are not confirmed by the data as it was found that there is not any association on noticing and comprehending the health claim and the graphical components, i.e. heart, red colour and their interaction.

5.2.2 Use of health claims

The construct “use of health claims” refers to consumer’s intention to choose and purchase food with a health claim on it. The frequency of the chosen products was measured as well as the influence of different elements on the particular choice. The General Lineal Model was used to test H1b, H2b and H3b.

H1b: The heart symbol can better facilitate the use of the health claim than the health claim being alone with a neutral colour.

H2b: A red colour can better facilitate the use of the health claim than the health claim being alone with a neutral colour.

H3b: The interaction of the heart symbol and the red colour can better facilitate the use of the health claim than the presence of one of the three each time.

Participants purchase cereals according to their preference. The majority (61.2%) chose the target cereal, Optivita, carrying the good-for-heart claim. The second most popular cereal
breakfast was the Muesli- 40% Gedroogen fruiten (15.5%) while the third was the Cruesli-Balans (10.7%) (Table 9).

Table 9. Cereal choice in frequency and percentage (%)

<table>
<thead>
<tr>
<th>Brand</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kellogg’s-Optivita</td>
<td>63</td>
<td>61.2</td>
</tr>
<tr>
<td>Cruesli-Balans</td>
<td>11</td>
<td>10.7</td>
</tr>
<tr>
<td>Kellogg’s- All Bran</td>
<td>4</td>
<td>3.9</td>
</tr>
<tr>
<td>Cruesli-Cruesli</td>
<td>7</td>
<td>6.8</td>
</tr>
<tr>
<td>Crunchy- Met Rode</td>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td>Cruesli-Volezel</td>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td>Muesli- 40% Gedroogen fruiten</td>
<td>16</td>
<td>15.5</td>
</tr>
<tr>
<td>Total</td>
<td>103</td>
<td>100</td>
</tr>
</tbody>
</table>

Among the conditions there was not a significant association regarding cereal product choice and message influence [F (3, 99) = 1.048, p > .05. In details, participants (N = 103) asked on what they based their choice. Among the conditions, participants, on average, stated that the message on pack influenced them to make the choice. Indeed the average score was 5.97 which lies between the scores “somewhat agree” and “agree”.

Moreover, participants were asked whether the picture and colour influenced them to choose the particular product. In both cases there was no significant difference among the conditions on whether the picture or the colour influenced participants’ choice [F (3, 99) = .552, p > .05 and F (3, 99) = .422, p > .05, respectively]. Among the conditions, participants, on average, stated that “neither agree nor disagree” and “somewhat agree” that the picture (M = 4.43) influenced their choice. Regarding the colour (M = 3.46), on average, they stated that “somewhat disagree” that the colour influenced their choice. The summary of the data on the use of health claims for the sample N = 103 is presented in Table 10.

Table 10. Summary of the data on the use of health claims. Mean (M), Standard deviation (SD), F-value for df₁=3, df₂= 99 and p-value.

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>M</th>
<th>SD</th>
<th>F (3,99)</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The message on the pack influenced me to choose that particular product</td>
<td>5.97</td>
<td>1.575</td>
<td>1.048</td>
<td>.38</td>
</tr>
<tr>
<td>The picture on the pack first influenced me to choose that particular cereal product</td>
<td>4.43</td>
<td>1.752</td>
<td>.422</td>
<td>.74</td>
</tr>
<tr>
<td>The colour of the package first influenced me to choose that particular cereal product</td>
<td>3.46</td>
<td>1.589</td>
<td>.552</td>
<td>.65</td>
</tr>
</tbody>
</table>

A further analysis was conducted taking into account the participants who chose the target brand Optivita (N = 63). On average, participants stated that the message on the pack
influenced them to make the choice. Indeed the average score was 6.57 which lies between the scores “agree” and “strongly agree”. However, among the conditions, there was no significant difference on how the message on the package influenced participants’ choice \[F (3, 59) = .264, p > .05\]. Therefore, the message influenced the choice in the same way among the different condition and the presence of red colour and/or the heart symbol did not influence the message usage.

Moreover, participants were asked whether the picture and the colour first influenced them to choose the particular product. In both cases, there was not a significant difference among the conditions \[F (3, 59) = .217, p > .05\] and \[F (3, 59) = .467, p > .05\], respectively. The average score for the picture was 4.33 which lies between “neither agree nor disagree” and “somewhat agree”. The average score for the colour was 3.14, which lies between “somewhat disagree” and “neither agree nor disagree. The summary of the data on the use of health claims for the sample \(N = 63\) is presented in Table 11.

### Table 11. Summary of the data on the use of health claims. Mean (M), Standard deviation (SD), F-value for \(df_1=3\), \(df_2= 59\) and p-value.

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>M</th>
<th>SD</th>
<th>F-value</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The message on the pack influenced me to choose that particular product</td>
<td>6.57</td>
<td>.962</td>
<td>.264</td>
<td>.85</td>
</tr>
<tr>
<td>The picture on the pack first influenced me to choose that particular cereal product</td>
<td>4.33</td>
<td>1.446</td>
<td>.217</td>
<td>.88</td>
</tr>
<tr>
<td>The colour of the package first influenced me to choose that particular cereal product</td>
<td>3.14</td>
<td>1.875</td>
<td>.467</td>
<td>.71</td>
</tr>
</tbody>
</table>

The results suggest that the participants, overall, were influenced mainly by the message and the picture on the package than by the colour in order to choose the product but among conditions, there was not a significant difference.

Hence H1b, H2b and H3b are not supported by the data. There is not a significant difference on whether the red colour or the heart symbol can facilitate more the use of the health claim.

### 5.2.3 Perception of the healthiness of the food product

**H4: The perception of good-for-heart product can influence the good perception for the overall healthiness of the product.**

Correlation analysis was also conducted to check whether the three items are associated. Remembering the Optivita brand, perception of good-for-heart Optivita brand and perception of the healthiness of Optivita brand were significantly correlated (Table 12). The good-for-heart perception of Optiva was significantly related to the perception of the overall healthiness of Optivita, \(r = .72\), \(p < .05\). There was a high correlation between these two items and the good-for-heart perception shared 52% of the variability in good-for-overall health perception and conversely.
Table 12. Correlation table for the 3 items regarding perception of the healthiness on the food product (N= 103).

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>I remember this brand very well</th>
<th>I think that this brand of cereal is good for heart</th>
<th>I think that this brand of cereal is good for my overall health</th>
</tr>
</thead>
<tbody>
<tr>
<td>I remember Optivita brand very well</td>
<td>1</td>
<td>.47</td>
<td>.40</td>
</tr>
<tr>
<td>I think that Optivita brand of cereal is good for heart</td>
<td>.47</td>
<td>1</td>
<td>.72</td>
</tr>
<tr>
<td>I think that Optivita brand of cereal is good for my overall health</td>
<td>.40</td>
<td>.72</td>
<td>1</td>
</tr>
</tbody>
</table>

All ps < .05.

Besides correlation, a GLM was conducted to check whether there is any significant difference on the perception of the healthiness of the Optivita. Participants (N = 103) were asked whether they remember the Optivita brand very well. The average stated that somehow disagree that they remember this brand very well (M = 3.59). This opinion was constant among the conditions, as the GML showed no significant difference on remembering this particular brand [F (3, 99) = 1.847, p > .05].

Asking participants for their perception of the healthiness of the target cereal product, Optivita, GLM showed that there was no significant difference among the conditions on participants perception that Optivita cereals are good for the heart [F (3, 99) = 1.999, p > .05] and for the overall healthiness [F (3, 99) = 1.207, p > .05]. Among the conditions, participants, on average, stated that they somewhat agree on the fact that Optivita cereals are good for the heart and for the overall health. Indeed the average score was 4.58 and 4.37 respectively, which both lie between the scores neutral and somewhat agree.

Therefore, the red colour and/or the heart symbol did not influence participants on remembering the Optivita brand better than without the graphical components. The graphical components did not help either participants in the good-for-heart perception and the perception of the overall healthiness of the target brand Optivita. Table 13 shows the mean, the standard deviation, the F- value with df₁ = 3 and df₂ = 99 and the significance of the three items.
A further analysis was conducted taking into account the participants who chose or remember the Optivia brand (n=74). Correlation analysis was also conducted to check whether the three items were associated. Remembering the Optivia brand, perception of good-for-heart Optivia brand and perception of the healthiness of Optivia brand were significantly correlated (Table 14). The good-for-heart perception of Optivia was significantly related to the perception of the overall healthiness of Optivia, r = .69, p < .05. There was a high correlation between these two items and the good-for-heart perception shared 47.6% of the variability in good-for-overall-health perception.

Table 14. Correlation table for the 3 items regarding healthiness of the food product among those who chose or notice Optivia brand (N=74).

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>I remember Optivia brand very well</th>
<th>I think that this brand of cereal is good for heart</th>
<th>I think that this brand of cereal is good for my overall health</th>
</tr>
</thead>
<tbody>
<tr>
<td>I remember Optivia brand very well</td>
<td>1</td>
<td>.50</td>
<td>.27</td>
</tr>
<tr>
<td>I think that Optivia brand of cereal is good for heart</td>
<td>.50</td>
<td>1</td>
<td>.69</td>
</tr>
<tr>
<td>I think that Optivia brand of cereal is good for my overall health</td>
<td>.27</td>
<td>.69</td>
<td>1</td>
</tr>
</tbody>
</table>

All ps > .05

In this group, there was not any significant difference among the conditions on how well participants remembered the Optivia brand (M = 4.20) [F (3, 70) = .417, p > .05]. Likewise, there was not a significant difference among the conditions regarding the good-for-heart perception (M = 4.85) and perception of the overall healthiness of the brand (M = 4.59) [F (3, 70) = 1.164, p > .05 and F (3, 70) = .355, p > .05, respectively]. Therefore, the red colour and/or the heart symbol did not influence the participants’ perception either on how good the cereals are for the heart or for the overall health. Table 15 shows the mean, the standard deviation, the F-value with df₁= 3 and df₂= 70 and the significance of the three items.
Table 15. Summary of the data on the perception of the healthiness of the Optivita. Mean (M), Standard deviation (SD), F-value for df₁=3, df₂= 70 and p-value.

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>M</th>
<th>SD</th>
<th>F (3, 99)</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I remember &quot;Optivita&quot; brand very well</td>
<td>4.20</td>
<td>1.951</td>
<td>.417</td>
<td>.74</td>
</tr>
<tr>
<td>I think that &quot;Optivita&quot; cereal is good for</td>
<td>4.85</td>
<td>1.411</td>
<td>1.164</td>
<td>.33</td>
</tr>
<tr>
<td>the heart</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I think that &quot;Optivita&quot; cereal is good for</td>
<td>4.59</td>
<td>1.302</td>
<td>.355</td>
<td>.79</td>
</tr>
<tr>
<td>my overall health</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Overall, the graphical components did not influence either the good-for-heart or the perception for the overall healthiness of Optivita. The good-for-heart perception was highly related to the perception of the overall healthiness of Optivita.

**Hence, the hypothesis H4 is supported by the data. The perception of good-for-heart product can influence the good perception for the overall healthiness of the product and conversely.**

### 5.2.4 Food choice in general

Participants were asked about which elements influence their food choice in general.

Participants, on average, claimed that agreed on that nice package design (M = 5.11) influenced their choices. The majority of the participants (45.6%) agreed and 27.2% somewhat agreed that nice package designs can influence their decision to choose a food product.

Health related information on the package is really important for the participants to judge if the product is good for the heart (M = 5.07). The majority (34%) agreed, 21.4% somewhat agreed, and 17.5% strongly agreed that health related information on packages are really important to judge if the product is good for the heart. Moreover, 31.1% claimed that health related information (M = 4.04) affects the choice to a moderate extent and 24.3% to a large extent. However there were 19.4% of the participants who claimed that the health-related information influences them to a small extent.

In general, ingredients (M = 4.75) affect participants on food choice, which lies between large extent (39%) and very large extent (16.5%). 24% claimed that ingredients influenced them to a moderate extent. Finally, participants, on average, stated that the overall healthiness of the product affects food product choice (M = 4.83). 20.4% and 39.8% of the participants claimed that the overall healthiness of the product affects food choice to a moderate and to a large extent, respectively; whereas 24.3% claimed that it affects their choice to a very large extent.
6 Discussion and Conclusions

The aim of the present study was to examine the influence of package elements on the cereal product on understanding and using of the health claim carried on the package.

It was hypothesized that the red colour, the heart symbol or their interaction can help consumers understand and use the good-for-heart health claim more easily for making food choices. However, in this study package elements (picture and colour) did not facilitate understanding and use of the health claim. Nevertheless, we should note that within the group who noticed or chose Optivita group, more than two thirds of the participants (70.3%) noticed the low cholesterol claim on the Optivita packages. This fact suggests that the majority of the consumers noticed and comprehended the message of the good-for-heart claim and deliberately chose the particular cereal.

The fact that the graphical components did not facilitate the understanding and the use of the health claim shows that the delivering message of the health claim itself is more important than its presentation (Van Trijp and Van der Lans, 2007). In fact, the results suggest that the participants, overall, were influenced mainly by the message on the pack and the picture on the package than by the colour in their choice of product. According to the participants, not only for the particular choice, but also in general, the message on the packages influences them to make food choices. This is in accordance with Williams (2005), where consumers, in general, regarded health claims as a useful tool, which influenced their food choices.

With regard to what first influenced participants to make their choice, the message and the picture on the pack played a more important role than the colour. This is in accordance with Bone and France (2001) where it is supported that pictures are a more direct way to communicate messages before processing the other elements. Therefore, the red colour may not yet be deeply associated with heart healthiness, whereas pictures and specifically heart is a more direct way to do so.

In addition, the open question suggested that from those who chose Optivita they did so because of the explicit message “low cholesterol” on the pack. For those who chose something else, an important fact was the presence of fruits in the product, which is good for the health, and also the absence of added sugar. Therefore, consumers, in general, are influenced by the health-related information and the ingredients. There were a few respondents who mentioned that they knew the brand and had tasted it before. In this case, the choice is based on the brand familiarity and the prior experience.

The presence of too much information on the food package may confuse the consumers and create problems on the understanding and the use of the message (FSA, 2007). Although, in the present study there was no significant difference on the perception and the use of the health claims among conditions, it seemed that participants were able to choose more frequently a good-for-heart cereal in a less crowded information package condition (condition 4) than in the condition where there were a lot of package cues (condition 1).

There are studies stating that short claims would be more easily processed and understood by consumers. Consumers do believe in health claims, but prefer short health claims than longer
when these are combined with a more explicit claim on the back of the pack (Wansink et al., 2004). There is still a debate on how long or short should a claim be and whether health claims should be supported by graphical components of the package or the health claims should stand alone with no specific additional package elements as in condition.

Moreover, it was hypothesized that the perception of good-for-heart product can influence the good perception for the overall healthiness of the product. Indeed the good-for-heart perception was highly associated to the good-for-overall health perception and vice versa. Nevertheless, in general, participants claimed that the overall health of a product affects the food choice in large extent. However, the red colour and/or the heart symbol, among the conditions, influenced in the same way the perception of the good-for-heart and good-for-overall health cereals.

One important limitation to this study is that the shopping experience took place in a virtual supermarket and not in an in-store situation. Thus, the perception of the message of the health claim, the use of it and in the end the food choice may differ from those of in an actual supermarket due to, for example, time-pressure (Van Herpen and Van Trijp). Moreover, the study sample was among high-educated participants, which could influence the results regarding how aware the participants are on health claims. It is likely that, these results would be significant with more diverse participants. In addition, this study did not take into account the involvement to the product category, cereals, despite the fact that the participants followed a task in order to get involved and choose a cereal package. Importantly, while some consumers pay attention only to the front-of-pack label, there are others who are more involved and concerned seeking for more explicit information on the back-of-pack label (Wansink et al., 2004).

Therefore, a future study focusing on health claims and functional foods could take into account the participants’ awareness on health claims and the involvement in the product category. Another suggestion is to place on display cereal packages that are unknown to the participants. In this situation, participants could choose a product according to the real understanding of the information that the packages carry and not because of the familiarity with the brand. For more concerned consumers it is important that they can seek information also to the back-of-pack label. Therefore, for future studies, participants should have access to both front and back side of the pack.

The findings of this study are relevant for the consumers, policymakers and the researchers. Additionally, they are useful for food companies which deal with functional foods. These findings may extend to the communication of health benefits of other types of products and not only to breakfast cereals.
Appendices

Appendix A. The colour palette with the names of the colours as referred in Microsoft Office Word programme.

<table>
<thead>
<tr>
<th>Dark red</th>
<th>Red</th>
<th>Orange</th>
<th>Yellow</th>
<th>Light green</th>
<th>Green</th>
<th>Light blue</th>
<th>Blue</th>
<th>Dark blue</th>
<th>purple</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>Dark blue lighter 80 %</td>
<td>Blue lighter 80 %</td>
<td>Red lighter 80 %</td>
<td>Olive green lighter 80%</td>
<td>Purple lighter 80 %</td>
<td>Aqua lighter 80 %</td>
<td>orange lighter 80 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dark blue lighter 60 %</td>
<td>Blue lighter 60 %</td>
<td>Red lighter 60 %</td>
<td>Olive green lighter 60%</td>
<td>Purple lighter 60 %</td>
<td>Aqua lighter 60 %</td>
<td>orange lighter 80 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dark blue lighter 40 %</td>
<td>Blue lighter 40 %</td>
<td>Red lighter 40 %</td>
<td>Olive green lighter 40%</td>
<td>Purple lighter 40 %</td>
<td>Aqua lighter 40 %</td>
<td>orange lighter 80 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dark blue Darker 25%</td>
<td>Blue Darker 25%</td>
<td>Red Darker 25%</td>
<td>olive green Darker 25%</td>
<td>Purple Darker 25%</td>
<td>Aqua Darker 25%</td>
<td>Orange Darker 25%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dark blue Darker 50%</td>
<td>Blue Darker 50%</td>
<td>Red Darker 50%</td>
<td>olive green Darker 50%</td>
<td>Purple Darker 50%</td>
<td>Aqua Darker 50%</td>
<td>Orange Darker 50%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix B. All the 42 double individual ladders. Each ladder start with the one and single attribute “colour”. (A) stands for attribute, (C) for consequence and (V) for value.

Laddering

1. Dark red (A) → heart colour (C) → heart (C) → benefit for heart (V)
   Dark blue (A) → heart colour (C) → heart (C) → benefit for the heart (V)
2. Red (A) → heart colour (C) → heart (C) → good heart (V)
   Red lighter 40 % (A) → heart colour (C) → heart (C) → good heart (V)
3. Light green (A) → fresh → vegetables and fruits (C) → good for health & heart
   Orange (A) → fresh → vegetables and fruits (C) → good for health & heart
4. Light green (A) → environment (C) → could be beneficial for my heart (V)
   Orange (A) → fruits (C) → health (V)
5. Light green (A) → positive feelings (V) → benefit for heart (V)
   Olive green lighter 40% (A) → organic products (C) → good for the health & heart (V)
6. Red (A) → heart colour (C) → good for my heart (V)
7. Dark blue lighter 40 %(A) → nature (C) → water (C) → fresh (C) → health (V) → good for heart (V)
   Olive lighter 40% (A) → nature (C) → sounds good (C) → good also for my heart (V)
8. Blue lighter 40% (A) → outside (C) → fresh (C) → good for your heart (V)
   Light green (A) → outside (C) → fresh (C) → good for your heart (V)
9. Olive green darker 25%(A) → fresh (C) → good for heart (V)
   Blue lighter 40% (A) → fresh (C) → good for heart (V)
10. Dark blue lighter 40%(A) → neutral (C) → healthy (C) → health (V)
    Olive green darker 25% (A) → neutral (C) → healthy (C) → health (V)
11. Light green (A) → light colours (not dark) (C) → not bad for the health (V)
    Light blue (A) → light colours (not dark) (C) → not bad for the health (V)
12. Green (A) → good in general (V) → good for heart (V)
    Orange (A) → good food (C) → sounds good for the heart (V)
13. Red (A) → clear colours (C) → trustworthy (C) → good for heart then (V)
    Light blue (A) → clear colours (C) → trustworthy (C) → good for heart then (V)
14. Dark red (A) → blood (C) → heart (C) → for heart (C) → good for the heart (V)
    Purple (A) → used to paint the aorta purple (C) → reminds me the heart (C) → good for heart (V)
15. Light green (A) → good in general (V) → good for heart (V)
16. Blue lighter 60%(A) → associated with heart (C) → good for heart (V)
17. Light green (A) → veggie (C) → healthy (C) → healthy for your heart (V)
    Green (A) → veggie (A) → healthy (C) → healthy for your heart (V)
18. Red (A) → heart colour (C) → good heart (V)
    Green → sustainability (C) → could be good for the heart (V)
19. Light blue → warm (A) → bright (A) → good for health (V)
    Purple (A) → warm (A) → bright (A) → positive feelings (V) → positive for heart (V)
20. Olive green lighter 40% (A) → vegetables and fruits (C) → when eat them is good for your health (V)
Red lighter 60% (A) → like salmon colour (A) → full my stomach (C) → sustainable (C) → healthy (C) → good for your heart (V)

21. Red (A) → heart colour (C) → regarded good for heart (V)
   Dark blue lighter 40% (A) → calms me (C) → improves my health (V) → also good for my heart (V)

22. Dark red (A) → heart colour (C) → heart benefits (C) → healthy heart (V)
   Blue lighter 40% (A) → previous experience with products with this colour that regarded as beneficial when consume them (C) → positive feeling (V)

23. Red (A) → love for others (C), draw attention (C)

24. Red (A) → recently saw red-white medicine (C)
   Purple (A) → warm (A) → feeling well (V) → good for heart (V)

25. Red (A) → blood(C) → heart(C) → good for heart (V)
   Dark blue lighter 40% (A) → water (C) → calm you when have burning sensation (C) → blue colour calm it down (C) → makes good (C) → good heart (V)

26. Red (A) → blood (C) → heart (C)
   Light green (A) → good (C) → positive feelings about the product (C)

27. Red (A) → something positive (C) → also good for health (V)
   Yellow → something positive (C) → also good for health (V)

28. Red (A) → heart colour (C) → good for heart (V)
   Green (A) → positive colour (A) → feel good (V) → good also for my heart (V)

29. Light green (A) → medicine-pills (C) → cure your heart (C) → healthy heart (V)
   Olive green lighter 40% (A) → medicine-pills (C) → cure your heart (C) → healthy heart (V)

30. White (A) → clean colour (C) → good health (V)
   Red (A) → heart colour (C) → good for heart (V)

31. Red (A) → heart colour (C) → good for heart (V)
   Purple (A) → safe colour (C) → good health (V)

32. Red lighter 40% → heart (C)
   Red lighter 40% → advertisements (C)
   Red darker 25% → heart colour (C) → good for heart (V)

33. Dark blue lighter 40% → like the colour (C) → regard it beneficial (V)
   Red → blood (C) → heart → benefits my heart (V)

34. Yellow → bright colour (C) → happiness (V) → good in general (V)
   Light green → bright (C) → good (C) → happiness (V)

35. Red → heart colour (C) → perceived to be good for the heart (C) → healthy heart (V)
   Purple darker 25% → hospital (C) → health (V)

36. Red → heart colour (C) → heart benefits (C) → healthy heart (V)
   Dark blue lighter 40% → experience (C)

37. Dark blue lighter 60% → nature (C) → health (V) → heart (C)
   Olive green lighter 60% → nature (C) → health (C) → heart

38. Red → blood (C) → good for heart
   Yellow → seen it on butter pack that was heath beneficial (C)

39. Blue lighter 40% → experience says that the product with this colour would be beneficial for the heart (C)
   Aqua lighter 40% → experience says that the product with this colour would be beneficial for the heart (C)

40. Dark blue lighter 60% → trustworthy (V)
Aqua lighter 40% → trustworthy (V)
41. Red darker 25% → blood (C) → generally good (C) → also good for the heart (V)
    Olive green darker 25% → plants (C) → nature (C) → good for my health (V) → also for my
    heart (V)
42. Light blue → health (V) → good for heart (V)
    Light green → health (V) → good for heart (V)
Appendix C. The relation of the colours to heart-benefit products

*Red* is a clear colour that indicates something positive for the respondents and also is closely associated with the heart. It is more related to heart benefits than to the overall health. It reveals trustworthy and catches consumers’ attention. It is also associated with medicine so it makes good.

*Red darker 25%* is associated with heart and the benefits that a product can provide to heart.

*Red lighter 40%* is associated to heart and the benefits and is preferable for advertisements.

*Red lighter 60%* reminds salmon and so is regarded as good also for the general health.

*Dark red* is commonly associated with the heart, because of the physical colour of the heart and the blood. Products with that colour perceived to be beneficial for the heart. It also draws attention and shows love for others.

*Dark blue lighter 40%* is connected with personal experiences which are associated with heart. It is closely relevant to environment and nature that is freshness and calmness. Therefore, is good for the general health and in turn, is beneficial for the heart.

*Dark blue* is associated with heart and products that are already regarded as beneficial for the heart.

*Dark blue lighter 60%* reveals trustworthiness and is connected to the environment. That shows that is good for the health and so beneficial for heart.

*Light blue* is light, clear, warm and bright colour that inspires trustworthiness. At first is good for health and then also beneficial for the heart.

*Blue lighter 40%* is connected to environment and its elements and freshness; that makes feel good and then is beneficial for the heart. The preference of this colour is also based on personal experiences. As other shades of blue colour is connected to heart benefits.

*Blue lighter 60%* is associated with heart and so could be beneficial for heart.

*Light green* is connected to vegetables, fruits and freshness and also to the environment and organic products. It is light and bright colour that makes feel good. It is good for the general health and also for the heart. It is also related to medicine, so it cures the heart.

*Green* is absolutely connected with vegetables, but also with sustainability. Is regarded as positive colour and that is good for the heart.

*Olive green lighter 40%* reminds organic products, environment, vegetables and fruits and so it is good for both health and heart.

*Olive green lighter 60%* reminds vegetables, fruits, organic products, nature and health

*Olive green darker 25%* is associated with nature and environment, freshness, vegetables and fruits. It is good for health and heart.
Orange gives the impression of freshness and good food, refers to vegetables and fruits. Is regarded good for health and heart.

Aqua lighter 40% is associated with personal experience and trustworthiness.

Purple is warm colour and bright. It makes you feel good and safe, so is good for the health and beneficial for the heart.

Purple darker, through personal experience, can be associated with health in general.

Yellow is for something positive so it is good for the health.

White is clear colour so should be good for the health.
Appendix D. Questionnaire

Block

Participant/condition

Dear participant,

The following questionnaire is about the visit to the virtual store that you just made. It takes 10 minutes of your time. Please, make sure that you fill in the questionnaire completely.

Thank you in advance!

You have just bought a cereal package. Why did you choose that product?

According to your recent experience to the virtual supermarket, how do you feel about the particular cereal product?

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Neither Agree nor Disagree</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am satisfied with the cereals I chose</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My choice for cereals is a good choice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I think my chosen cereals will be of high quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

According to your recent experience to the virtual supermarket, how did you choose the particular cereal product?

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Neither Agree nor Disagree</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The picture on the pack first influenced me to choose that particular cereal product</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The color of the package first influenced me to choose that particular cereal product</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The message on the pack influenced me to choose that particular product</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

According to your recent experience to the virtual supermarket, how easy or difficult was it to find cereals that are good for the heart?

<table>
<thead>
<tr>
<th>It was easy to distinguish between the different types of healthy heart cereals</th>
<th>Very Difficult</th>
<th>Difficult</th>
<th>Somewhat Difficult</th>
<th>Neutral</th>
<th>Somewhat Easy</th>
<th>Easy</th>
<th>Very Easy</th>
</tr>
</thead>
</table>
It was easy to notice that the good-for-heart cereals were from the same brand
It was easy to notice which brand of cereals were good for the heart
It was easy to find cereals that was good for the heart
It was easy to notice that there were different tastes of good-for-heart cereals

In order to buy cereals that are good for the heart

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>This store is a bad store</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>This store is a good store</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would not visit this store</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would visit this store</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would not recommend this shop</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would recommend this shop</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Block 1

Please indicate the extent to which the following elements influence your food choice

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Neither Agree nor Disagree</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usually, nice package design can influence my decision to choose a food product.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health-related information on the package are really important to me to judge if the product is good for the heart</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In general, I have a strong interest in breakfast cereals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breakfast cereals are very important to me</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breakfast cereal matter a lot to me</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I often eat cereals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I like cereals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please indicate the extent to which you agree or disagree with the following statements.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Neither Agree nor Disagree</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>In general, I often read nutritional labels/nutrition facts on food product packages</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In general, I am interested in reading nutrition and health-related information at the grocery store</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I read about nutrition and health in magazines and books</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I do not really know very much</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

48
about nutrition and health in general
Compared to most people, I am quite knowledgeable about nutrition and health
In general, I think I know about the topic of nutrition health
In general, I often read health-related information on food packaged food
I don't spend much time in the supermarket reading health information
I usually pay attention to health-related information when I see it in an advertisement or elsewhere
I use health-related information when making most of my food selections.

Please indicate the extent to which the following elements influence your food choice

<table>
<thead>
<tr>
<th></th>
<th>To an Extremely Small Extent</th>
<th>To a Very Small Extent</th>
<th>To a Small Extent</th>
<th>To a Moderate Extent</th>
<th>To a Large Extent</th>
<th>To a Very Large Extent</th>
<th>To an Extremely Large Extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>In general, to what extent do the ingredients affect your food product choice?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In general, to what extent do the health-related information affect your food product choice?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In general, to what extent does the overall healthiness of the product affect your food product choice?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

According to your recent experience to the virtual supermarket, answer the following questions by choosing Yes/No.

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did you notice that there was &quot;Cereal&quot; brand?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did you notice that there was &quot;Optivita&quot; brand?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

One of the brands you could choose from was "Optivita". Please answer the following question about this brand.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Neither Agree nor Disagree</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I remember this brand very well</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I think that this brand of cereal is good for the heart</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I think that this brand of cereal is good for my overall health</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

According to your recent experience to the virtual supermarket, answer the following questions by choosing Yes/No.

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Did you notice any health-related information on the cereal packaging?

Did you notice that the cereal brand "Optivita" had a "low cholesterol" claim on?

Did you notice a heart symbol on the package of the "Optivita" cereal?
References


Food Standards Australia New Zealand, 2005. Food Labelling Issues: Quantitative Research on Consumers’ perception and use of nutrition, health and related claims on packaged foods, Evaluation reports Series No. 13 Available at: www.foodstandarts.gov.au


Published by: The University of Chicago Press


