

The influence of visual elements on product packages with health claims on consumer choice behaviour

BSc Thesis

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5/21/2015

Course code: YSS-81812

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Abstract

The purpose of this research was to test how visual elements on product packages with health claims may influence consumers in making healthier food choices. However, there is little information on the influence of visual elements. Therefore, hypotheses were formulated as a stepping stone to conduct more research on this topic. Also, two pre-tests were conducted to find out more about relevant pictures/health claims that can be beneficial for future research. The claim “Iron contributes to the reduction of tiredness and fatigue” appears best suited as a health claim on the product package of breakfast cereals when conducting further research on visual elements and health claims with Dutch students as a target group. Moreover, more research is needed to find out which picture is best suited to use as a health-related visual element, since the respondents may not have had a clear opinion on what extent they thought that the product would contribute to their health with the shown pictures on the product package.

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1. Introduction

Diet and nutrition play an important role as a risk factor for chronic diseases. The World Health Organization (WHO) has, therefore, made recommendations to encourage healthier food choices and thereby reduce risks of chronic diseases. Among these recommendations are the following: less saturated fat, effective food labelling and incentives for the marketing and production of healthier products on the market. One of the practical actions the WHO has recommended is enabling people to make informed choices and take corrective action. (WHO, 2003).

One way to help consumers make informed choices may be nutrition and health claims on products. These claims can be used to provide information about the product that the consumer otherwise would not have known. Nutrition and health claims might, therefore, help consumers make informed choices (Leathwood, Richardson, Sträter, Todd, & van Trijp, 2007). As explained by Richardson et al: nutritional claims provide information about the level of a specific nutrient of a food product, whereas health claims are claims that describe the relationship between a food product and reducing risk of a disease or the perceived health benefits (Richardson, et al., 2003; Lin, 2008). Research about nutrition and health claims generally focuses on the verbal aspect of the claim. However, in practice, the claim can be found on the product, integrated with the total package.

Package design is one of the major attributes that play a role in consumer choice and preference, because consumers get in contact with it at the time they are actually making the decision about which product to buy (Silayoi & Speece, 2007). As stated by Underwood et al., package design is multidimensional. It incorporates many different elements, such as: text, shape, graphic design, logo, size, colours, illustrations, material, construction, texture etc. (Underwood, Klein, & Burke, 2001) It can, with these elements, generate an impression (set expectations) of the attributes of the product. (Berkowitz, 1987; Alesandrini, 1982). Some of these elements have been studied: e.g. Creusen & Schoormans (2004) concluded, after a literature review and qualitative research, that aesthetic preferences on packages positively influence attitudes towards products and purchase decisions by consumers (Creusen & Schoormans, 2004).

Multiple studies have been done on congruency of the above elements on product packages. In general, studies show that congruence between elements on product packages positively affect brand credibility and consumer response (Van Rompay & Pruyn, 2011; Littel & Orth, 2013). These studies have all been done about congruency of characteristics of product packages and its influence on consumer behaviour or attitude, sharing a view in which congruence of elements positively influence brand evaluation or consumer behaviour. However, little is known about the manner in which visual elements, that are congruent with nutrition and health claims in different levels, influence consumer choice behaviour.

In this research, health claims rather than nutritional claims will be used, because it is assumed that the perceived health benefits in health claims can be visualized and used on product packages easier than specific nutrients of food products when nutritional claims are used on product packages. There are different kinds of visual elements that are in a different way congruent with the product package or the health claim on the product package. These different types of visual elements might generate different consumer choice responses.

One type of visual elements might be: product-related visual elements/ pictures. These are defined as visual elements or pictures that are related to the product, but not related to the used nutrition or

health claim or to healthiness. An example of these may be pictures of the ingredients of a specific food product. These visuals are congruent with the product package because they show a picture of the flavour of the product package.

Claim-related visual elements/pictures are also used. These are defined as visual elements or pictures that are specifically related to the used nutrition or health claim, showing the specific nutrition/health claim related theme, rather than general healthiness. An example may be: the picture of a measuring tape used as visual element on a package with the claim 'low-fat'. These visuals are congruent with the product package because they show something related to the nutrition/health claim that is used on the product package.

Other visual elements that can be used are health-related visual elements/pictures. They are defined as those visual elements/pictures that are related to general healthiness. An example of this may be a picture of joggers in a field. These visuals are congruent with the product package because they show general health and the product package shows a nutrition/health claim.

1.2. Problem & Objective

Consumers are often unable to make healthy food choices and not maintaining a healthy diet is one of the main factors that can explain the worldwide growth of obesity (Cavaliere, De Marchi, & Banterle, 2013). One way to promote healthier food choices might be by label use on packages (Barreiro-Hurléa, Gracia, & de-Magistris, 2010). Also, health claims may influence purchase behaviour, depending on consumer's understanding of the claim (Wills, Storcksdieck genannt Bonsman, Kolka, & Grunert, 2012). Studies show that visual stimuli are generally more effective in advertisements than verbal stimuli, because humans are better at getting information from visual stimuli than from verbal stimuli (Paivio, 1979; Mitchell & Olsen, 1981). The purpose of this research is, therefore, to test how visual elements on product packages with health claims may influence consumers in making healthier food choices.

1.3. Relevance

Consumers get in contact with packages at the time they are making purchase decisions (Silayoi & Speece, 2007). These packages may contain health and nutrition claims. Health and nutrition claims may provide useful information about health benefits of products. When nutrition and health claims are in a certain way visually congruent with the package design, this may help consumers make healthier food choices and thus maintaining a healthy diet. Moreover, this research may provide more information about manners in which health claims are visually integrated in the package that may provide marketers more opportunities to market their products.

Also, this research may demand changes in regulations/policies by policymakers because certain ways in which nutrition and health claims are visually integrated in or congruent with packages may result in unwanted magic bullet. Magic bullet effects happen when consumers attribute health benefits to a product even though the claim does not state these benefits. E.g. a product that has the claim 'low-cholesterol' is also perceived to be against cardiovascular diseases (Leathwood, Richardson, Sträter, Todd, & van Trijp, 2007).

1.4. Research Questions

In this research hypotheses were formulated regarding consumer behaviour on different levels of congruence of visual elements on product packages with nutrition and health claims. Moreover, pre-tests were conducted to identify elements that may be used in testing the hypotheses presented in the literature review. Further research on this subject might benefit from these pre-tests and hypotheses. The research questions will be split up between theoretical and practical research questions. The theoretical questions are formulated, based on a literature review. They will not be tested empirically. Rather, existing literature will be used to create hypotheses that can be tested in future research. The practical questions are based on the theoretical questions. These practical questions were formulated to gain more knowledge to be able to conduct research that tries to answer the theoretical questions.. The practical research questions will be answered using data collected from pre-tests.

1.4.1 Theoretical questions

Main Question

How does consumer choice behaviour differ with different visual elements on product packages with nutrition/health claims?

Sub questions

1. Will a product with health claim be chosen more often with health-related pictures, product-related pictures, claim-related pictures or without a picture?
2. In what way can consumers' understanding of the claim be influenced when claim-related, product-related or health-related visual elements are present?
3. Will magic bullets happen more often when health-related visual elements are used than when claim-related visual elements are used?

1.4.2 Practical questions

The theoretical questions above give rise to more questions. For example, to be able to find out whether consumers will choose a product with a health claim more often with no picture or a health-related, product-related or claim-related picture, a health claim must be chosen. Also, pictures that can be used as these health-related, product-related or claim-related pictures must be chosen. Next to that, a product that can be used as the product with the health claim must be chosen.

This gives rise to the following questions:

4. Which health claim can be used during further research?
5. Which visual elements can be used as health-related/product-related elements during further research?

1.5 Research Proposal

The research will first present a theoretical framework. This theoretical information will lead to hypotheses about how different visual elements, on a different level congruent with a chosen health claim, lead to different consumer behaviour. Then the research design and the analytical methods that are used will be discussed. The practical hypotheses are then tested using data collected with pre-tests. Finally, the results are presented and their theoretical implications are discussed, along with a discussion about future research on congruence in visual elements on product packages.

2. Theoretical background

2.1 Nutrition and health claims

Product packages nowadays sometimes contain health and nutrition claims. Nutrition and health claims may be used by consumers to gather information to achieve healthy balanced diet and this may prevent chronic diseases (Geiger, 1998; Leathwood, Richardson, Sträter, Todd, & van Trijp, 2007). Health claims have been researched regarding the influence of health claims on consumer attitudes, consumers' understanding, consumer behaviour. Williams (2005) has looked at other studies regarding consumer understanding of health claims. He concluded that health claims on foods are seen as useful. When a product has a health claim, consumers view it as healthier than without health claim and they state that they are more likely to purchase it. However, consumers are sceptical of health claims and think that health claims should be approved by governments (Williams, 2005). Wills, et al. (2012) reviewed studies that looked at consumer behaviour regarding health claims. They concluded that perceiving a food product as healthier (because of health claims) does not have to result in the consumer purchasing the product. (Wills, Storcksdieck genannt Bonsman, Kolka, & Grunert, 2012)

In many countries health claims are only permitted after approval by a national regulatory body (Williams, 2005). In the EU, for example, regulation 1924/2006 aims to protect consumers from misleading and false claims and to harmonise legislation across the EU (European Parliament, 2006). However, since health and nutrition claims are not seen alone, but may be found on product packages, integrated in total package design, it is useful to gather more knowledge on how the total package design can influence consumer choice behaviour.

2.2 Package design

The importance of package design is found to be growing, because a unique design can stand out from other products in the shelf in a society with an increasing number of products that are homogenous in functionality and quality (Rettie & Brewer, 2000; Berkowitz, 1987; Reimann, Schilke, & Thomas, 2010). Another reason for package design being one of the major attributes to play a role in consumer choice and preference is that over 70 per cent of the purchase decisions is made at the point of purchase. (Rettie & Brewer, 2000; Connolly & Davidson, 1996; Silayoi & Speece, 2007).

In general, studies show that visual information attracts more attention than verbal information (Bolen, 1984; Alesandrini, 1982; Bone & France, 2001). Also, visual advertisements are more effective in generating positive attitudes than verbal advertisements (Mitchell & Olsen, 1981). According to Mitchell & Olsen (1981) visual information in advertisements and packages generally attracts more attention than verbal advertising. Based on this, it is assumed that a product (with a health claim) with a visual element (product-related, claim-related, or health-related) should be chosen more often than the product (with a health claim) without the picture. This leads to the following hypothesis:

H₁: Products with a health claim will be chosen more often when the product package contains an appealing product-related, claim-related, or health-related picture than without a picture.

Consumers do not always understand nutritional information (Szykman, Bloom, & Levy, 1997). Too much information may be overwhelming, whereas too little information may be misleading (Jacoby,

Speller, & Kohn, 1974). As stated by Wills et al, health claims may influence attitudes towards products, which may affect purchase intentions and in the end it may affect purchase behaviour, but this all depends on consumer's understanding of the claim. (Wills, Storcksdieck genannt Bonsman, Kolka, & Grunert, 2012).

In his book, *Imagery and Verbal Processes*, Paivio (1979) explains that visual stimuli are received all at the same time, whereas verbal stimuli are processed one part at a time. This makes humans far better at getting information from visual stimuli than from verbal stimuli (Paivio, 1979). Bone and France (2001) state that verbal information, rather than nonverbal information, had been the focus of research and regulation, even though the total product package, including visual stimuli, may be seen as a silent salesperson (Bone & France, 2001). They, therefore, did research to find out more about the impact of packaging graphics (both colours and pictures) on consumer beliefs. In their study package labels were made to represent a cola with either high-caffeine content (a red and yellow coloured picture of a football player) or low-caffeine content (a blue background with a person lying under a palm tree). Participants in the study were shown these package labels and filled out questions about product beliefs and purchase intention. The verbal information on the labels was the same. Bone and France found that participants that saw the cola label that represented a high-caffeine content, believed that the cola had more caffeine than the participants in the low-caffeine condition (Bone & France, 2001). This means that visual elements may indeed alter consumer beliefs.

Combining this knowledge, one could assume that consumers are better able to get information from visual elements than from verbal claims, that their product beliefs may change because of visual elements or that consumers' understanding of the health claim will be increased because of information from visual elements. This leads to the following hypothesis:

H₂: With the presence of appealing visual elements related to the health claim or general health, consumers' understanding of the claim will be increased.

Keller. et al, (1997) argued that nutrition and health claims may influence consumer behaviour in the following manner: Consumers are aware of a health claim, understand it, draw health inferences from it, consider it credible, appealing, motivating and proceed to action (purchase or not) (Keller, et al., 1997). Following this framework, when consumers' understanding of the claim is increased, consumer choice behaviour may be affected, so that consumers choose products with claim-related or health-related visual elements more often than products with product-related visual elements. This leads to the following hypothesis:

H₃: Products with a health claim will be chosen more often when the package contains appealing health-related or claim-related visual elements than with appealing product-related visual elements.

However, this hypothesis has a few side-notes. When decisions are taken at low levels of involvement, consumers do not necessarily follow the full sequence described above (Leathwood, Richardson, Sträter, Todd, & van Trijp, 2007). Consumers may be more likely to follow some rules of thumb (e.g. previous experience) or look at the price, than conduct intensive cognitive processing. Also, when consumer's understanding is increased, they may decide that the product is not relevant for them and therefore they may decide not to buy it.

Grunert, Scholderer & Rogeaux (2011) also explain that new information may increase consumer's understanding of the claim. When consumers get new information, they relate the new information to information that is already present in memory. Part of this process is that they make conclusions about the product with the health claim. These conclusions can be incorrectly derived from the health claim, meaning that the conclusion is not stated in the health claim itself (Grunert, Scholderer, & Rogeaux, 2011). Two types of these conclusions are the halo effect and the magic bullet effect. Halo effects occur when other product attributes are perceived to be positive even though that is not mentioned in the claim. E.g. a product is 'low-fat' and is also perceived as 'low-sugar'. Because of these effects, nutritional and health claims can potentially mislead consumers (Wills, Storcksdieck genannt Bonsman, Kolka, & Grunert, 2012; Orquin & Scholderer, 2015). Magic bullet effects happen when consumers overgeneralise the health benefits from the claim to the product even though the claim does not state these benefits. E.g. a product that has the claim 'low-cholesterol' is also perceived to be against cardiovascular diseases (Leathwood, Richardson, Sträter, Todd, & van Trijp, 2007).. The associative network model might provide a framework for the magic bullet effect and the halo effect (Andrews, Netemeyer, & Burton, 1998). This research will focus on magic bullet effects, because these are related to health benefits, whereas halo effects may occur with non-health related product attributes.

2.3 Associative network model

The associative network model can be explained by looking at knowledge or human memory as a set of nodes (concepts of information) that are linked together, as in a network. For example: the colour 'red' can be linked to the concept of 'different colours', but also to maybe the concept of 'danger'. Each node can be linked to other nodes and those nodes can be linked to others in return. Collins & Loftus (1975) proceed by explaining the spreading activation theory: when a concept is primed, nodes (concepts) are activated. This spreads throughout memory because of the links between nodes (Collins & Loftus, 1975).

Collins & Loftus, 1975, proceed to explain that links can vary in strength. Links can have a certain number of so-called 'criterialities'. This is the extent to which the link is essential to the meaning of a concept. They provide an example, stating that it might be important for the concept of a 'typewriter' to say that it is a machine. This link will be strong, it is highly criterial. However, for the concept of a 'machine', it might be less important to say that one kind is a typewriter. It is not very criterial. To explain this in terms of health claims, one could say that it is highly criterial to note that a specific claim (e.g. low-fat) is linked to the concept of 'health'. However, for the concept of 'health' it might be less important to say that one type of healthiness is the health claim (e.g. low-fat) (Collins & Loftus, 1975). There are more concepts related to the node 'health' than to the (more specific) node of the 'health claim'. When nodes are activated, the same amount of activation is spread to the nodes linked to this node. This means that when a node is connected to more nodes, the same amount of activation spreads to these nodes, creating weaker links between the nodes. Also, the further activation spreads outwards, the weaker the links between the starting node and the nodes are.

Andrews, Netemeyer & Burton explain how, based on the spreading-activation theory by Collins & Loftus, this might provide a framework for the magic-bullet effect and the halo effect: When health-related visual elements are shown on a product package with a health claim, the concepts of 'health' and of the health claim will be primed, because of the visual element and the claim. Activation in

memory spreads outwards in the network, declining the further it travels outwards. The activation of concepts will spread to other types of health benefits, because they are linked with the concept of health. This may potentially lead to a magical bullet effect, as links between health and other health benefits are strong. If claim-related visual elements are shown on a product package with a health claim, the concept of the health claim will be primed because of both the visual element and the claim itself. Activation in memory may spread sooner to concepts related to that specific health claim, because those are closer to the primed node. Activation in memory will be spread less directly to other concepts related with 'health', because this concept is not primed directly and activation of concepts declines the further it travels outward in the network (Andrews, Netemeyer, & Burton, 1998).

For example, the nodes 'health' and 'low-fat' may be primed because of visual elements and a health claim. Activation of concepts spreads outwards in the network. The concept of low-sugar has a link with health which is stronger than the link between low-sugar and low-fat. Because of the primed concept of 'health' consumers may think that the product has low-fat and low sugar levels. However, if just the concept 'low-fat' is primed, the concept of low-sugar is further away in the network, resulting in weaker links between low-fat and low-sugar. The consumer might, therefore, not think of the product as being low-fat and having low sugar-levels. Health-related visual elements might, therefore, promote the magic bullet effect more than claim-related visual elements. Products with health-related visual elements might be interesting to more consumers than products with claim-related visual elements, because more concepts of health benefits might be activated in memory. This may result in a higher number of consumers choosing products in a product line with health-related visual elements than products with claim-related visual elements. This leads to the following hypothesis:

H₄: Products with a health claim with appealing health-related visual elements will cause magic bullet effects more often than products with health claim with claim-related visual elements.

Magic bullet effects occur when consumers overgeneralize health benefits. When this happens, consumers may sooner perceive the stated health claims as relevant to them. Perceived relevance increases the perceived benefit and makes products more appealing (Wong, et al., 2013). This increased relevance may also increase the likelihood to buy these products (Dean, et al., 2012). If H₄ is true, one may assume therefore that products with a health claim with appealing health-related visual elements increase the perceived relevance for consumers and may therefore be chosen sooner.

H₅: Products with a health claim with appealing health-related visual elements will be chosen more often than products with health claim with appealing claim-related visual elements.

3. Pre-tests

The hypotheses formulated in the theoretical background above give rise to some practical questions that need to be answered before these hypotheses can be tested in further research. These practical questions are:

4. Which health claim can be used during further research?

5. Which visual elements can be used as health-related/product-related and claim-related visual elements during further research?

To answer these questions, pre-tests were conducted. These will be explained below.

4. Pre-test 1: Which health claim can be used during further research?

4.1 Method

4.1.1 Procedures

To answer research question 4. 'Which health claim can be used during further research?', pre-test 1 was conducted. About 30 Dutch students were asked to participate in pre-test 1. Data were collected through an Internet questionnaire. The first pre-test consisted of a short questionnaire. Participants had to fill out questions about health claims to find out which health claim can be used during further research. This survey (survey 1) can be found in annex 1. Some of the questions of pre-test 1 are the same as those of pre-test 2. After pre-test 1 was conducted, the results were analysed. On the basis of these analyses a claim was chosen that can be used during further research.

4.1.2 Stimuli

4.1.2.1 Product category

The product category breakfast cereals has been chosen, because the products generally are in a big box that is easy to manipulate, compared to small products in the supermarket. Also, breakfast cereals is a product category which are marketed using nutrition and health related information, such as nutrition and health claims. (Williams, et al., 2006; Maschkowski, Hartmann, & Hoffmann, 2014).

4.1.2.2 Claim choice

The claims were selected on basis of compatibility with cereals and the assumed relevance for a large group of people, to make sure that the claims were attractive to the participants of the survey. The claims were chosen from claims that were accepted by the EU regulation (EU register of nutrition and health claim made on foods, 2014). Since students are generally young people, they may not think about risks of chronic diseases yet. They may therefore do not adapt their eating pattern to minimize these risks (Smith, Taylor, & Stephen, 1999). Some claims were, therefore, seen as irrelevant to students and were not used in the survey. The compatibility of the health claims with cereals was verified by an expert.

Also, the claims in the survey were based upon a table from the Clymbol project that showed the top 3 of claims for several countries on basis of ability and motivation to process (Clymbol, 2014). One claim was deliberately deleted from the list, because it was in the bottom 3 of the same table. The top 3 was checked for the countries the Netherlands, because the pre-test will be held there.

4.1.3 Measures

In pre-test 1 respondents were asked 'If you are looking for breakfast cereals, to what extent would you buy a product package with the following claim?'. This question was used to find out which health claim can be used during further research about visual elements on product packages with health claims. The product breakfast cereals was used in the question, because this is the product chosen for the study. The evaluation of the health claims by respondents might be influenced by the type of product given. Therefore, it might be important that the product is mentioned in the question.

In both pre-test 1 and 2 respondents were shown nine health claims with a slider scale from 0-100, with 0 being "totally not" and 100 being "very much". Slider scales were used because when Likert-scales are used, information may be lost or the responses might be affected by the categories used (Neibecker, 1984). They were shown in a random order, so that the order of the health claims would not matter in the answers that the participants provided. When the respondents saw the slider scale, the slider was in the middle of the scale to avoid any bias. Also, no numbers (1-100) were shown next to the slider scale to avoid respondents using these numbers as a reference.

4.1.4 Data Analysis

Survey data were entered into a database and analysed using the statistical package SPSS. Pairwise comparisons with a significance level of 0.05 were made to find out which health claim can be used during further research and which visual elements can be used as health-related/product-related and claim-related visual elements during further research. See annex 3 for the table with pairwise comparisons.

4.2 Results

To answer question 4. 'Which health claim can be used during further research?', question 3 from pre-test 1 was used: 'If you are looking for breakfast cereals, to what extent would you buy a product package with the following claim?'.

Based on the results from survey 1, the following table was made.

Claim letter	Corresponds to claim number in table	Claim	Mean	Std. Dev.	Significant different from
I	8	<i>Iron contributes to the reduction of tiredness and fatigue.</i>	67.80	23.03	All,
H	7	<i>Iron contributes to the normal functioning of the immune system.</i>	62.30	19.32	All, but F,G,
G	3	<i>Rye fiber supports normal functioning of the bowels.</i>	56.80	25.88	All, but C,E,F,H
F	6	<i>Vitamin D contributes to the maintenance of normal bones.</i>	55.60	25.56	All, but C,G,H,
E	9	<i>Iron contributes to a normal cognitive function.</i>	46.43	22.83	All, but B,C,D,G
D	2	<i>Potassium contributes to the maintenance of a normal blood pressure.</i>	45.60	23.94	All, but B,C,E
C	5	<i>Glucomannan konjac contributes to weight loss.</i>	44.03	26.81	All, but B,D,E,F,G,
B	4	<i>Glucomannan konjac contributes to normal cholesterol levels.</i>	38.97	24.05	All, but C,D,E
A	1	<i>Beta-glucans of oats and barley contribute to a decreased blood sugar-rise after a meal.</i>	31.57	20.76	All

Table 1 - Answers to question 3 in pre-test 1

From table 1 can be read that claim number 8: “Iron contributes to the reduction of tiredness and fatigue.” had the highest mean and was significantly different from all other claims ($p < 0.05$). Claim number 1: “Beta-glucans of oats and barley contribute to a decreased blood sugar-rise after a meal.” had the lowest mean and was also significantly different from all other claims.

4.3 Conclusion

From table 1 can be concluded that claim number 8 was significantly different from all other claims and had the highest mean. This means that from these claims, based on these results, the package with this claim will be bought most. Therefore, it is concluded that this claim is most relevant to the participants in the study. Based on these results, the claim “Iron contributes to the reduction of tiredness and fatigue” appears best suited.

5. Pre-test 2: Which visual elements can be used as health-related/product-related and claim-related visual elements during further research?

5.1 Method

5.1.1 Procedures

To answer question 7 “Which visual elements can be used as health-related/product-related and claim-related visual elements during further research?”, pre-test 2 was conducted. About 30 Dutch students were asked to participate in pre-test 2. Data were collected through an Internet questionnaire. The second pre-test also consisted of a short questionnaire. Pre-test 2 was made to

find out more about another health claim (related to sugar and teeth). Not all questions were relevant for this study. However, one of the questions consisted of rating health-related pictures. That question is relevant and was therefore analysed below. On the basis of these analysis visual elements were chosen that can be used during further research as health-related visual elements. The whole questionnaire can be found in annex 2.

5.1.2 Stimuli

5.1.2.1 Product category

The same product category was chosen as for pre-test 1: breakfast cereals. The product category breakfast cereals has been chosen, because the products generally are in a big box that is easy to manipulate, compared to small products in the supermarket. Also, breakfast cereals is a product category which are marketed using nutrition and health related information, such as nutrition and health claims. (Williams, et al., 2006; Maschkowski, Hartmann, & Hoffmann, 2014).

5.1.2.2 Picture choice

Participants of the second survey were asked to evaluate health-related pictures. Pictures for the pre-test were chosen because it was assumed that these pictures would be attractive to students as pictures that showed that the product contributed to health.

5.1.3 Measures

In pre-test 2 respondents were asked: 'If the following picture could be found on the product package of breakfast cereals, to what extent would you think that this products contributes to your health?'. This question was used to find out which health-related pictures could be used during further research about visual elements on product packages with health claims. Again the product breakfast cereals was used in the question, because this is the product chosen for the study.

In both pre-tests respondents were shown nine health claims with a slider scale from 0-100, with 0 being "totally not" and 100 being "very much". Slider scales were used because when Likert-scales are used, information may be lost or the responses might be affected by the categories used (Neibecker, 1984). They were shown in a random order, so that the order of the health claims would not matter in the answers that the participants provided. When the respondents saw the slider scale, the slider was in the middle of the scale to avoid any bias. Also, no numbers (1-100) were shown next to the slider scale to avoid respondents using these numbers as a reference.







5.1.4 Data Analysis

Survey data were entered into a database and analysed using the statistical package SPSS. Pairwise comparisons with a significance level of 0.05 were made to find out which health claim can be used during further research and which visual elements can be used as health-related/product-related and claim-related visual elements during further research. See annex 3 for the table with pairwise comparisons.

5.2 Results

To answer question 7 "Which visual elements can be used as health-related/product-related and claim-related visual elements during further research?" Question 4 of survey 2 was used: "If you would see the following picture on a package of breakfast cereals, to what extent do you think that this product contributes to your health?".

In the survey 2, the respondents were asked to answer the following question on a scale from 0 – 100, with 0 being “totally not” and 100 being “very much”: “If the following picture could be seen on a cereal-package, to what extent do you think the product will contribute to your health?”

Picture Letter	Corresponds to picture number in table	Picture	Mean	Std. Dev.	Significantly different from:
A	1		60.50	25.45	E,F
B	3		55.85	25.37	E,F
C	2		55.45	28.00	E,F
D	4		50.45	23.94	F
E	5		44.70	22.06	A,B,C
F	6		37.40	27.46	A,B,C,D

Tabel 2 - Answers to question 4 in pre-test 2

From table 2 can be seen that no picture was significantly different from all the other pictures. Also, no picture had very high (close to 100) or very low (close to 0) means. In this case a picture with a higher mean means that respondents think that a product with this picture on its product package contributes to their health more than a product with a picture with a lower mean on its product package.

A quick look at the results shows that picture A seems to be the preferred picture, because it had the highest mean (60.50). However, statistical analysis shows us that with the given number of responses the difference in the result of picture A and most of the other pictures is not significant ($P < 0.05$).

To further complicate the results, the mean of this picture is not statistically different from the middle of the scale ($p < 0.05$, $t = 50$). This can be seen in the One Sample Test in Annex 6. The ends of the scale were not defined clearly enough to make any statements on whether or not the respondents thought that the products on which the pictures stood were contributing to their health to an either high or low extent. However, what can be said is that the sliders of the scales were in the middle as a starting point and the respondents did not significantly deviate from this middle

point. The respondents, therefore, may not have had a clear opinion on what extent they thought that the product would contribute to their health with the shown pictures on the product package.

5.3 Conclusion

A picture that could be used as a health-related picture on a product package with a health claim in further research, is a picture that makes the respondents think the product contributes to their health. In this case a picture with a higher mean means that respondents would think the product with this claim contributes more to their health than a product with a picture with a lower mean. IN this case picture A appears best suited. However, since the respondents may not have had a clear opinion on what extent they thought that the product would contribute to their health with the shown pictures on the product package, more research is needed to find out which picture is best suited to use as a health-related visual element.

6. Discussion

The participants in the pre-test answered the following question: 'If you are looking for breakfast cereals, to what extent would you buy a product package with the following claim?'. On average, the participants gave the following health claim the highest mean: "Iron contributes to the reduction of tiredness and fatigue." This health claim appears, therefore, to be best suited as a health claim when conducting further research on consumer behaviour regarding visual elements on a product package with a health claim. However, the participants in this study were all Dutch students. Students might have different behaviour regarding products with health claims than other groups of people: socioeconomic, demographic and health or nutrition-related factors might have different effects on label use (Nayga, Lipinski, & Savur, 1998). Also, other studies argue that relevance of health-claims may influence consumers in terms of perceived healthiness, benefit to consumers and likelihood to buy (Wong, et al., 2013; Dean, et al., 2012). For example, as said before, since students are generally young people, they may not think about risks of chronic diseases yet. They may therefore do not adapt their eating pattern to minimize these risks (Smith, Taylor, & Stephen, 1999). Other groups of people might, therefore, have different reactions or behaviour regarding health claims. The health claim above was found to be best suited for this target group. Other target groups might choose other health claims.

In the same manner, the participants were asked to think about this health claim in relation to breakfast cereals. The results might have been different when participants were asked to think of the health claims in relation to other products. In this case, participants were asked to think about breakfast cereals. Since one could assume that breakfast cereals are eaten at breakfast when people try to wake up, this could relate to the choice of health claim. People might choose different health claims for products related to other meals of the day (lunch or dinner). Also, some products might generate the same response (choice of health claim) from people. One such product could be muesli bars. This could generate the same response, because it is a similar product to breakfast cereals in terms of moment of eating, ingredients, and the product such as muesli bars, might generate the same response (choice of health claim) from people. Muesli bars might be eaten as snack or as breakfast and might have, like breakfast cereals, ingredients such as: grains, fruit, chocolate, sugar/caramel. Muesli bars, like breakfast cereals, may be found in the store with health claims on their package and are also used in research about health claims (Walker Naylor, Droms, & Haws, 2009).

All of the pictures used in the pre-test done above were chosen because it was assumed that these pictures would be attractive to students as pictures that showed that the product contributed to health. It was expected that the participants would think that products that display the tested pictures would contribute to their health in a similar manner. However, some pictures are more seen as health-related pictures than others. This is interesting because it indicates that pictures related to health, and possibly to other areas as well, are interpreted in different ways. Researchers and marketers may have to take this into account when they use pictures, because they might assume the pictures to have similar interpretations that might not be true.

A theoretical implication of this research is that according to Bone and France (2001) researchers and regulators have focused primarily on verbal statements regarding health claims when determining whether practices might be deceptive (Bone & France, 2001). Visual elements are therefore relatively new in this field of research. In the literature review of this research can be found that visual

elements may have an influence on consumer behaviour. The formulated hypotheses presume this as well. However, claim-related and health-related visual elements have not been thoroughly researched in this manner. The hypotheses can therefore not be compared with the literature.

A practical implication of this research is that according to the formulated hypotheses in the literature review above, visual elements may generate different types of behaviour when used with different health claims. The use of visual elements by marketers may lead to the deception of the consumer. Policymakers might therefore want to look better into visual elements, because changes in policies may be demanded when consumers are deceived by visual elements in relation to health claims.) Regulation (EU) No 1169/2011 states that: "Food information shall not be misleading, particularly: by attributing to the food effects or properties which it does not possess (European Parliament, 2011)." The term 'food information' is defined as: "information concerning a food and made available to the final consumer by means of a label, other accompanying material, or any other means including modern technology tools or verbal communication (European Parliament, 2011)." This, however, does not specifically include visual elements. When it is found that consumers may be misled by visual elements on packaging, policymakers might need to change their policies and protect consumers against misleading information because of visual elements.

On the other hand, when nutrition and health claims are in a certain way visually congruent with the package design, this may help consumers make healthier food choices and thus maintaining a healthy diet. Regulation (EU) No 1169/2011 states that: "The provision of food information shall pursue a high level of protection of consumers' health and interests by providing a basis for final consumers to make informed choices and to make safe use of food, with particular regard to health, economic, environmental, social and ethical considerations (European Parliament, 2011)." Again, the definition of 'food information' does not specifically include pictorial information. When consumers are better able to make informed choices about food due to visual elements on their packaging, these policies might demand changes so that visual elements are included in the policies.

7. Limitations and further research

This research tried to find out which health-related visual elements might be used to find out more about the influence of visual elements on consumer choice behaviour. However, in the theoretical research questions one of the questions was: "Will a product with health claim be chosen more often with health-related pictures, product-related pictures, claim-related pictures or without a picture?" Therefore, more research should be done to find out which product-related and claim-related pictures can best be used in further research. Claim-related pictures can only be researched when a health claim is chosen before the research is conducted.

On the basis of pre-test 1 it was concluded that the following claim appears best suited, when conducting further research: "Iron contributes to the reduction of tiredness and fatigue." A limitation to this find is that claim-related pictures (related to tiredness and fatigue) might be difficult to find. Researchers might, therefore, choose not to use this claim in their research. Another claim that, therefore, could be used, might be the following: "Iron contributes to the normal functioning of the immune system". This claim was found to be significantly different from all but two of the other health claims. Also, it had the second to highest mean.

In this research it was chosen to try and find out a health claim for further research. Consumers also

get in contact with nutritional claims. The hypotheses/results might differ when nutritional claims are used. Researchers should take this into account when conducting further research. Also, the health-related pictures and the health claims were shown in the pre-tests in an artificial situation. When consumers get in contact with health-claims or health-related pictures regarding products, these will be shown integrated in the total product package. The results might therefore differ when more research is conducted, showing the health-related pictures and health claims integrated in the product package.

Two pre-tests were conducted in this research to find the answers to the practical research questions. Around 30 Dutch students participated in these pre-tests. This is a restricted number and diversity of people. Students might have different behaviour regarding products with health claims than other groups of people: socioeconomic, demographic and health or nutrition-related factors might have different effects on label use (Nayga, Lipinski, & Savur, 1998). Therefore, more research can be done to find out whether the same results (same claim and health-related pictures) will be found with different groups of people. Also, in this research it was chosen to do the pre-test using breakfast cereals as the target product for the health claim. It was concluded that a health claim should be used in further research. But this health claim might not be compatible with other products and consumers might react differently to the use of the same health claim on different products (even when it's compatible).

This research has looked at magic bullet effects. However, in research about this effect, it is commonly paired with halo effects (Leathwood, Richardson, Sträter, Todd, & van Trijp, 2007; Andrews, Netemeyer, & Burton, 1998). Consumers may infer information from the health claim to other attributes. On the one hand they may infer it to the health benefits of the product (magic bullet effect) or to other quality dimensions of the product (halo effect). The spreading activation theory explains how magic bullet effects and halo effects may occur (Andrews, Netemeyer, & Burton, 1998). They explain that nodes are activated in memory that in turn activate other nodes. When a health claim is activated in memory, other related nodes may be activated as well. Activation decreases the further it travels outwards in the network. Therefore, inferences about overall healthiness and other related attributes will happen sooner (because they are closer in the network) than inferences about other (non-related) attributes. This might lead to halo effects happening to a lower extent when health-related visual elements or claim-related visual elements activate the node 'health'. Certain attributes might not be activated because they are further away from the node 'health'. Halo effects might therefore happen less than magic bullet effects with health-related and claim-related visual elements. However, when product-related visual elements are used, nodes related to other quality dimensions of the product might be activated, resulting in a halo effect. More research is needed to find out more about (potential) halo effects.

8. Conclusion

As a conclusion, this research has shown that the claim "Iron contributes to the reduction of tiredness and fatigue" appears best suited as a health claim on the product package of breakfast cereals when conducting further research on visual elements and health claims with Dutch students as a target group. Also, picture 1 shown above appears best suited as a general health-related visual element in further research on visual elements and health claims. Moreover, this research has tried to find out more about visual elements and their possible influence on consumer choice behaviour

regarding products with health claims. There is little information on the influence of visual elements. Therefore, hypotheses were formulated as a stepping stone to conduct more research on this topic.

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10. Annexes

10.1 Annex 1 - Survey: Health claims

Q1 Beste respondent,

Deze enquête is gemaakt door een student van de Wageningen Universiteit. De enquête gaat over **voedings- en gezondheidsclaims**. Voedings- en gezondheidsclaims zijn claims die op verpakkingen van voedingsmiddelen kunnen staan om consumenten meer informatie te geven over voedingswaarden / gezondheidsvoordelen van het product.

Het doel van deze enquête is om meer inzicht te krijgen **in welke gezondheidsclaims** volgens consumenten relevant zijn bij bepaalde voedingsmiddelen.

Het invullen van de enquête duurt ongeveer **5 minuten**. De antwoorden worden enkel gebruikt voor dit onderzoek en zullen niet voor andere doeleinden gebruikt worden. De enquête is anoniem.

Alvast **hartelijk bedankt** voor het invullen van deze enquête!

Q2 In welke mate vindt u de volgende aspecten belangrijk tijdens het kopen van voedingsmiddelen?

	Helemaal niet belangrijk (1)	Niet belangrijk (2)	Niet erg belangrijk (3)	Neutraal (4)	Belangrijk (5)	Erg belangrijk (6)	Heel erg belangrijk (7)
Gezondheid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Verpakking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Smaak	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prijs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q3 Als u op zoek bent naar ontbijtgranen, in hoeverre zou u een verpakking met de volgende claim kopen?

_____ Beta-glucanen van haver en gerst dragen bij aan een verlaging van de bloedsuikerstijging na de maaltijd. (1)

_____ Kalium draagt bij aan het behoud van een normale bloeddruk. (2)

_____ Roggevezels ondersteunen je darmen. (3)

_____ Glucomannan konjac is goed voor normale cholesterolgehalten. (4)

_____ Glucomannan konjac draagt bij aan gewichtsverlies (5)

_____ Vitamine D is goed voor je botten. (6)

_____ Ijzer draagt bij aan het goed functioneren van het immuunsysteem. (7)

_____ Ijzer draagt bij aan het verminderen van moeheid. (8)

_____ Ijzer draagt bij aan een normale cognitieve functie. (9)

Q4 Wat is uw geslacht?

- ☐ Man (1)
- ☐ Vrouw (2)

Q5 Wat is uw leeftijd?

- ☐ 18-25 (1)
- ☐ 26-35 (2)
- ☐ 36-45 (3)
- ☐ 56-65 (4)
- ☐ >65 (5)

Q6 Bent u student?

- ☐ Ja (1)
- ☐ Nee (2)

10.2 Annex 2 - Survey 2: Health Claims

Pretest

Q1

Beste respondent,

Deze enquête is gemaakt door een student van de Wageningen Universiteit. De enquête gaat over **voedings- en gezondheidsclaims**. Voedings- en gezondheidsclaims zijn claims die op verpakkingen van voedingsmiddelen kunnen staan om consumenten meer informatie te geven over voedingswaarden / gezondheidsvoordelen van het product.

Het doel van deze enquête is om meer inzicht te krijgen in **welke afbeeldingen** die volgens consumenten bij bepaalde voedings- en gezondheidsclaim passen.

Het invullen van de enquête duurt ongeveer **5 minuten**. De antwoorden worden enkel gebruikt voor dit onderzoek en zullen niet voor andere doeleinden gebruikt worden. De enquête is anoniem.

Alvast **hartelijk bedankt** voor het invullen van deze enquête!

Q2 In welke mate vindt u de volgende aspecten belangrijk tijdens het kopen van voedingsmiddelen?

	Helemaal niet belangrijk (1)	Niet belangrijk (2)	Niet erg belangrijk (3)	Neutraal (4)	Belangrijk (5)	Erg belangrijk (6)	Heel erg belangrijk (7)
Gezondheid (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Verpakking (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Smaak (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prijs (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q3 Als u op zoek bent naar ontbijtgranen, hoe aantrekkelijk vindt u dan producten met de volgende claim?

	Helemaal niet aantrekkelijk (1)	Niet aantrekkelijk (2)	Niet erg aantrekkelijk (3)	Neutraal (4)	Aantrekkelijk (5)	Erg aantrekkelijk (6)	Heel erg aantrekkelijk (7)
Dit product bevat minder suiker en draagt daarom bij aan het onderhouden van tandglazuur. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Minder suiker, dus beter voor je tanden (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Minder suiker voor gezonde tanden (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Minder suiker voor minder tandbederf (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Minder suiker voor beter onderhouden tandglazuur (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Minder suiker voor onderhouden tandglazuur (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Minder suiker draagt bij aan goed tandglazuur (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Minder suiker voor minder afbraak van het tandglazuur (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q4 Als het volgende plaatje op een verpakking van ontbijtgranen zou staan, in hoeverre denkt u dan dan dit product bijdraagt aan uw gezondheid?



(1)



(2)



(3)



(4)



(5)



(6)

Q14 Als het volgende plaatje op een verpakking van ontbijtgranen zou staan, in hoeverre denkt u dan dat het product bijdraagt aan het onderhouden van uw tandglazuur?



(1)



(2)



(3)



(4)



(5)



(6)

Q5 Wat is uw geslacht?

- ☐ Man (1)
- ☐ Vrouw (2)

Q6 Wat is uw leeftijd?

- ☐ 18-25 (1)

- ☐ 26-35 (2)
- ☐ 36-45 (3)
- ☐ 56-65 (4)
- ☐ >65 (5)

Q17 Bent u student?

- ☐ Ja (1)
- ☐ Nee (2)

10.3 Annex 3 - Pairwise comparisons question 3 – survey 1

Pairwise Comparisons

Measure: MEASURE_1

(I) factor1	(J) factor1	Mean Difference (I-J)	Std. Error	Sig. ^b	95% Confidence Interval for Difference ^b	
					Lower Bound	Upper Bound
1	2	-14,033 [*]	3,842	,001	-21,891	-6,175
	3	-25,233 [*]	5,745	,000	-36,984	-13,482
	4	-7,400 [*]	3,309	,033	-14,168	-,632
	5	-12,467 [*]	5,233	,024	-23,170	-1,764
	6	-24,033 [*]	4,900	,000	-34,055	-14,012
	7	-30,733 [*]	4,988	,000	-40,935	-20,531
	8	-36,233 [*]	5,322	,000	-47,118	-25,349
	9	-14,867 [*]	3,541	,000	-22,110	-7,624
	1	14,033 [*]	3,842	,001	6,175	21,891
2	3	-11,200 [*]	5,420	,048	-22,285	-,115
	4	6,633	3,425	,063	-,371	13,637
	5	1,567	5,320	,770	-9,314	12,447
	6	-10,000 [*]	4,196	,024	-18,581	-1,419
	7	-16,700 [*]	4,653	,001	-26,216	-7,184
	8	-22,200 [*]	4,639	,000	-31,688	-12,712
	9	-,833	3,737	,825	-8,477	6,810
	1	25,233 [*]	5,745	,000	13,482	36,984
	2	11,200 [*]	5,420	,048	-,115	22,285
3	4	17,833 [*]	5,317	,002	6,959	28,708
	5	12,767	6,535	,060	-,599	26,133
	6	1,200	4,102	,772	-7,190	9,590
	7	-5,500	4,523	,234	-14,751	3,751
	8	-11,000 [*]	4,870	,032	-20,960	-1,040
	9	10,367	5,565	,073	-1,015	21,748
	1	7,400 [*]	3,309	,033	-,632	14,168
	2	-6,633	3,425	,063	-13,637	-,371
	3	-17,833 [*]	5,317	,002	-28,708	-6,959
4	5	-5,067	5,178	,336	-15,657	5,523
	6	-16,633 [*]	4,994	,002	-26,848	-6,419
	7	-23,333 [*]	5,173	,000	-33,914	-12,753
	8	-28,833 [*]	5,252	,000	-39,574	-18,093
	9	-7,467	4,244	,089	-16,148	1,214
	1	12,467 [*]	5,233	,024	1,764	23,170
	2	-1,567	5,320	,770	-12,447	9,314
	3	-12,767	6,535	,060	-26,133	-,599
	4	5,067	5,178	,336	-5,523	15,657

6	6	-11,567	6,820	,101	-25,515	2,382
	7	-18,267*	5,429	,002	-29,369	-7,164
	8	-23,767*	5,111	,000	-34,221	-13,313
	9	-2,400	5,848	,685	-14,360	9,560
	1	24,033*	4,900	,000	14,012	34,055
	2	10,000*	4,196	,024	1,419	18,581
	3	-1,200	4,102	,772	-9,590	7,190
	4	16,633*	4,994	,002	6,419	26,848
	5	11,567	6,820	,101	-2,382	25,515
7	7	-6,700	3,831	,091	-14,535	1,135
	8	-12,200*	3,981	,005	-20,342	-4,058
	9	9,167	4,496	,051	-,029	18,363
	1	30,733*	4,988	,000	20,531	40,935
	2	16,700*	4,653	,001	7,184	26,216
	3	5,500	4,523	,234	-3,751	14,751
	4	23,333*	5,173	,000	12,753	33,914
	5	18,267*	5,429	,002	7,164	29,369
	6	6,700	3,831	,091	-1,135	14,535
8	8	-5,500*	2,080	,013	-9,755	-1,245
	9	15,867*	4,223	,001	7,229	24,504
	1	36,233*	5,322	,000	25,349	47,118
	2	22,200*	4,639	,000	12,712	31,688
	3	11,000*	4,870	,032	1,040	20,960
	4	28,833*	5,252	,000	18,093	39,574
	5	23,767*	5,111	,000	13,313	34,221
	6	12,200*	3,981	,005	4,058	20,342
	7	5,500*	2,080	,013	1,245	9,755
9	9	21,367*	4,892	,000	11,362	31,372
	1	14,867*	3,541	,000	7,624	22,110
	2	,833	3,737	,825	-6,810	8,477
	3	-10,367	5,565	,073	-21,748	1,015
	4	7,467	4,244	,089	-1,214	16,148
	5	2,400	5,848	,685	-9,560	14,360
	6	-9,167	4,496	,051	-18,363	,029
	7	-15,867*	4,223	,001	-24,504	-7,229
	8	-21,367*	4,892	,000	-31,372	-11,362

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

10.4 Annex 4 - Pairwise comparison question 3 (claims) in Dutch

Claim letter	Corresponds to claim number in table	Claim	Mean	Std. Dev.	Significant different from
A	1	Beta-glucanen van haver en gerst dragen bij aan een verlaging van de bloedsuikerstijging na de maaltijd.	31.57	20.76	All
B	4	Glucomannan konjac is goed voor normale cholesterolgehalten.	38.97	24.05	All, but C,D,E
C	5	Glucomannan konjac draagt bij aan gewichtsverlies	44.03	26.81	All, but B,D,E,F,G,
D	2	Kalium draagt bij aan het behoud van een normale bloeddruk.	45.60	23.94	All, but B,C,E
E	9	Ijzer draagt bij aan een normale cognitieve functie.	46.43	22.83	All, but B,C,D,G
F	6	Vitamine D is goed voor je botten.	55.60	25.56	All, but C,G,H,
G	3	Roggevezels ondersteunen je darmen.	56.80	25.88	All, but C,E,F,H
H	7	Ijzer draagt bij aan het goed functioneren van het immuunsysteem.	62.30	19.32	All, but F,G,
I	8	Ijzer draagt bij aan het verminderen van moeheid.	67.80	23.03	All,

Tabel 3 - Answers to question 3 in survey 1 Dutch

10.5 Annex 5 - Pairwise comparisons pre-test 2

Pairwise Comparisons

Measure: MEASURE_1

(I) factor1	(J) factor1	Mean Difference (I-J)	Std. Error	Sig. ^b	95% Confidence Interval for Difference ^b	
					Lower Bound	Upper Bound
1	2	5.050	5.894	.402	-7.286	17.386
	3	4.650	6.414	.477	-8.775	18.075
	4	10.050	6.302	.127	-3.140	23.240
	5	15.800 [*]	6.256	.021	2.706	28.894
	6	23.100 [*]	5.581	.001	11.419	34.781
2	1	-5.050	5.894	.402	-17.386	7.286
	3	-.400	6.608	.952	-14.230	13.430
	4	5.000	5.307	.358	-6.109	16.109
	5	10.750 [*]	4.576	.030	1.173	20.327
	6	18.050 [*]	5.485	.004	6.570	29.530
3	1	-4.650	6.414	.477	-18.075	8.775
	2	.400	6.608	.952	-13.430	14.230
	4	5.400	5.210	.313	-5.504	16.304

4	5	11.150*	4.833	.032	1.035	21.265
	6	18.450*	6.823	.014	4.169	32.731
	1	-10.050	6.302	.127	-23.240	3.140
	2	-5.000	5.307	.358	-16.109	6.109
	3	-5.400	5.210	.313	-16.304	5.504
	5	5.750	5.296	.291	-5.334	16.834
5	6	13.050	6.657	.065	-.883	26.983
	1	-15.800*	6.256	.021	-28.894	-2.706
	2	-10.750*	4.576	.030	-20.327	-1.173
	3	-11.150*	4.833	.032	-21.265	-1.035
	4	-5.750	5.296	.291	-16.834	5.334
	6	7.300	5.278	.183	-3.746	18.346
6	1	-23.100*	5.581	.001	-34.781	-11.419
	2	-18.050*	5.485	.004	-29.530	-6.570
	3	-18.450*	6.823	.014	-32.731	-4.169
	4	-13.050	6.657	.065	-26.983	.883
	5	-7.300	5.278	.183	-18.346	3.746

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

10.6 Annex 6 - One-Sample Test Health-related Pictures

One-Sample Test

	Test Value = 50					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Als het volgende plaatje op een verpakking van ontbijtgranen zou staan, in hoeverre denkt u dan d...-	1.845	19	.081	10.50000	-1.4113	22.4113
Als het volgende plaatje op een verpakking van ontbijtgranen zou staan, in hoeverre denkt u dan d...-	.870	19	.395	5.45000	-7.6548	18.5548
Als het volgende plaatje op een verpakking van ontbijtgranen zou staan, in hoeverre denkt u dan d...-	1.031	19	.315	5.85000	-6.0233	17.7233
Als het volgende plaatje op een verpakking van ontbijtgranen zou staan, in hoeverre denkt u dan d...-	.084	19	.934	.45000	-10.7561	11.6561
Als het volgende plaatje op een verpakking van ontbijtgranen zou staan, in hoeverre denkt u dan d...-	-1.075	19	.296	-5.30000	-15.6221	5.0221
Als het volgende plaatje op een verpakking van ontbijtgranen zou staan, in hoeverre denkt u dan d...-	-2.052	19	.054	-12.60000	-25.4525	.2525