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COMMUNICATING HEALTHFULNESS

"The importance of visual and verbal package attributes in communicating healthfulness."

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ABSTRACT

Although when asked, consumers have certain beliefs about product attributes, these believes are not always triggered in a day to day shopping situation where time is scarce. This study examines consumers attribute preference in the perception of healthfulness under time pressure for four product attributes; colour, image, claim and symbol. To understand importance and processing of healthful attributes consumers were asked to make fast decisions in pair wise choice set. Both product preference and response time were recorded. Additional measures were consumers style of processing and their general interest in healthy eating. Results show a dominant role for the package colour and the choices symbol on healthfulness perception. Product choices take less time as products become more congruent with consumers health perception. Piecemeal processing is triggered when the colour of both products is negatively correlated with health. Results also show that the importance of symbols on a package also increases when the visual attributes of that package are negatively correlated with health. The visual attributes become less important for consumers who show a high level of verbal processing, verbal items on their turn become more important. All attributes become more important when consumers show a high interest in healthy eating.

Keywords: Healthfulness, health perception, verbal attributes, visual attributes, pair wise choice set, product choice, response time, style of processing, general healthy eating interest.

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1. INTRODUCTION

The use of package design provides opportunities to influence consumers into making healthier food choices. Research has shown that it is hard to change attitudes and beliefs concerning healthy eating with health claims alone (Frewer, Scholderer, & Lambert, 2003). Some of these beliefs and attitudes are deeply rooted in consumers' minds, for instance the notion that healthy is not tasty (Maison, Greenwald, & Bruin, 2001; R. Raghunathan, R. W. Naylor, & W. D. Hoyer, 2006) nor satiating (Vadiveloo, Morwitz, & Chandon, 2013). In order for consumers to make the right (healthy) choices marketers should find the optimal mix of package attributes communicating health without loss of perceptions of taste and satiety.

The last couple of decades researchers found that promoting products through mass-media is no longer the most effective way of marketing. Instead of making decisions before going to the store, decision making has shifted towards in-store decisions (Schoormans & Robben, 1997). In-store decision making has made package design more and more relevant in the marketing mix because choices are made based on how consumer perceive the product in the stores. Package design helps to differentiate the product and stimulates consumers to choose the product among similar products (Wells, Farley, & Armstrong, 2007).

In order to persuade the consumer in store to buy the right product the marketer should keep in mind the two different processing styles of system 1 and system 2 processing. System 1 is inferential, faster and based on intuition rather than reasoning. System 2 processing is a conscious style of processing in a more informational way that allows the consumer to make an informed decision based on reasoning (Evans, 2003). To find the optimal mix of product attributes the marketer should consider which attributes should be directed at the unconscious mind of the consumer and which at the conscious mind.

Defining the aspects of package design has been widely researched (Kotler & Keller, 2011; Smith & Taylor, 2004). However, the division in two blocks of characteristics concerning package design seems to be most suitable for this research; structural attributes and graphic attributes (Hine, 1995; Underwood, 2003; Vila & Ampuero, 2007). Structural attributes such as shape, size of the container and materials form the basis of the product. Graphic attributes are all attributes that are printed on the package. Graphic attributes of package design can be divided in another set of blocks; the verbal attributes and the visual attributes (Rettie & Brewer, 2000). Verbal attributes like claims and symbols communicate meaning in a direct way, whereas the communication in visual attributes like colour, fonts, shapes and images is much more abstract.

These design attributes might all have an individual effect in communication. However, in order to communicate health, the overall image of the package is important. Therefore it is important that the package is congruent with the consumers perception of health (Mandler, Bauer, & McDonough, 1991).

This research is aimed to find the optimal mix of these attributes to communicate healthfulness and how they communicate with the mind of the consumer the following research question is proposed:

"How can verbal and visual package design attributes be used to communicate health and what is their effect on healthfulness perception and response time?"

In order to answer this research question a full factorial conjoint design is proposed. This method is chosen such that main effects and all interactions can be assessed independently at the level of individual participants. Two visual and two verbal attributes act as independent variables predicting choice and response time during a healthfulness task.

This study is aimed to help promote healthy eating through package design attributes, both for consumers as for agencies working in the field of health promotion. Perhaps this research might even shed some light on the (mis)conception that healthy food is not tasty.

2. THEORETICAL BACKGROUND

2.1 Consumer perception process

In a purchase situation the consumer is confronted with a great deal of cues in the environment. Due to limited cognitive capacity only a small part of these cues will be acquired and categorised. A distinction can be made between intrinsic attributes and extrinsic attributes. Intrinsic attributes are those attributes that cannot be altered without changing the actual product. Extrinsic quality attributes are those attributes that are only associated with the product (Aaron, Mela, & Evans, 1994). As this research focuses on in-store decision making, the focus is on the external attribute; packaging. The acquisition of the attributes is closely related to categorisation. The categorisation of the primary acquired attributes might activate the consumer to search for other attributes that support this category which is closely related to the concept of congruency (Bettman, 1979). Both categorisation and congruence will be discussed later on.
Forming beliefs or inferences about a certain product is the next step in the complex process. Attribute beliefs can be divided into three categories (Srinivasan & Till, 2002); search, experience and credence attributes. Search attributes are attributes that are directly available to evaluate the product such as colour or shape. Experience attribute beliefs are beliefs that can be formed about the product directly after or during consumption of the product. Credence attribute beliefs are the beliefs about attributes that cannot be tested directly after consumption, such as the healthiness or naturalness of the product (Srinivasan & Till, 2002).

Apart from product attributes, the way consumers perceive a product is dependent on the consumer. Based on the constructive perception theory, consumer perception is influenced by internal and external variables (Solomon, Polegato, & Zaichkowsky, 2009). The internal variables relate to the consumers personal attributes like; age, social status and culture but also the internal processes happening inside the consumers mind such as attitudes and interpretation of attributes. External variables are more based on the physical and social surroundings of the consumer.

The way some of these internal and external variables influence consumer perception is dependent on the available time to process the product. Processing time is essential in the perceptual process of interpreting a package. Difficult choices for instance take more time to process as opposed to easy choices. In another sense of time; the longer a person is exposed to a product, the more the information about this product will accumulate (Massaro, 1972). The elaboration likelihood model indicates that having more time to analyze a package might even change the processing route through which the package is being processed. With limited amount of time the package will be perceived via the peripheral route, the more intuitive route of processing information. Adding more

time might change the route of processing, the more cognitive and conscious search and interpretation for different product attributes (Petty & Cacioppo, 1986).

The distinction can also be made between informational versus inferential belief formation. Informational belief formation is closely related to system 2 processing and the central route of processing. Informational belief formation is the construction of beliefs based on information acquired from the object (Fishbein & Ajzen, 1975). In this case, for example, actively reading the claims and information on the package. Inferential belief formation is more related to system 1 processing and the peripheral route of processing. Through inferential belief formation people are using their own experience or associations with healthy attributes to determine whether a product is healthy (Fishbein & Ajzen, 1975).

During the process of belief formation inferences are made about the product. An inference is the belief a consumer forms to represent the relationship between two or more concepts while these concepts are not explicitly present in the direct environment (Sujan & Dekleva, 1987). The attributes of the product are linked with the perceived functionality or psychological outcomes of the product . For example, I associate the green colour on the cookie package I just bought with health and therefore I feel good about myself for I have invested in a long and healthy life.

The concept of inference making is closely related to the concept of categorization covered in the next chapter.

2.2 Categorisation

In our daily life we are confronted with a great deal of stimuli. In fact, through our sensory system we are confronted with way more information than our cognitive system is able to handle. One of the ways our brain deals with all this information is organising all our knowledge. This knowledge is represented in consumer schemata or knowledge structures centred around consumer expectations. The knowledge used to classify products is based on constructs between two or more meaning concepts. For instance the connection between Ferrari cars and Italian made. This declarative knowledge can either be obtained through experience (episodic knowledge) or knowledge based on general world known knowledge (semantic knowledge) (King, 2006). Classification will occur once the information of the product is congruent with the knowledge stored in memory. After classification, inferences or predictions of other attributes of the product can be made (King, 2006).

Categorisation happens at different levels of classification. The super ordinate level is the most abstract level representing the product type, for instance snacks. The subordinate level is the most detailed level of categorisation e.g. healthy cookies (Alba & Hutchinson, 1987). The basic level of categorisation is the most informative and also the fasted recognized compared to the subordinate and super ordinate levels and is also best for promotion (Corter & Gluck, 1992). An example of a basic level of categorisation is cookies.

Whether a product belongs to a certain category can be portrayed on a continuum ranging from the prototypical member of the category through unclear cases to prototypical non-members (Barsalou, 1983). For marketers it is important to find the right balance on this continuum. Mandler's theory states that if the product is 100% percent congruent with the knowledge of the category it doesn't attract attention as much as a product within the product category that is not or not fully congruent with the knowledge stored in memory (Mandler, et al., 1991).

Some semantic knowledge that is central in research for health promotion in food is the (miss-) conception that healthy is not tasty (Raghunathan, Naylor, & Hoyer, 2006), meaning that health is negatively correlated with taste. This is important to keep in mind when looking at consumers trying to categorise packages communicating health as well as taste. This product can either be categorised as healthy or as tasty but not somewhere in between.

2.3 Product attributes and their link to health perception

As mentioned in the introduction, package design attributes can be divided into two different blocks; the structural and the graphic attributes of package design. This chapter will cover the aspects of product attributes and their link with health perception.

2.3.1 Structural attributes

Structural attributes like shape, size and materials are important for acquiring the consumers initial attention. Because of time pressure the mind places products in categories and filters out information to make fast choices. One of the first things a brain perceives when shopping are shapes. These shapes are then compared to basic knowledge about products and their shapes and are being placed into a category. For instance, if one would be exposed to the silhouette of a soda bottle it is immediately categorized as a soda. This is not only category based. For instance, if the soda bottle is a coca cola bottle almost everyone will be able to derive the fact that it's a coca cola bottle just from its silhouette. This visual equity is proven to stimulate purchase and differentiation from competitors (Underwood, 2003). However interesting, structural attributes will not be included in this study. Because of the time restraints of this study, the focus will be on graphic attributes (see chapter 2.3.1).

2.3.2 Graphic Attributes

Graphic attributes of package design are a potent carrier to guide consumers in making healthier choices, because graphic attributes are able to carry information in many different forms. The graphic attributes used in this research are divided into visual and verbal attributes.

2.3.2.1 Visual attributes

The visual attributes of package design are those attributes that contain no explicit information but are more abstract. The visual attributes in this research are colour and images.

Colour

Based on research by (Sharpe, 1975), who claims that emotions are attached to colours, loads of research has been done of its implication in package design. Colours are often associated with one's senses (Garber & Hyatt, 2003; Nelson & Hitchon, 1995; Sharpe, 1975). For instance with temperature, where long wavelength colours like red and orange are perceived as hot and arousing. Shortwave length colours like blue and purple are perceived as cold and calming. Colour might also interact with weight and therefore with satiety, where darker colours are perceived as heavier and lighter colours as lighter. Lastly, colour can also be associated with smell or taste implying the product to be fresh or stale.

Although a lot of research has been done about colours and its implications none provide concrete guidance for package design and propose to consult a colour expert (Garber & Hyatt, 2003). This might be caused because of the vast variety of variables that influence the correct use of a certain colour. For instance, cold colours are higher rated in general, but in sales contrasting colours and

"hot" colours attract more attention (Sharpe, 1975). Colour associations are also very context dependent and change over time (Bruce, Green, & Georgeson, 2003). For instance oral hygiene products are mostly cold colours, where sugar rich sodas are mostly bright colours. In food and beverage products packages are often linked to certain taste. For instance yellow for lemon flavour, orange for orange flavour and red for strawberry flavours. Deviations in colour are capable of portraying a product as a novelty and therefore create more attention (Schoormans & Robben, 1997). However too much deviation in colour may cause the product to be categorized outside the wanted product category. If for instance, a strawberry flavoured soda would be coloured yellow the consumer is not likely to categorize the product as strawberry flavoured.

It is expected that the green colour will be chosen as most healthy colour and closely linked to naturalness because the leafs of the trees are green and outdoors is associated with healthy (Clarke & Costall, 2008). The link between green and healthiness could possibly be explained by all things that are "good" are green, for instance green cars or biological versus manufactured. Things that are healthy for the planet are mostly green.

Red is expected to be related with indulgence. Indulgent food made to make you feel good should have a warm and exciting colour. Red is associated with activity, strength and stimulation (Fraser & Banks, 2004). Therefore red is probably chosen as tasty because it is perceived to contain a lot of sugar and energy.

Images

The presence of imagery on packaging has proven to have a positive effect on the attention of the brand compared to other products in the same category without the images (Underwood, Klein, & Burke, 2001). A powerful aspect of imagery on packaging is that it shows the anticipated outcome of the product, like relief or pleasure (Andrade, May, & Kavanagh, 2012; Kisielius & Sternthal, 1986). Imagery on package design can also activate certain temporary health goals. For instance, an image of individuals participating in some sort of sport might enable the temporary goal of being healthy and therefore choose healthier products. A joyful consummatory image is expected to evoke the notion of taste because the anticipated pleasure is depicted in the image.

2.3.2.2 Verbal Attributes

Verbal attributes are those attributes that communicate explicit information about the product. Research has shown that verbal attributes have less influence on consumers product choice than visual attributes, especially under time pressure (Bloch, 1995; Silayoi & Speece, 2007). However, some research contradicts these findings (Kuvykaite, Dovaliene, & Navickiene, 2009). These studies looked at the individual influence of visual versus verbal attributes. However it is expected that, regarding the product as a whole, verbal attributes play a role in consumer decision-making.

Claims

Two types of health claims exist on packaging namely general function claims (physiological claims) and reduce risk claims (prevention claims) (Poulsen, 1999). General function claims are claims that propose a certain benefit or ingredient of a product. Reduce risk claims carry the message that consumption of the product reduces the risk of a certain negative effect on health.

Some research suggests that general function claims have a more positive effect on the consumers attention towards the healthiness of the product compared to reduce risk claims (Krishnamurthy,

Carter, & Blair, 2001; Levin, Schneider, & Gaeth, 1998). Recent research however does not support this claim and show that the effectiveness of the type of claim depends on the health issue that is being claimed (Van Kleef, van Trijp, & Luning, 2005).

The length of a health claim influences not only the attention they receive from consumers but they also influence the favourability of the product (Wansink, Sonka, & Hasler, 2004; Williams, 2005). The research shows that shorter claims on the front of the package with an extensive explanation on the back have a positive influence on the beliefs and perception of the product.

Symbols

Next to claims there is also a symbolic way to communicate meaning. As with claims, symbols can be divided in nutrition symbols and health symbols. Nutrition symbols communicate the benefits of the chosen recipe or way of preparation, for instance, 100% organic or choices symbol. Health symbols communicate a health benefit as the hearth symbol on Blue Band butter suggests a positive effect for all sorts of hearth afflictions.

Eye-tracking literature (Turner, Skubisz, Pandya, Silverman, & Austin, 2014) shows that front of pack nutrition symbols do get attention while looking at the specific product. Increased gaze time suggests that people motivated to buy a healthy product are significantly looking more extensively to all nutrition attributes as opposed to people motivated to find an indulgent product. However, people with a health motivation also look for nutritional information on the back of the package (Turner, et al., 2014) while people with a taste motivation do not. Although some attention goes towards front of pack labels, no evidence is found on their impact on health perception of the product.

Complexity has a major impact on the time needed for people to process the symbol. If a symbol becomes more complex people need significantly more time to process the information (Feunekes, Gortemaker, Willems, Lion, & Van den Kommer, 2008). Time used to analyse the package is scarce when doing groceries, therefore it is important to use simple symbols in order to communicate the symbols meaning.

2.4 Interaction effects between attributes

As shown in the last chapter loads of research has been done on the individual effects of product attributes. Also a lot of research has been done about the environmental attributes to enhance the holistic package of product design such as scent, music or shelf arrangement (Mattila & Wirtz, 2001) (Van Herpen, Pieters, & Zeelenberg, 2005; van Kleef, Otten, & van Trijp, 2012). However, to my knowledge, few research has been done on the interaction effects between product attributes. Psychology literature has shown that holistic processing plays a role in the choice process (Bloch, 1995; Ellis, 1999). Holistic processing implies that products are not evaluated every attribute individually but as a whole.

Looking at a package as a whole means that there is some sort of interaction between the different attributes that either do or do not work. It is expected that the interaction will mostly lie between the verbal versus the visual attributes and therefore between inferential and the informational belief formation. Translated into attributes, beliefs about visual attributes in this study are formed in an inferential way while the verbal attributes, such as claims and symbols, are informational attributes. If the two types of belief formation do not match, the consumer might switch to the central route of processing (Olson, 1978). The concept of congruency helps explaining these interactions. Congruency

in this sense of the word is the extent to which the perceived package has overlap with the consumers' expectations of this type of package. Congruency, in this paper, is a continuum between total congruence and total incongruence. Somewhere along this continuum lies the point to which the consumer chooses the product or discards it as an optional buy.

The ideal point would be where a product is perceived to be healthy as well as indulgent. However, looking at categorisation and the notion that health is negatively correlated with taste (Raghunathan, et al., 2006) makes this type of design unlikely. It is expected that when a package communicates health as well as taste attributes, the consumer places the product either in the health or taste category. Overlap seems unlikely.

In the following chapter a conceptual model and a set of hypotheses is proposed to figure out where this point on the continuum lies, which of the product attributes are the most important individually and which are most important in an holistic design.

2.5 Conceptual Model

Based on prior mentioned theories and conceptualizations the model depicted in figure 1 was created. The model describes how consumers process and make inferences about new product packages under time pressure. In contrast with the quality perception model (Steenkamp, 1990) the model is focused solely on packages. Therefore the distinction is made between visual and verbal attributes rather than intrinsic and extrinsic attributes. The visual attributes that are manipulated in this research are the colour of the package and the image presented on the package. The verbal attributes used are claims and symbols. The moderating factors on the formation of beliefs are the processing style and general healthy eating interest. It is proposed that processing style, being visually or verbally oriented, will affect the importance of certain attributes in the categorisation process.

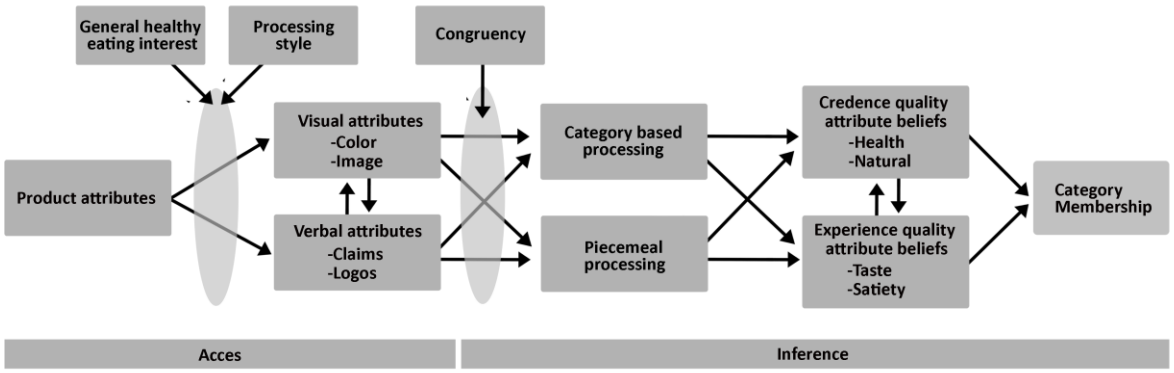


Figure 1. A conceptual model of the category membership process.

It is expected that the way packages are processed is moderated by the congruency between what is stored in memory versus the actual package. A match between the product and what is perceived as part of the category evokes the use of category based processing. When category based processing is triggered all affects associated with the category will be projected on the product (Ruth, 2001). When there is no match and the product does not fit in a category according to the consumers perception, piecemeal processing is triggered. Piecemeal processing is the process of cutting the product in small pieces to be analyzed separately. With piecemeal processing all different attributes are evaluated

separately and in the end combined to form an overall judgment of the product (Goodstein, 1993; Sujan, 1985). Category based processing will naturally demand less effort than piecemeal processing.

The way attributes are processed is dependent on the sort of attribute. Attribute beliefs can be divided into three categories; search, experience and credence attributes. Search attributes are used to explain consumer expectations of credence and experience attribute beliefs. Meaning that we try to form different credence and experience attribute beliefs by manipulating the search attributes, such as colour, imagery, symbols and text.

2.6 Hypotheses

Hypotheses were developed around the attribute beliefs of package design concerning the perceived healthfulness of the product. Four different product attributes were manipulated on the package design: (1) Colour, in terms of the background of the package; (2) Image; (3) health claims, existing health claims were chosen; (4) Symbols, existing symbols were chosen. The levels of the attributes were chosen based on a pilot study (see Appendix a).

In a shopping situation a consumer is confronted with a vast amount of packaging attributes. Based on these packaging attributes the consumer makes a choice and forms an attitude towards the product. Therefore we propose the following hypothesis:

H1. Product attributes have an effect on the evaluation of the healthfulness of a product at point of purchase.

Product attributes can be divided into two groups; the visual and the verbal attributes. Visual attributes such as images or colours have the ability to attract attention and communicate a feeling or goal. We expect that these visual attributes are able to give meaning towards the product. Therefore we propose the following hypothesis:

H2. Visual attributes have an effect on the evaluation of the healthfulness of a product at point of purchase.

> *H2a Green coloured packages will have a more positive effect on the evaluation of the healthfulness of a product at point of purchase as compared to the red colour. H2b The image of the running couple will have a more positive effect on the evaluation of the healthfulness of a product at point of purchase as compared to the image of the consummatory girl.*

Verbal attributes such as claims and symbols provide direct information about the product. Although consumers spend only a small amount of time on choosing their products, verbal attributes could have an influence on the evaluation of a product at point of purchase. Therefore we propose the following hypothesis:

H3. Verbal attributes have an effect on the evaluation of the healthfulness of a product at point of purchase.

> *H3a The absence of a claim will have less of a positive effect on the evaluation of the healthfulness of a product as compared to the fibre claim, but will have a more positive effect in comparison to the improved taste claim.*

H3b The organic symbol will have less of a positive effect on the evaluation of the healthfulness of a product as compared to the choices symbol, but will have a more positive effect in comparison to a product without a symbol.

The beliefs about the healthiness of a package can be determined in two different but complementary ways: informational belief formations, in terms of actively searching for information about the healthiness of the product (e.g. health claims and symbols) and inferential belief formation, meaning that people use their own experience or associations with healthy attributes to determine whether a product is healthy (e.g. package colour and images) (Fishbein & Ajzen, 1975). In line with prior research it is expected that choices about health under time pressure are made through inferential belief formation (Grunert & Wills, 2007), mainly because no attention goes towards health information on the package. Apart from the task to make a decision under time pressure, time can tell a lot about the consumers choices. If the choice gets easier, a person will need less time to respond because less cognitive process is needed to make the right choice.

If all attributes point in the same direction, either healthy or indulgent, it is easier to form beliefs about that product. In other words, congruency between package attributes is expected to reduce response time. During this study respondents will be confronted with a pair of products. Attributes in both of these pairs either communicate health, indulgence or something in between. If both products communicate similar benefits, it will become harder to choose. Therefore we expect:

H4. Congruency between packaging attributes reduces response time.

H5. Similarity within the product pair increases response time.

Consumers submitted to different situations have shown to have a great variety in processing skills based on their goals and prior knowledge (Bettman & Park, 1980; Capon & Davis, 1984). (Richardson, 1978) found that the choice of processing style (verbal versus visual) is not a choice of ability but a choice of preference. Some people prefer to process information in a verbal way while others rather use a visual approach. Although there might be a preference between the two processes they can coexist when appraising an object. Learning literature shows that when the two processes coexist depending on the information, attention and inferences the two processes can either collaborate or have a competitive nature (Kirby, 1993). Based on the notion that people do have a preferred processing style we propose the following hypothesis:

H6a in the evaluation of the healthfulness of a product, verbal attributes are more important than visual attributes for consumers with a verbal processing style.
H6b In the evaluation of the healthfulness of a product, visual attributes are more important than verbal attributes for consumers with a visual processing style.

Consumers that have a general interest in healthy eating have shown increased attention towards healthy attributes (Turner, et al., 2014). These consumers tend to spend more attention towards attributes that give explicit information about the healthfulness of a product rather than attributes with vague hints of healthfulness therefore we propose the following hypothesis:

H7 Verbal attributes are more important than visual attributes for consumers with a general interest in healthy eating.

3. METHODOLOGY

3.1 Design

The main study is designed to find out how package design attributes relate to perception of healthfulness. This should answer the question how important different design attributes are in eliciting healthfulness inferences and to what extent different levels of these attributes add or distract from perceived healthfulness. It also explores to what extent individual's processing style (verbal versus visual) or general healthy eating interest influences the importance of attributes corresponding with the participants processing style (colour and image for visual, claim and symbol for verbal) or level of interest in healthy eating.

3.2 Subjects

The subjects of this study are a convenience sample of 51 students (19 male and 32 female) of the university of Wageningen. The subjects' age ranged from 18-31 with an average of 20.6. One participant was excluded from the study due to multiple extremely long responses times (>5000 ms). The number of respondents is based on the vast number of data points provided by each of the participants covering the entire field of product pairs multiple times. The data was collected during three days (September 2015) using a combination of Inquisit and Qualtrics software. This research was conducted in the MCB research room located in the basement of the Leeuwenborch building (Wageningen University, the Netherlands). Participants were recruited via an e-mail, flyers and social media.

3.3 Stimuli

The products used in this study (see Appendix b) do not exist in the market place to avoid confounding effects of prior knowledge and associations with the packages. The stimulus material was specifically designed for the purpose of this research according to a systematically varied design. The packaging itself differed on four factors each consisting of different levels. The basic design of the packages was similar enough for participants to see the package variants as the same product, but at the same time different enough to reveal relevant variations as a basis for healthfulness inferences. All combinations of stimuli and their levels were used. And all combinations of package pairs were tested in the research. Table 1 shows an overview of the attributes and their levels.

Table 1 Product attributes and their levels considered for conjoint analysis

Product attribute	**Attribute level**
Visual packaging cues	
Packaging colour	1. Green 2. Red
Visual imagery	1. Fitness image 2. Consummatory image
Verbal packaging cues	
Verbal claim	1. High on fibres 2. Improved taste 3. No claim
Symbol	1. Green choices symbol 2. 100% organic symbol 3. No symbol

The levels of the attributes are based on the pilot study conducted earlier in 2015 (Appendix a).

3.4 Procedure

The full conjoint analysis design lead to 36 (2x2x3x3) product profiles (an overview of all product profiles is provided in Appendix b). This totals up to 1260 (36x35) pairs (including mirrored pairs). Using a full factorial design, the pairs are divided into 10 blocks of 126 product pairs such that main effects and all interactions can be assessed independently at the level of individual participants. The product pairs are assigned in a way that all attributes and all their levels are present equally among the 10 blocks. Each participant completed 1 block (randomized) of product pairs. In addition every participant assessed a common block of 10 product pairs to assess base line differences in response time. These 10 pairs constituted of 5 stimuli (Appendix c). Each stimulus was carefully selected to represent all attributes and their levels. The stimuli also represented the most healthful product, the most indulgent product and two products with internal conflicting attributes where visual cues were communicated as healthful, whilst the verbal attributes communicated indulgence and vice versa. The fifth product contained no verbal attributes. Each respondent evaluates this common block in the same order in between a set of 15 trial pairs (for task familiarisation) and the individual set of 126 pairs (the main study). The study was designed in the Inquisit software (The required Inquisit files can be obtained from the author).

Using this program the participants were instructed to use two keys corresponding with the left and right package shown on screen. Before the participants started the program they were informed of the task; “indicate the package that you perceive as the most healthful”. Participants were then presented with product pairs starting with a practice run (15 pairs, random order). After the practice run was completed every participant would rate the common part (10 pairs, fixed order). After the common part was completed the assigned main block (126 pairs, random order) would start. The participants were urged to answer as quickly as possible. The selected packaging from the pair as well as the response time was recorded for each pair as a basis for further analyses.

After completion of the choice task, participants were asked to fill out a questionnaire. The questionnaire collected some basic demographic information as well as additional measures covered in chapter 3.5.3.

3.5 Measures

3.5.1 Dependent measures

The study has two dependent measures. *Choice* was operationalized as the packaging from the pair that was selected as the more healthful option. *Response time* was operationalized as the time needed by the participant to respond in the choice task. Response time for each pair was restricted to a maximum of 5000 ms, after which the pair was coded as “undecided”.

3.5.2 Independent measures

Independent measures are the design attributes of the packages and their respective levels, coded as dummy variables. *Packaging colour* was coded as 1 (colour red) or 0 (if green). *Visual ima*gery was coded as 1 (consummatory image) or 0 (fitness image). *Claim* was coded as two dummy variables, where claim1 was coded 1 if “high on fibres” versus 0 (otherwise), and claim2 was coded 1 if “improved taste” versus 0 (otherwise). The condition of “no claim” hence served as baseline category. Similarly symbol was coded as two dummy variables. Symbol1 was coded as 1 if “Green choices symbol” versus 0 (otherwise), and symbol2 was coded 1 if “100% organic symbol” versus 0 (otherwise).

3.5.3 Additional measures

As basic demographic characteristics, information was collected on *age, gender and education level* (see Appendix d for questionnaire).

Processing style was measured using the “style of processing" (SOP) scale (Childers, Houston, & Heckler, 1985). The SOP scale consists of 11 items for measuring visual processing style and 11 items for measuring verbal processing style. The items are measured on a four point always true/usually true/usually false/always false scale. To shorten the already long questionnaire the SOP scale was shortened based on Bagozzi's (2008) findings. Eight questions were deleted because of their poor convergent validity, meaning that they did a poor job at measuring what they were supposed to measure (Bagozzi, 2008). Two more questions were deleted because of overlap with remaining questions. To test the style of processing 12 questions in total remained, six for verbal and six for visual (see Appendix d).

Health orientation was measured using the general healthy eating interest scale (Roininen, Lähteenmäki, & Tuorila, 1999). This scale consists of six statements about the interest of eating healthy. Each statements is measured on a 5 point Likert scale strongly disagree/disagree/neither agree nor disagree/agree/strongly agree.

3.6 Data Analysis

Initially 6300 pairs (50 participants x 126 pairs) were part of the study, meaning that, across all respondents, every product made 350 appearances. 24 pairs were rated too slowly(>5000ms) and were removed from the dataset before analysis. Analyses were executed on product level (averages per product), per on individual level (all data, all respondents) and individual (individual respondent-level).

For the analysis on product level a new dependent variable was constructed to measure the frequency with which any particular product (of the 36 products included in the study) was selected as the more healthful option in the pair. This measure was operationalized as the difference in the number of times (out of 350) the product was selected as most healthful versus was not selected as the more healthful option in the pair. This measures hence ranges theoretically from -350 to +350.

For the individual level analysis, choice in a pair was coded as 1 if the right hand stimulus was selected as more healthful and 0 if the left hand stimulus was selected. With the left and the right hand stimulus of the pair being coded in terms of the six dummy variables (colour, image, claim1, claim2, symbol1 and symbol2), the choice (0,1) reflects the difference between these two vectors of dummy variables. So the left hand stimulus dummy variable levels were distracted from the right hand stimulus dummy variable level to serve as independent variables (ranging from -1 to +1) to predict the choice outcomes (0/1) in a logistic regression analysis.

For the analysis involving response time, the average time needed to respond to the 10 pairs in the common block (same to all) was calculated as the average response time for that individual. This average response time per individual was distracted from the actual response times of that individual for each of the 126 pairs to account for baseline differences in response speed.

The scores for the additional measures (SOP and the general healthy eating interest score), are mean scores per person. On both measures respondents were divided into two groups; the low and the high score group. The cut-off points were set based on frequency percentages so that the low and

the high score group were as equal as possible in size. The additional measures were tested for their reliability using the Cronbach's alpha as a reliability measure.

Reliability analysis of the SOP scale was divided in two parts, the verbal and the visual part. Initial Cronbach's alpha of the verbal questions was .713. Although the verbal questions surpasses the .7 threshold, question three "I like to think of synonyms for words" shows a corrected item total correlation of .28 which is below the preferred threshold of .3. Based on this observation question three was deleted resulting in a final Cronbach's alpha of .734. Further deletion of questions is unnecessary because the Cronbach's alpha is above the .7 threshold and all item total correlations are above .3.

Initial Cronbach's alpha for the visual questions was low (.621). Deleting question two "I like to picture how I could fix up my apartment or a room if I could buy anything I wanted" (item total correlation of .12) increased the Cronbach's alpha to .663. A second reliability analysis of the remaining 5 questions showed that by deleting question three "I like to daydream" (item total correlation .2) the Cronbach's alpha would increase to .705. Further deletion of questions is unnecessary because the Cronbach's alpha is above the .7 threshold and all item total correlations are above .3.

Reliability Analysis on the General Healthy Eating Interest Scale shows a decent Cronbach's alpha of .799. All questions in the general healthy eating interest scale show an item total correlation above .4. Based on the reliability analysis no questions were deleted.

Regression analysis was chosen as a method to identify the utilities of each factor level on the observed perception of healthfulness

4. RESULTS

4.1 Respondent selection

Out of the original 51 participants, one was excluded from analysis based on slow response during the task. The remaining 50 participants appeared equally distributed across the 10 blocks, so that all pairs were presented with exactly the same frequencies (5 responses per pair).

4.2 Perception of Healthfulness

In this thesis the perception of healthfulness is measured in three different levels of analysis; product level, individual response over all data level and the per person level. In the next chapters all main effects will be analysed based on these three levels followed by the additional measures.

4.2.1 Product level

4.2.1.1 Product level data predicting choice

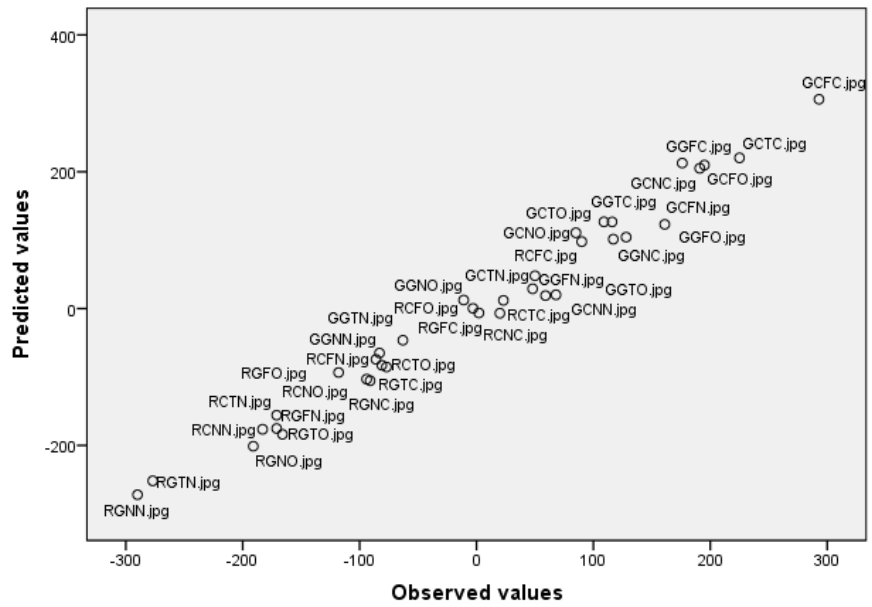
For perception of healthfulness, part worth values were assessed using linear regression. At the group product level, predictive accuracy (see table 2) of the part worth levels for perceived healthfulness is very high (r^2=0.987). Which means that 98.7 percent of the model is explained by the attributes. All variables are significant in predicting healthfulness choice.

Table 2 Part worth levels of product attributes on group level predicting choice	
	B
Red colour	-207.111***
Consummatory image	-97.889***
Fibre claim	101.083***
Taste claim	18.917*
Choices symbol	172.917***
Organic symbol	76.333***
(constant)	29.417**

*p<0.05 **p<0.01 ***p=0.00

As the dependent variable is a deduction of chosen products minus rejected products, the dependent variable data ranges from -290 to 293. Table 2 shows that colour had an influence on predicting healthfulness choice with a part worth value of -207.11, meaning that the colour red will cause the product, on average, to be chosen 207.11 times less than the same product with the colour green. Next to the colour of the package, the other visual attribute; image, has a significant influence on prediction of choice in healthfulness. A product with the image of the consummatory girl will be chosen on average 97.889 times less than the same product with the running couple image. The beta coefficients (B) shown in table 2 for verbal claims must be interpreted in a different matter. In both verbal attributes the B's are relative to the third attribute (no claim, no symbol). Meaning that a product with the rich on fibre claim will be chosen on average 101.083 times more than the same product with no claim. The taste claim will be chosen on average 18.917 times more than the same product with no claim. The same goes for symbols, a product with the "choices" symbol will be chosen on average 172.917 times more than the same product with no symbol. The "organic" symbol will be chosen on average 76.333 times more than the same product with no symbol.

Figure 2. Observed versus predicted values on product level.



The scatter plot in figure 2 shows a strong positive linear association between the healthfulness score and the predicted values with no outliers.

Congruence on product level data predicting response time

To find out if congruency between the healthiness of product attributes had any influence on response time, linear regression was performed. The scoring of the congruency scale was based on the pilot study and can be found in Appendix e. All negative congruence scores (indulgent congruence) were then multiplied by -1 to get an absolute score for congruency. Linear regression was performed to see if congruence influences response time.

Table 3 Congruency predicting response time on product level

	B
Congruency	-35.288**
Constant	74.552**
r^2	0.305
df	(1,34)

**p<0.01

The model with the congruency score shows a decent model fit with a r^2 of .305. Meaning that 30.5 percent of the response time can be explained by the congruency level of the products. The beta for the congruency scale shows that congruency has a negative effect on response time. This means that every point a product increases on the congruency scale the response time decreases by 35.288ms.

4.2.2 Individual responses over all data

4.2.2.1 Individual responses over all data predicting choice

To account for the fact that the product packages were presented in pairs, logistic regression was performed over all the data. Attributes of the product pairs were coded as dummy variables (right product minus left product) and tested against the dependent variable "choice" [0=left] [1=right]. Table 4 shows that all dummy variables are significant in predicting "choice".

Table 4 Part worth levels of product attributes on individual level predicting choice

Variable	B	Predicted Probability [a]	SE
Red colour	-1.622**	17%	.050
Consummatory image	-.796**	32%	.045
Fibre claim	.825**	70%[b]	.054
Taste claim	.155*	55%[b]	.052
Choices symbol	1.399**	81%[b]	.057
Organic symbol	.617**	66%[b]	.053
Constant	.039		.031
Nagelkerke's R^2	0.420		
-2 log likelihood	6325.301		
Correct predictions	76.4%		

*p<0.05 **p<0.01 [a]*If all other attributes are the same in the pair* [b]*for verbal attributes claim and symbol as compared to no claim and no symbol respectively.*

The overall model is significant according to the Model chi-square statistic p=0.00. The model predicts 76.4% of the responses correctly. Nagelkerke's r^2 is .42. All attributes had a significant effect on the dependent variable. However, the constant had no significant effect. Table 3 shows that the colour red has a significant negative influence (B= -1.622, p=0.00) on the package being chosen. The image of the consummatory girl also has a significant negative effect (B=-.796*1, p=0.00) on the

product choice. Again the part worth levels of the verbal attributes, claim and symbol, are relative to the third attribute (no claim and no symbol, respectively). The fibre claim as well as taste claim have a significant positive effect (B=0.825, p=0.00 and 0.155, p=0.01 respectively) on product as compared to no claim. Both symbols (choices and organic) have a significant positive effect (B=1.399, p=0.00 and 0.617, p=0.00 respectively) on product as compared to no symbol. The predicted probability that a certain product would be chosen can be calculated using the following equation:

$$P\ right = \frac{e^{0.039\ -1.622*\text{colour}-.796*\text{image}+.825*\text{claim1}+.155*\text{claim2}+1.399*\text{symbol1}+0.617*\text{symbol2}}}{e^{0.039\ -1.622*\text{colour}-.796*\text{image}+.825*\text{claim1}+.155*\text{claim2}+1.399*\text{symbol1}+0.617*\text{symbol2}}\ +1}$$

For example, if the product pair would consist of the following attributes; red versus green (-1), consummatory image versus running image (-1), no claim versus fibre claim (claim1=1 claim2=0) and no symbol versus choices symbol(symbol1=1 symbol2=0), the chance of a respondents product of choice being the right hand product is 86%.

$$\frac{e^{0.039\ -1.622*-1-.796*-1+.825*1+.155*0+1.399*1+0.617*0}}{e^{0.039\ -1.622*-1-.796*-1+.825*1+.155*0+1.399*1+0.617*0}\ +1} = 86\%$$

A predicted probability of 50% means that the product choice is totally random. Meaning that the further predicted probability is from 50% the more impact the attribute or product has. The predicted probability odds in table 4 can also be calculated using this equation by keeping all attributes equal except for the attributed of choice. Meaning that all X's equal 0 except for the attribute of choice which equals 1. For colour this results in 17%, meaning that if all attributes remain the same except for colour, the odds a product with the red colour will be chosen is 17%. It should be noted that, although not significant, there is a slight preference for the right hand product. Meaning that if the red coloured product is placed on the left instead of the right the predicted probability is no longer 17% but decreased to 16%. Same goes for the other attributes. Predicted probability for the consummatory image on the right hand product is 32% (30% if placed on the left). Predicted probability for fibre claim on the right hand product as compared to no claim is 70% (69% if placed on the left). Predicted probability for taste claim on the right hand product as compared to no claim is 55% (53% if placed on the left). Predicted probability for choices symbol on the right hand product as compared to no symbol is 81% (80% if placed on the left). Predicted probability for organic symbol on the right hand product as compared to no symbol is 66% (64% if placed on the left)

4.2.2.2 Attribute Interactions predicting choice

The selection of interaction variables on product choice was performed in four steps (Table 5).

Table 5 Interaction variable selection process

Step	Method	Enter	Outcome
1	Backward deletion	Main effects, all 3-way and 2-way interactions	Model 1 main effects, significant three-way and 2-way interactions
2	Adding complementary variables	Model 1 + complementary variables	Model 2 No significant 3-way variables left.
3	Backward deletion	Main effects, all 2-way interactions	Model 3: main effects, significant 2-way interactions
4	Adding complementary variables	Model 2 + complementary variables	Model 4 (table 6): main effects, significant 2-way interactions + complementary variables

Backwards deletion was selected as a method to determine which interactions between attributes had a significant effect on product choice. First selection step was performed on all main effects with all two- and three-way interaction variables. Backward deletion resulted in three two-way and five three-way interaction variables as significant predictors of product choice.

Some of the effects explained in the interaction variables might be partially explained by other interaction variables that are not included in the model. For every higher order variable all lower order variables must be included. For instance a model with a significant three way variable redxgirlxfiber should also incorporate all two-way variables associated with the three-way variable (redxgirl, redxfiber and girlxfiber). Due to the fact that our verbal attributes (claim and symbol) are split up into two variables, one cannot be in the model without the other. So for instance if the redxorganic variable is significant, redxchoices should also be added to the model, no matter its significance. All of these additional variables were included in the model in step 2. The amount of significant variables was diminished greatly after this step. After deletion off all the insignificant interactions, no significant three-way interaction remained. Therefore a second selection was performed in step 3 using the backward deletion method without the three-way interaction variables. In step 4 all additional variables of the significant two-way interaction variables were added to the model. The final model for interaction variables on product choice are show in table 6.

Table 6 Part worth levels of product attributes on individual level with interactions predicting choice

Variable	B	SE
Red colour	-1.835***	.083
Consummatory image	-.950***	.078
Fibre claim	.827***	.054
Taste claim	.155**	.052
Choices symbol	1.171***	.098
Organic symbol	.350***	.090
redxchoices	.315**	.111
redxorganic	.301**	.107
girlxchoices	.169	.107
girlxorganic	.276**	.105
Constant	.039	.031
Nagelkerke's R^2	.422	
-2 log likelihood	6309.058	
Correct predictions	76.4%	

*p<0.05 **p<0.01 ***p=0.00

The model with the interaction variables shows a decent model fit with a Nagelkerke's pseudo r^2 of .422,-2 log likelihood of 6309.058 and 76,4% of the predictions were correct. The remaining interaction terms show a link between the visual attributes and the symbols. Both the choices as well as the organic symbol show significant increase in importance on a red coloured package (.315 and .301 respectively) as compared to a green coloured package. The predicted probability for contribution of the choices symbol on a green package (b=1.171) is 76% whilst on a red package (b=1.171+.351) the predicted probability is 82%. This means that the importance of the choices symbol increases by 5.1% on a red package as compared to the green package. These statistics are explaining the contribution of the choices symbol on product choice alone. The full effect for a product with a red colour and the choices symbol (b=-1.835+1.171+.315) has a predicted probability

of 40.9%). A product with the green colour and the choices symbol (b=1.835+1.171) has a predicted probability of 95.2%.

The predicted probability for contribution of the organic symbol increases by 7% for the red package (b=.350+.301 predicted probability= 66.6%) as compared to the green package (b=.350 predicted probability= 59.6%).

The interaction variable for the consummatory girl image on the choices symbol was not found significant but was left in the model accounting for the fact that the verbal attributes are divided among two variables. The interaction variable for the consummatory girl image on the organic symbol however does significantly influence product choice. The predicted probability for contribution of the organic symbol increases by 6.4% for the consummatory girl image (b=.350+.276 predicted probability= 66.04%) as compared to a package with the running couple image (b=.350 predicted probability= 59.6%).

4.2.2.3 Individual responses over all data predicting response time

Across attribute level combinations on response time

A one-way ANOVA F-test was performed to analyze the influence of product attributes on response time, across (either four or nine possible attribute level combinations within the (6276) pairs (redxred, redxgreen, greenxred, and greenxgreen) Such analyses were conducted across the following group:

- Colour combination (greenxgreen, greenxred, redxred, redxgreen)
- Image combination (runningcouplexrunningcouple, runningcouplexconsummatorygirl, consummatorygirlxconsummatorygirl, consummatorygirlxrunningcouple).
- Claim combinations (fiberclaimxfiberclaim, fiberclaimxtasteclaim, fiberclaimxnoclaim, tasteclaimxfiberclaim, tasteclaimxtasteclaim, tasteclaimxnoclaim, noclaimxfiberclaim, noclaimxtasteclaim, noclaimxnoclaim)
- Symbol combinations (choicessymbolxchoicessymbol, choicessymbolxorganicsymbol, choicessymbolxnosymbol, organicsymbolxchoicessymbol, organicsymbolxtorganicsymbol, organicsymbolxnosymbol, nosymbolxchoicessymbol, nosymbolxorganicsymbol, noclaimxnosymbol)

Table 7 Effects of colour combinations on (adjusted) response time.

Attribute combinations	mean response time (SD)
redXgreen	-76.11 (669.9) a
greenXred	-71.7 (696.6) a
greenXgreen	78.23 (755.5) b
redXred	180.25 (763.6) c

a,b,c mean values sharing the same letter are not significantly different ($p<0.05$)

Results showed a significant effect of colour on response time [$F(3, 6272) = 46.5$, $p = 0.000$]. Post hoc comparison (using the Games-Howell test, table 7) showed that response time for combinations of red and green package (green-red and red-green) do not differ from each other, but are significantly shorter (M=-71.7 and -76.1 respectively), than response times for green-green and red-red (M=79.2 and 180.3). Choosing between packages in the combination red-red is proven to be the hardest for its response time is considerably higher as compared to the runner up (greenxgreen).

No significant effect of image on response time was found F[(3, 6272) = 1.401, p = 0.240].

Table 8 Effects of claim combinations on (adjusted) response time.	
Attribute combinations	mean response time (SD)
fiberclaimxfiberclaim	-30.35 (715.4)
noclaimxnoclaim	-19.81 (681.6)
noclaimxfiberclaim	-7.68 (712.8)
fiberclaimxnoclaim	-4.49 (744.7)
tasteclaimxfiberclaim	21.45 (734.9)
tasteclaimxnoclaim	34.28 (743.3)
tasteclaimxtasteclaim	58.04 (721.7)
noclaimxtasteclaim	78.18 (750.5)
fiberclaimxtasteclaim	86.25 (743.9)

none of the mean values are significantly different ($p<0.05$)

Results showed a significant effect of claim on response time [$F(8, 6267) = 2.408$, $p=0.014$]. Post hoc comparison (using the Turkey HSD test, table 8) did not show significant difference between the claim pairs ($p>0.05$).

Table 9 Effects of symbol combinations in product pairs on (adjusted) response time.	
Attribute combinations	mean response time (SD)
choicessymbol-nosymbol	-57.8 (711.1) a
nosymbol-choicessymbol	-36.63 (724.3) a,b
organicsymbol-choicessymbol	-16.43 (740.5) a,b,c
choicessymbol-organicsymbol	-16.23 (711.2) a,b,c
choices-choices	11.81 (697.6) a,b,c,d
organicsymbol-nosymbol	59.44 (727.8) a,b,c,d
nosymbol-organicsymbol	64.64 (718.8) b,c,d
organicsymbol-organicsymbol	104.76 (730.1) c,d
nosymbol-nosymbol	120.85 (782.6) d

a,b,c, d mean values sharing the same letter are not significantly different ($p<0.05$)

Results (table 9) showed a significant effect of symbols on response time [$F(8, 6267) = 5.303$, $p=0.000$]. Post hoc comparison (using the Turkey HSD test) showed that response time for a product pair with the choices symbol on both products (11.81ms), does not significantly differ from any other symbol combination. The response time for the combination no symbolxno symbol was significantly higher (M=120.85) than response times for both combinations of choices symbol and organic symbol (choicesxorganic(a) and organicxchoices(e)) (M=-16.23) and (M=-16.43) respectively, and for both combinations of choices symbol and no symbol (choicesxno(d) and noxchoices(g)) respectively (M=-57.8) and (M=-36.63). No significant difference in response time was found between the combination of no symbolxno symbol(M=120.85) and organic symbolxorganic symbol (M=104.76), however response time for the combination organic symbolxorganic symbol was significantly higher for both combinations of choices symbol and no symbol (choicesxno(b) and noxchoices(f)) respectively (M=-57.8) and (M=-36.63).

Individual responses over all data predicting response time

The output of the ANOVA test showed that there is almost no difference between the right and the left hand product in terms of response time (e.g. redxgreen is almost equal to greenxred). Therefore our difference scores (-1, 0 or 1) are not suitable for regression analysis on response time. A new dummy variable was created where contrast in the product pair received a value of 1 (e.g. redxgreen or greenxred). Matching attributes within the pair received a value of 0 (e.g. redxred or

greenxgreen). For matching colour combinations however table 7 suggest that there is a significant difference. Therefore a variable is added to account for the difference in [redxred] and [greenxgreen] where 1 = redxred and 0 = all other colour combinations. Two more dummy variables (tastextaste and choicesxchoices) were found significant and contributed to increase the r^2 (table 10)

Table 10 Part worth values for response time

	Model 1			Model2		
	B	SE	t	B	SE	t
(Constant)	183.979***	23.839	7.717	131.458***	29.679	4.429
red (versus green)	-206.331***	18.212	-11.330	-155.382***	22.353	-6.951
Girl (versus couple)	-36.009*	18.212	-1.977	-36.182*	18.178	-1.990
Fibre (versus no claim)	-14.144	18.314	-.772	.770	19.196	.040
Taste (versus no claim)	48.547**	18.317	2.650	63.435**	19.192	3.305
Choices (versus no symbol)	-109.702***	18.311	-5.991	-123.423***	19.185	-6.433
Organic (versus no symbol)	-.151	18.313	-.008	-13.945	19.184	-.727
redxred				102.039***	26.048	3.917
tastextaste				81.506**	32.722	2.491
choicesxchoices				-76.169**	32.832	-2.320
	r^2	0.026		r^2	0.031	

a. dependent variable: adjusted response time *p<0.05 **p<0.01 ***p=0.00

Table 10 shows that the addition of the three extra dummy variables increases the r^2 to 0.031. Meaning that 3% of the response time can be explained by model 2. Therefore model two will become the final model and will be used for analysis. The colour variable has a significant negative effect on adjusted response time. A beta coefficient of -155.382 means that if the product pair contains a contrast in colour response time will decrease on average with 155.382ms compared to a product pair with two green products. The extra variable redxred shows that a product pair with two red products will increase response time with 102.039ms compared to a product pair with two green products. A contrast of images in a product pair significantly lowered the response time by 36.128ms on average as compared to a product pair with corresponding images. Contrast in claim1 (fibre claim versus no claim) did not significantly increase or decrease response time as compared to corresponding claims in the product pair. Contrast in claim2 (taste claim versus no claim) significantly increased response time by 63.435ms as compared to a product pair without claims. The variable tastextaste shows that a product pair with two products carrying the taste claim significantly increases the response time by 81.506ms as compared to a product pair with no claims. Contrast in symbol1 (choices symbol) decreases the response time significantly by 123.423ms as compared to a product pair without any symbols. The choicesxchoices variable shows that response time decreases by 76.169ms as compared to a product pair without symbols. Symbol2 (organic symbol versus no symbol) shows that symbol contrast in a product pair does not significantly increase or decrease response time as compared to a product pair without symbols.

Congruence over all data on response time.

The congruence score mentioned earlier in chapter 4.2.1 ranges from 4, the most healthful attribute combination, to -3 , the most indulgent attribute combination. Because each recorded response time is based on product pairs, a congruency difference score was computed. The difference score was created by deducting the congruence score of the right hand product by that of the left. The difference score ranges from -7 (right product: all attributes indulgent(-3) left product: all attributes healthful (+4)) to +7 (right product: all attributes healthful (+4) left product: all attributes indulgent(-

3). As the product placement on the left or the right hand side had no significant influence on response time the scores -7 and 7 are not on a linear line. Therefore the difference score was transformed into absolute scores by multiplying all negative scores by -1.
Linear regression on response time was performed using the congruence difference variable with absolute scores. The results are shows in table 11.

Table 11 The effect of congruency on response time (n=6276)

	B
Congruence[a]	-52,059***
Constant	127,044***
r^2	0.01
df	(1,6274)

a. Absolute congruence difference score ***=p=0.00

Table 11 shows that congruency within a product has a significant effect on response time. Meaning that at every point the two products differ on the congruence scale, response time decreases by 52ms.

Additional linear regression analysis was performed to find significant interaction effects on response time. Using the backward deletion selection method no significant interaction effects were found on response time.

4.2.3 Individual responses per person

Analysis of a box plot on all individual beta coefficients showed that respondent 43 was an enormous outlier for colour (b=-40.1) and the choices symbol (b=21.1) and was therefore left out further per person analysis. Normality analysis showed that the remaining beta coefficients for all attributes except for the organic symbol were normally distributed (see Appendix f1-7).

4.2.3.1 Individual responses per person predicting choice.

Logistic regression on the individual data per person was performed to gain in depth information about the influence of the dummy variables (Table 12). Nagelkerke's r^2 shows a decent model fit (r^2= .655) meaning that on average 65.5 percent of the model is explained by the attributes.

Table 12 Average part worth values per person predicting choice.

variable	Average B (SD)	Sig negative	Not significant	Sig positive
Red colour	-2.797 (0.625)	45	5	0
Consummatory image	-1.862 (0.537)	31	17	2
Fibre claim	2.171 (0.616)*	1	25	24
Taste claim	0.378 (0.547)*	5	36	9
Choices symbol	2.487 (0.626)*	0	8	42
Organic symbol	1.820 (0.585)*	1	27	22
Constant	0.271 (0.286)	2	43	5
	Average r^2 (SE)	Minimum	maximum	
Nagelkerke's r^2	0.655 (0.18)	0.116	0.892	

**Verbal attributes are relative to an absence of that attribute. For instance fibre claim is relative to no claim.*

Table 12 is a descriptive table of the beta coefficients for the attributes on product choice. Except for the taste claim, all significant attributes are clearly mostly positive or negative. Table 12 shows that 45 out of 50 times the colour red had a significant negative influence (B= -2.797) on healthful product choice. The consummatory image shows the same, mainly negative effect on healthful product choice. The consummatory image was found significant (B= -1.862) 33 out of 50 times of which 31 times negative and only twice positive.

The verbal attributes as compared to an absence of that attribute had a positive influence on average on healthful product choice. A significant effect (B= 2.171) for fibre claim on healthful product choice was found 25 out of 50 times of which 24 times positive. Taste claim however only had a significant effect (B= 0.378), 14 out of 50 times of which 9 times positive. 42 out of 50 times the choices symbol had a significant positive influence (B= 2.487) on healthful product choice. The organic symbol also showed a mainly positive significant effect (B= 2.487) on healthful product choice. Out of 50 times the organic symbol was found significant 23 times of which 22 times positive.

On average the constant was shown to have a significant effect (B= 0.271) on healthful product choice seven times of which 5 times positive. Meaning that there was a slight preference for respondents to choose the right hand product.

4.2.3.2 Individual responses per person predicting response time

Linear regression on response time was performed using individual per person data. The results of the linear regression are shown in table 13.

Table 13 Average part worth values per person on response time

Variable	Average B (SD)	Sig negative	Not significant	Sig positive
Red (versus green)	-456.03 (129.34)	8	41	0
Girl (versus couple)	-118.78 (106.7)	6	39	4
Fibre (versus no claim)	-84.63 (130.24)	2	45	2
Taste (versus no claim)	382.93 (136.77)	0	47	2
Choices (versus no symbol)	-228.62 (102.66)	16	32	1
Organic (versus no symbol)	-377.69 (126.27)	3	46	0
redxred	318.41 (122.81)	1	41	7
tastextaste	232.57 (167.94)	2	41	6
choicesxchoices	-259.51 (112.16)	5	44	0
constant	230.34 (155.13)	6	26	17
	Average r^2 (SE)	Minimum r^2	Maximum r^2	
Model fit	.149 (0.082)	0.025	0.39	

Table 13 shows the average influence of attributes on response time per person. Although the model shows an average r^2 of .149 not many of the attributes were found to have a significant effect on response time. Besides the constant, the choices symbol in contrast with another symbol was found significant most often (17 out of 49 times, and only once positive) with an average beta of -228.62ms. Remarkable however is that when both products had the choices symbol, response time lowered (-259.51ms on average) in all five significant cases as compared to a product pair without any symbols. The colour red in a product pair with a green product was found to have a significant negative effect (-456.03ms on average) on response time 8 times out of 49 and never had a significant positive effect on response time as compared to a product pair with two green products. If both products had a red colour, response time increased with an average 318.41ms as compared to a green only coloured product pair. Beta for redxred was found significant 8 out of 49 times of which 1

time negative. Taste claim in a product pair with a product without a claim significant increased response time 2 out of 49 times with an average increase of 382.93ms as compared to a product pair without claims. When both products in the product pair had the taste claim response time significantly lowered by 232.57ms on average as compared to a product pair without claims. Fibre claim in a product pair where both products had different claims had a significant effect on response time four times; twice negative and twice positive. On average fibre claim lowered response time by 84.63ms as compared to a product pair with both the fibre claim or both without any claims. A product pair with a single product with the organic symbol significantly lowered the response time by 377.69ms on average as compared to a product pair where both products had the organic symbol or where both did not have any symbol. A product pair with the image of the consummatory girl on one of the products and the image of the running couple on the other had an significant influence on response time 10 times of which 6 times negative. On average the response time lowered by 118.78ms as compared to product pairs where both products had the same image.

4.2.4 Summary of the main effects

Table 14 provides an overview of the findings concerning the hypothesis about the main effects.

Table 14. Summary of findings (main effects)

	Product level	Individual over all data level	Per person level
h1. Product attributes have an effect on the evaluation of the healthfulness of a product at point of purchase.	✓	✓	✓
H2. Visual attributes have an effect on the evaluation of the healthfulness of a product at point of purchase.	✓	✓	✓
H2a Green coloured packages will have a more positive effect on the evaluation of the healthfulness of a product at point of purchase as compared to the red colour.	✓	✓	✓
H2b The image of the running couple will have a more positive effect on the evaluation of the healthfulness of a product at point of purchase as compared to the image of the consummatory girl.	✓	✓	✓
H3. Verbal attributes have an effect on the evaluation of the healthfulness of a product at point of purchase.	✓	✓	✓
H3a The absence of a claim will have less of a positive effect on the evaluation of the healthfulness of a product as compared to the fibre claim, but will have a more positive effect in comparison to the improved taste claim.	x	x	x
H3b The organic symbol will have less of a positive effect on the evaluation of the healthfulness of a product as compared to the choices symbol, but will have a more positive effect in comparison to a product without a symbol.	✓	✓	✓
H4. Congruency between packaging attributes reduces response time.	✓	✓	
H5. Similarity within the product pair increases response time.		✓	

✓ =confirmed, **X** = *disproved*

As table 14 shows the main effects were tested on all three levels of analysis except for hypothesis h4 and h5. These two hypothesis were not tested at per person level due to time constraints. Hypothesis h5 was not tested on product level because this level does not contain product pair information. Hypothesis h3a was disproved as the improved taste claim had a more positive effect on the evaluating of healthfulness of a product then no claim did. The fibre claim however still had the most positive effect. All other hypothesis were confirmed on all the levels of analysis they were tested on.

4.3 Additional measures

In this chapter the additional measures, style of processing and General healthy eating interest, will be analysed. Analysis will be done in the individual response over all data level.

4.3.1 Style of processing

4.3.1.1 Style of processing and attribute importance

Normality analysis showed that the verbal scores were normally distributed among the respondents. On average respondents scored 1.86 on the visual scale. Although the highest score of 1 was obtained, as with the verbal scale none had reached the lowest possible score of 4. The lowest recorded score was 3.25. Normality analysis showed that the visual part of the SOP scale is not normally distributed among the respondents.

Pearson correlation was performed to see whether there was a significant correlation between the sop scores (verbal and visual score) and the beta coefficients for the attributes on product choice. None of the variables had any correlation with the SOP scores. The verbal score and the visual score however were significantly correlated (Pearson correlation -.168, p=0.000).

Logistic regression was performed on the data to test whether the verbal and visual orientation had an influence on the importance of product attributes. To be able to perform the logistic regression respondents were divided into two groups (high score versus low score). On the SOP scale a score of 1 is the highest possible score and 4 is the lowest possible score. The high verbal score group contained al verbal scores with a minimum score of 1 and a maximum score of 2.0. 44.9% of the respondents was in the high verbal score group. The low verbal score group consists of all respondents with a verbal score of 2.2 and above upwards to 3.2. The high visual score group consists of 24 respondents with a maximum score of 1 and a minimum of 1.75. The low visual score group consists of 25 respondents with a maximum score of 2.25 and a minimum score of 3.25. The results from the logistic regression on visual and verbal scores are shown in table 15.

Table 15 Style of processing predicting choice.						
Verbal	low verbal score group			High verbal score group		
Variable	B	Predicted probability	SE	B	Predicted probability	SE
Red colour	-1.731***	14.7%	.074	-1.463***	20.5%	.069
Consummatory image	-.649***	33.6%	.064	-.979***	52.6%	.065
Fibre claim	.811***	68.6%	.078	.871***	72.6%	.077
Taste claim	.115	52.12%	.076	.196**	57.5%	.074
Choices symbol	1.312***	78.3%	.082	1.474***	82.9%	.082
Organic symbol	.570***	63.2%	.076	.683***	68.74%	.076
Constant	-.030		.045	.105*		.044
Nagelkerke's r^2	.420			0.422		
-2 log likelihood	3028.020			3.158.804		
Correct predictions	76.2%			76.5%		
Visual	Low visual score group			High visual score group		
Red colour	-1.674***	16.8%	.073	-1.511***	18.10%	.07
Consummatory image	-.747***	33.9%	.064	-.877***	29.40%	.064
Fibre claim	.992***	74.4%	.079	.696***	66.80%	.076
Taste claim	.199**	56.9%	.076	.115	52.90%	.074
Choices symbol	1.539***	83.4%	.085	1.257***	77.90%	.08
Organic symbol	.708***	68.7%	.077	.549***	63.40%	.075
Constant	.077		.045	.001		.044
Nagelkerke's r^2	.448			.389		
-2 log likelihood	3067.352			3134.865		
Correct predictions	76.9%			75.5%		

a. respondent 43 was removed for extreme values *p<0.05 **p<0.01 ***p=0.00

Verbal style of processing predicting choice

The results of the logistic regression on the two groups are shown in table 14. Comparing the two groups shows that the higher verbal score group increases the importance of the verbal attributes and decreases the importance of the visual attributes.

Table 14 shows that in the high verbal score group the predicted probability for the colour red (20.5%) moved closer to 50% as compared to the low verbal score group (14.7%). Meaning that the colour of a package in a product pair is less important for people with a higher verbal score. Predicted probability also moved closer to 50% in the high verbal score group for the consummatory girl image (52.6%) as compared to the low verbal score group (33.6%). Meaning that the image on a package in a product pair is less important for people with a higher verbal score. A predicted probability of 52.6% means that for people in the high verbal score group image has almost no effect on product choice as it is very close to 50%.

The importance of verbal attributes however tends to increase in the high verbal scores group as compared to the low verbal scores group. The predicted probability for the fibre claim move further away from 50% for the high verbal score group as compared to the low verbal score group. Meaning that the importance of fibre claim is marginally higher in the high verbal score group (72.6%) as compared to the low verbal score group (68.6%). The importance of the taste claim is also marginally higher in the high verbal score (57.5%) group then in the low verbal score group (52.2%). The choices symbol is marginally more important in the high verbal score group (82.9%) in comparison with the

low verbal score group (78.3%). The organic symbol is marginally more important in the high verbal score group (68.74%) as compared to the low verbal score group (63.2%).

Visual style of processing predicting choice

All attributes except for colour seem to behave as expected in the comparison between respondents in the high and the low visual score group. The predicted probability of the red colour for high visual score group (18.1%) is actually closer to 50% compared to the low visual score group (16.8%), meaning that although the difference is small, colour is slightly more important in the low visual score group compared to the high visual score group. The consummatory girl image however seems to be more important in the high visual score group (predicted probability of 29.4%) as compared to the low visual score group (predicted probability of 33.9%). The importance of the fibre claim as well as the taste claim is lower in the high visual score group (66.8% and 52.9% respectively) as compared to the low visual score group (74.4% and 56.9% respectively). The importance of the choices symbol and the organic symbol is also lower in the high visual score group (77.9% and 63.4% respectively) as compared to the low visual score group (83.4% and 68.7% respectively).

4.3.1.2 Style of processing and response time

Table 16 shows the results of regression analysis performed on adjusted response time for all moderating scales.

Table 16 Style of processing predicting response time

Verbal	low verbal score group	High verbal score group
Variable	B (SE)	B (SE)
red (versus green)	-185.006(29.741)***	-116.496(33.884)**
Girl (versus couple)	-38.84(24.186)	-30.904(27.567)
Fibre (versus no claim)	0.902(25.554)	-0.085(29.075)
Taste (versus no claim)	87.323(25.533)*	31.823(29.087)
Choices (versus no symbol)	-119.68(25.51)**	-128.415(29.087)***
Organic (versus no symbol)	-8.056(25.511)	-21.116(29.102)
redxred	123.459(34.658)***	76.034(39.541)
tastextaste	130.406(43.506)**	20.041(49.662)
choicesxchoices	-65.005(43.833)	-91.053(49.559)
Constant	131.184(39.742)**	130.756(44.64)**
r^2	0.043	0.02
df	(9. 3499)	(9, 2757)
Visual	Low visual score group	High visual score group
red (versus green)	-217.378(33.427)***	-109.24(29.873)***
Girl (versus couple)	-46.545(27.063)	-26.983(24.34)
Fibre (versus no claim)	-3.042(28.624)	2.001(25.687)
Taste (versus no claim)	71.512(28.59)*	56.782(25.697)*
Choices (versus no symbol)	-142.407(28.611)***	-111.132(25.675)***
Organic (versus no symbol)	-23.821(28.602)	-8.7(25.675)
redxred	90.082(38.874)*	112.065(34.845)**
tastextaste	138.187(48.712)**	38.141(43.853)
choicesxchoices	-68.877(48.92)	-80.315(43.955)
Constant	253.894(44.904)***	38.88(39.248)
r^2	.045	.023
df	(9. 2753)	(9, 3503)

a. respondent 43 was removed for extreme values *p<0.05 **p<0.01 ***p=0.00

Verbal style of processing predicting response time

The model fit for both the high as the low verbal score group is very low (r^2=0.02 and 0.043 respectively). The image of the consummatory girl, the fibre claim and the choicesxchoices attribute had no significant effect on response time in both verbal score groups.

The red versus green colour variable was significant in both the high and the low verbal score group. Table 15 shows that for a respondent with a low verbal score, the contrast of colour in a product pair reduces response time with about 70ms more than the respondents in the high verbal score group. The redxred colour combination in a product pair as compared to a greenxgreen colour combination did not have a significant effect on response time in the high verbal score group, it did however increase response time (123.459 ms) in the low verbal score group. Meaning that the colour of a package becomes less important for respondents in the high verbal score group as compared to the low verbal score group.

The choices symbol versus no symbol variable was significant in both high and the low verbal score group. Table 15 shows that for a respondent with a high verbal score, the product with a choices symbol and a product without a symbol reduces response time with about 9ms more than the respondents in the low verbal score group. Meaning that the choices symbol of a package becomes slightly more important for respondents in the high verbal score group as compared to the low verbal score group.

The taste claim in a product pair with a product with no claim did not have a significant effect on response time in the high verbal score group, it did however increase response time (87.324 ms) in the low verbal score group. The tastextaste variable also did not influence response time significantly in the high verbal score group. The tastextaste combination however did increase response time (130.406ms) in the low verbal score group. The significant effect of the constant remains about the same among both verbal score groups.

Visual style of processing predicting response time

The model fit for the high and the low visual score group on response time is also very low (r^2= .023 and .045 respectively) . The image of the consummatory girl, the fibre claim and the organic symbol did not significantly contribute to response time in both visual score groups.

The red versus green colour variable was significant in both high and the low visual score group. Table 15 shows that for a respondent with a low visual score, the contrast of colour in a product pair reduces response time with about 108ms more than the respondents in the high visual score group. The redxred colour combination in a product pair as compared to a greenxgreen colour combination also had a significant effect on response time in both visual score groups. The high visual score group increased response time with 22ms more than the low visual score group.

The choices symbol versus no symbol variable was significant in both high and the low visual score group. Table 15 shows that for a respondent with a high visual score, the product with a choices symbol and a product without a symbol reduces response time with about 30ms more than the respondents in the low visual score group. Meaning that the choices symbol of a package becomes slightly more important for respondents in the high visual score group as compared to the low visual score group.

The taste claim in a product pair with a product with no claim did have a significant effect on response time in the high and the low visual score group. The taste claim versus no claim product pair combination increased response time 14ms more in the low visual score group as compared to the high verbal score group. The tastextaste variable however did not influence response time significantly in the high visual score group. The tastextaste combination however did increase response time (138.187ms) in the low visual score group. The constant did not have a significant effect on response time in the high visual score group. However, it did considerably slow down the response in the low visual score group (253.894ms).

4.3.2 Healthy eating interest

4.3.2.1 Healthy eating interest and attribute importance

For the healthy interest scale the highest possible score is 5 and the lowest possible score is 1. The average observed healthy eating interest score was 3.23. The highest observed general healthy eating interest score was 4.33 and the lowest was 1.67. Normality analysis shows a normal distribution for the healthy interest scores among the respondents.

Once again the respondents were split into two groups to perform logistic regression. The high general healthy eating interest score (GHEIS) group contained al scores with a minimum score of 1 and a maximum score of 3.1667. 44.9% of the respondents were in the high GHEIS group. The low GHEIS group consists of all respondents with a score of 3.33 and above upwards to 4.33.

Table 17 General healthy eating interest predicting choice.

Variable	B	Predicted probability	SE	B	Predicted probability	SE
Healthy eating interest	Low Healthy eating interest score group			High Healthy eating interest score group		
Red colour	-1.596***	17.4%	.066	-1.678***	16.3%	.079
Consummatory image	-.715***	33.7%	.058	-.927***	29.2%	.071
Fibre claim	.760***	69%	.071	.936***	72.6%	.085
Taste claim	.085	53.1%	.069	.262**	57.5%	.081
Choices symbol	1.186***	77.3%	.074	1.719***	85.3%	.094
Organic symbol	.590***	65.2%	.070	.667***	67%	.082
Constant	.039		.041	.040		.048
Nagelkerke's r^2	.392			.463		
-2 log likelihood	3644.880			2650.463		
Correct predictions	75%			78.4%		

a. respondent 43 was removed for extreme values *p<0.05 **p<0.01 ***p=0.00

Table 17 shows that the model fit for the high GHEIS group (Nagelkerke's r^2= .463 with a -2 log likelihood of 2650.463 and 78.4% of correct predictions) is better as compared to the low GHEIS group (Nagelkerke's r^2= .392 with a -2 log likelihood of 3644.880 and 75% of correct predictions). Comparing the high and the low GHEIS group shows us that all attributes are more important for the high GHEIS group as compared to the low GHEIS group. The colour red tends to be slightly more important (predicted probability further from 50%) for the high GHEISG (predicted probability 16.3%) as compared to the low GHEIS group (predicted probability 17.4%). The consummatory girl image is more important for the high GHEIS group (predicted probability 39.2%) as compared to the low GHEIS group (predicted probability 33.7%).

Verbal attributes (claim and symbol) are relative to the absence of that attribute (noclaim and nosymbol). The fibre claim is more important for the high GHEIS group (predicted probability 72.6%)

as compared to the low GHEIS group (predicted probability 69%). The taste claim for the low GHEIS group had no significant effect on product choice. The taste claim for the high GHEIS group however did have a significant positive effect on product choice (predicted probability 57.5%). The importance for the choices symbol was found higher for the high GHEIS group (predicted probability 85.3%) as compared to the low GHEIS group (predicted probability 77.3%). The organic symbol was also slightly more important in the high GHEIS group (predicted probability 67%) for product choice as compared to the low GHEIS group (predicted probability 65.2%). Both the constant for the high and the low GHEIS groups were not significant and almost equal (.040 and .039 respectively).

4.3.2.2 Healthy eating interest and response time

Table 18 shows the results of linear regression on response time moderated by the general healthy eating interest scale.

Table 18 General healthy eating interest predicting response time.

	Low GHEIS group	High GHEIS group
variable	B (SE)	B- (SE)
red (versus green)	-174.000(30.441)***	-133.085(32.921)***
Girl (versus couple)	-44.257(24.704)	-25.956(26.848)
Fibre (versus no claim)	0.346(26.063)	1.362(28.343)
Taste (versus no claim)	63.012(26.058)*	64.863(28.337)*
Choices (versus no symbol)	-113.097(26.056)***	-137.22(28.31)***
Organic (versus no symbol)	-46.166(26.054)	26.462(28.311)
redxred	97.647(35.435)**	107.731(38.392)**
tastextaste	57.305(44.325)	113.826(48.442)*
choicesxchoices	-66.046(44.565)	-87.469(48.501)
Constant	140.133(40.305)**	121.051(43.81)**
r^2	0.032	0.032
df	(9, 2753)	(9, 3503)

a. respondent 43 was removed for extreme values *p<0.05 **p<0.01 ***p=0.00

Table 18 shows that the model fit for both the high and the low GHEIS group are fairly low with a r^2 of .032. Meaning that only 3.2 percent of response time is explained by the attributes in the high GHEIS group and 3.2 percent in the low GHEIS group. In both GHEIS groups four attributes and the constant were found to be significant. The tastextaste variable were found to be significant in the high- but not in the low GHEIS group.

The colour combination of red and green in a product pair significantly lowered response time in both GHEIS groups as compared to a product pair with 2 green products. This combination of colours however did increase response time in the low GHEIS group(-174 ms) even more than in the high GHEIS group (-133ms). However, respondents in the high GHEIS group took longer to respond when both products in the product pair were red as compared to the low GHEIS group. As compared to an all green product pair response time for an all red product pair increased in the high GHEIS group by 108ms. In the low GHEIS group this response time increased by 98ms.

A product pair with a product with a taste claim and a product with no claim significantly increased response time. However the increased response time was almost equal for the high- and the low GHEIS group (64.863ms and 63.012ms respectively). A product pair where both product pairs wielded the taste claim as compared to a product pair without claims, increased response time significantly in the high GHEIS group by 114ms. The choices symbol in a product pair with no symbol

significantly lowered response time in both GHEIS groups. Response time in the high GHEIS group (-137.22ms) decreased more as compared to the decrease in the low GHEIS group (-113.097ms). The constant was significant for both the high- and the low GHEIS group (121.051ms and 140.133ms respectively. The image of the consummatory girl, the fibre claim, the organic symbol and the choicesxchoices product pair did not significant influence response time in any of the GHEIS groups.

4.3.3 Summary of the additional measures

Table 19 provides an overview of the findings concerning the hypothesis about the additional measures.

Table 19. Summary of findings (additional measures)

	Product level	Individual over all data level	Per person level
H6a in the evaluation of the healthfulness of a product, verbal attributes are more important than visual attributes for consumers with a verbal processing style.		✓	
H6b In the evaluation of the healthfulness of a product, visual attributes are more important than verbal attributes for consumers with a visual processing style.		x	
H7 Verbal attributes are more important than visual attributes for consumers with a general interest in healthy eating.		x	

✓ =confirmed, **X** = *disproved*

As table 19 shows the additional measures were only tested on the individual over all data level as this level of data analysis was considerate most appropriate. Hypothesis 6a was confirmed. For all verbal attributes became more important for consumers with a verbal processing style. In addition all visual attributes became less important. Hypothesis 6b was disproved as the attribute colour became less important for consumers with a visual style of processing. The image attribute however did become more important. Hypothesis 7 was disproved as not only the verbal but all attributes become more important for consumers with a general interest in healthy eating.

5. GENERAL DISCUSSION

In this research two verbal and two visual product packaging attributes were examined. During the experimental part of this study product packages were manipulated on these four packaging attributes and presented to respondent in a pair wise choice task. In the context of communication of healthy products in a shopping environment, the motivation of this study was to discover the importance of verbal and visual packaging attributes on their (1) influence on healthfulness perception, (2) influence on response time, and (3) influence of moderating variables such as style of processing and general healthy eating interest. The data provided by the experiment was examined on three levels of analysis, (1) product level, (2) individual responses over all data, (3) individual responses per person.

This research has proven to be well designed and robust as it provides clear information on the way packaging attributes influence consumers perception of healthfulness. Many advantages were indentified using this design such as the ability to mimic near actual marketplace health perception choice tasks. Using a pair wise choice task under time pressure, enabled the possibility to expose respondents to a vast number of stimuli. Which in turn required only a relatively small amount of respondents and made it possible to test all proposed stimuli in a full factorial design.

A disadvantage of the design was the complexity of the analysis. Since our outcome variables now depend on product attributes from two instead of one product. Interaction variables had to be created to account for both stimuli influencing the outcome.

The experimental part of the research provided interesting, clear and consistent results over all three levels of analysis. The majority of hypothesis were confirmed and those that were not confirmed were only partly disproved.

Across the three levels of analysis, proof was found that product packaging attributes contribute to consumers perception of the healthfulness of that product as well as influence their response time in the choice task. Both Verbal and visual attributes contribute consistently and somewhat equal which contradicts Grunert (2007), who proposed that health choices under time pressure are made through inferential belief formation and not informational belief formation. Symbols and packaging colour contributed more to the perception of healthfulness as compared to the image or the claim on a package. The importance of the colour is probably due to the fact that colour is easy to perceive and has some well-established beliefs connected to health. Under time pressure people rely more on this kind of inferential belief formation (Bloch, 1995; Clarke & Costall, 2008; Fishbein & Ajzen, 1975; Fraser & Banks, 2004; Silayoi & Speece, 2007). Although in line with other research saying that respondents with health motivation (Turner, et al., 2014), or a verbal style of processing (Kuvykaite, et al., 2009), rely their choice more on the informational belief formation, in this case on the choices symbol.

In terms of preference between the levels of the visual attributes, the research showed a clear preference for the predetermined healthful levels in the choice task; green colour preferred over red and the image of the athletic couple over the consummatory girl.

For the verbal attributes, the symbol showed a similar preference for the pre determined healthy levels. The choices symbol was clearly viewed as the most healthful level followed by the organic symbol and lastly the absence of one. The claim attribute however showed a unexpected preference for the taste claim above the absence of a claim. This might be explained by the fact that the claim is a big part of the package holistic design, as some literature suggests that holistic design plays a role in the choice process (Bloch, 1995; Ellis, 1999). The difference between the taste claim and no claim on a package however is minimal as the difference was not always significant across different methods of analysis. This finding might also contradict the conception that healthy is negatively correlated to tasty (Raghunathan, et al., 2006). The fibre claim however was still the most preferred level in the healthfulness choice task.

The results showed that congruence within a product speeds up the choice process. This is in line with literature saying that incongruence leads to the central route of processing which increases response time (Olson, 1978). Response time is also drastically shortened when the product pair contains two contrasting colours (redxgreen or greenxred). Similarity between products within the product pair has proven to increase the difficulty of the choice task as response time increases when products within the pair become more similar. When both products have the same colour response time increases. Remarkable however is that response time increases twice as much if both products are red coloured as compared to both being green. These findings can be explained by the (in)congruency effect we discussed earlier. Because the main indicator of a prototypical product in the healthfulness category (colour) is negatively correlated with health on both products, respondents resort to a more piecemeal style of processing by looking at all other attributes individually which takes more time (Goodstein, 1993). Response time was lower for the product pair

with two choices symbols as compared to a product pair without symbols. This means that the piecemeal style of processing was not triggered by two symbols communicating health. This seems to be in line with the literature (Olson, 1978) saying that piecemeal processing is only triggered when a product is incongruent with a respondents expectations of healthfulness.

Our findings that symbols become more influential in health perception when the visual attributes are communicating indulgence instead of health, are probably due to the fact that most choices under time pressure are initially based on these visual elements (Clarke & Costall, 2008; Fraser & Banks, 2004; Underwood, et al., 2001). When these visual elements do not communicate health, the respondent resorts to other attributes to base their choice on (Olson, 1978).

The processing style of the respondent was proven to influence the importance of different attributes. Respondents with a high preference for a verbal style of processing tend to be more influenced by verbal attributes and less by visual attributes. As expected respondents with a high preference for visual style of processing are less influenced by verbal attributes and the image printed on a package becomes more important. Remarkable however is the fact that the importance of colour actually diminished as compared to respondents in a low preference for a visual style of processing. This might be due to the fact that the measure of the style of processing is not optimal, for it was shortened and comes with a 4 point Likert scale where a 5 or 7 point Likert scale would have been more accurate (Bagozzi, 2008).

Respondents with a high general interest in healthy eating seem to be more aware in general as all attributes become more important as compared to respondents with a low general interest in healthy eating. These results are in line with literature that respondents with a health motivation pay more attention towards explicit information about healthfulness (Turner, et al., 2014), but in contrary to the literature also pay more attention towards less explicit information.

Consumers with a high interest in healthy eating and a high preference for a verbal style of processing make a quicker decision when the choices symbol is on one of the packages (and no symbol on the other) as compared to respondents with less interest in healthy eating and a verbal style of processing. In contrary, the consumers with a low interest in healthy eating and a low preference for a verbal style of processing made a faster choice when there was a colour contrast within the product pair.

The findings of this study raise interesting research possibilities for future research. The study used a relatively small and selective sample which should be widened in future studies. It would be potentially interesting to widen the levels of attributes used, as much is to be learned about different colours, images, claims and symbols in communicating health. Besides attributes communicating healthfulness, research on the effect of attributes on indulgence, saturation and naturalness is needed, which might result in a complete oversight of the communicating power of attribute-use in product package design. Furthermore it would be recommended to look for an alternative measure for the style of processing as the SOP scale turned out to be rather weak. These future studies should take in mind some of the limitations of this present study.

Despite the clear findings of this study, some limitations should be kept in mind. The artificial nature trying to mimic an actual shopping situation and the use of participating students are some. Although respondents were not in an actual shopping situation, the experiment produced significant results. This might be partly due to the fact that the attributes used in the study were chosen by a similar set of respondents in the pilot study. Due to the method of recruiting participants, most

participants are highly educated students who might be more aware of a healthy lifestyle and might have a unique set of habits connected to healthful shopping. This limitation might have the most significant effect on the research as health promotion should be aimed at those who are not yet committed into a health motivation. Another reasonable limitation refers to the small amount of levels per attribute. For the visual attributes only two levels were chosen en for the verbal attributes only three. Despite this limitation a significant overview of attribute importance in health perception was made. Moreover, the product category (coffee cookie) was chosen as a relatively neutral product, but some respondents might not associate coffee cookies as potential healthy snacks. Despite its limitations, this study has contributed to the understanding in the use of attributes in communicating health though package design. Caution, however, should be exercised with generalizing these findings onto different product categories and onto alternative levels of the attributes.

In conclusion, the results show a clear division in the importance of different attributes in a healthful choice task. Great care should go towards the attributes and their levels used in communicating healthfulness through package design. An important factor is to keep in mind the target group as their style of processing, motivation and time at hand might change the preferred product attributes. Congruence within the package has shown to reduce response time greatly. Therefore it should be noted that packages aimed at health promotion should have some form of congruence between the attributes. However keep in mind that a fully congruent package will attract less attention than a less congruent package within the product category (Mandler, et al., 1991). As in-store decision making and healthfulness keep becoming more important factors in health promotion, marketers and other agencies committed to the promotion of healthfulness should take note of these findings and benefit accordingly.

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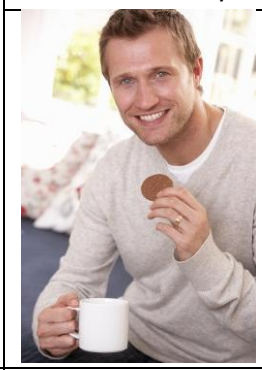
Appendices

Appendix a: Pilot study

In order to find the correct and justified levels of packaging attributes a pilot study was conducted. In a pre-designed Photoshop template respondents were asked to construct four product packages which they perceived as most (1) healthful, (2) indulgent, (3) natural and (4) satiating. Respondents were given the ability to manipulate four attributes (1) colour, (2) image, (3) claim and (4) symbol. Each of the attributes contained six or eight levels (see table a1)

<table>
<tr><td>Product attribute</td><td colspan="2">Attribute level</td></tr>
<tr><td>Colour</td><td colspan="2">Red</td></tr>
<tr><td></td><td colspan="2">green</td></tr>
<tr><td></td><td colspan="2">White</td></tr>
<tr><td></td><td colspan="2">Pink</td></tr>
<tr><td></td><td colspan="2">Brown</td></tr>
<tr><td></td><td colspan="2">Blue</td></tr>
<tr><td>Visual imagery</td><td colspan="2">1. Fitness image (family and couple)</td></tr>
<tr><td rowspan="6"></td><td>  </td><td>  </td></tr>
<tr><td colspan="2">2. Natural image (grain and cookie)</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td colspan="2">3. Consummatory image (man and woman)</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td></td><td></td></tr>
<tr><td>Claims</td><td colspan="2">1. Nutrient content claims:</td></tr>
<tr><td rowspan="2"></td><td>Rijk aan vezels</td><td>(fibre) (rich in fibre)</td></tr>
<tr><td>Minder suiker</td><td>(sugar) (less sugar)</td></tr>
</table>

	2. Health claims:	
	Verlaagd cholesterol	(cholesterol) (lowers cholesterol)
	Energie voor de hele dag	(energy) (energy all day long)
	3. Taste claim:	
	Verbeterde receptuur	(recipe) (improved recipe)
	Verbeterde smaak	(taste) (improved taste)
	4. Combined claims:	
	Lekker vetarm tussendoortje	(fat) (a tasty low-fat snack)
	50% minder suiker net zo lekker	(50%) (50% less sugar, as tasty)
Symbols	100% organic 100% natural	
	Stevia (sugar suplement)	
	Green choices symbol: Healthier choices within the product category	
	Blue choices symbol: Conscious choice within the product category	
	EU eco symbol	
	Eko symbol	

Questionnaire

Upon completion of the design task participant was asked to complete a short printed questionnaire (see Annex 1) concerning particular demographic data and information on possible allergies or intolerances of respondents. The questionnaire also included questions about consumer preferences regarding Naturalness, Indulgence, Healthiness and Satiating of cookies. Their preference could be expressed on seven-point scale where 1 meant not at all and 7 very much. The results of packaging designs were saved after completion of both parts of the research (designing + printed questionnaire).

Results of the pilot study

52 respondents started the pilot study of whom 25 were women, (mean age 23.6 years) and 27 men (mean age 22.1 years). We received complete and properly saved designs from 51 participants. One participant handed in only two (healthy and satiating design) out of four (indulgent and natural design were missing) required designs per person. The majority of participants considered good taste (indulgence factor) as an essential preferential factor of biscuits (mean on the seven-point scale is 6.27). This trend occurred for both men (mean = 6.52) and women (mean = 6.04). The least important factor was satiety (mean on a seven-point scale is 4.21). The following chapters will give an overview of the results from the design tasks.

Healthfulness

Table a1 and a2 show the frequencies in which the different levels of our visual and verbal attributes were chosen when constructing a package that is perceived as most natural.

Table a1 Visual attributes on healthfulness

Colour	frequency	Image	frequency
Brown	6	Fitness family	9
Red	3	Fitness couple	30
Blue	17	Consummatory woman	2
Green	23	Consummatory man	1
White	3	Cookie	6
Pink	0	Natural grain	4
No colour	0	No image	0

Table a2 Verbal attributes on healthfulness

Claim	frequency	Symbol	frequency
Lowers cholesterol	2	100% organic 100% natural	8
Energy all day long	6	Stevia	6
Less sugar	4	Choices green	31
Improved Taste	0	Choices blue	5
50% less sugar, same taste	15	Eu eco	0
Improved Recipe	0	Eko	1
A tasty low-fat snack	13	No symbol	1
Rich on fibers	11		
No claim	1		

The packaging that was perceived as most healthful contained the blue colour with a picture of the running couple, the green “Choice symbol" and the reduced fat claim . However, over all data (table a1) consumers most often (44%) choose the green colour instead of blue. Of all images, the fitness couple was perceived as most healthful (58%). Table a2 shows that the combined claim "50% fat, just as tasty" was perceived as most healthfull (30%). The green choices symbol was perceived as most healthful by 60% if the respondents.

3.1.4.2 Indulgence

Table a3 and a4 show the frequencies in which the different levels of our visual and verbal attributes were chosen when constructing a package that is perceived as most indulgent.

Table a3 Visual attributes on indulgence			
Colour	frequency	Image	frequency
Brown	8	Fitness family	1
Red	25	Fitness couple	2
Blue	8	Consummatory woman	30
Green	3	Consummatory man	5
White	1	Cookie	8
Pink	6	Natural grain	4
No colour	0	No image	1

Table a4 Verbal attributes on indulgence			
Claim	frequency	Symbol	frequency
Lowers cholesterol	1	100% organic 100% natural	8
Energy all day long	3	Stevia	2
Less sugar	0	Choices green	6
Improved Taste	21	Choices blue	11
50% less sugar, same taste	2	Eu eco	6
Improved Recipe	17	Eko	5
A tasty low-fat snack	2	No symbol	13
Rich on fibers	3		
No claim	2		

Table a3 shows that the red colour was perceived as most indulgent. 59% of the respondents perceived the consummatory woman image as most indulgent. The Improved taste claim was perceived as the most indulgent claim by 41% of respondents (see Table a4)). 25% of respondents choose the absence of a symbol as most indulgent compared to a product with a symbol.

3.1.4.3 Naturalness

Table a5 and a6 show the frequencies in which the different levels of our visual and verbal attributes were chosen when constructing a package that is perceived as most natural.

Table a5 Visual attributes on naturalness			
Colour	frequency	Image	frequency
Brown	10	Fitness family	3
Red	3	Fitness couple	0
Blue	7	Consummatory woman	2
Green	35	Consummatory man	0
White	5	Cookie	17
Pink	1	Natural grain	29
No colour	0	No image	0

Table a6 Verbal attributes on naturalness			
Claim	frequency	Symbol	frequency
Lowers cholesterol	0	100% organic 100% natural	35
Energy all day long	3	Stevia	6
Less sugar	3	Choices green	0
Improved Taste	0	Choices blue	1
50% less sugar, same taste	5	Eu eco	4
Improved Recipe	4	Eko	5
A tasty low-fat snack	2	No symbol	0
Rich on fibers	28		
No claim	6		

10 out of 51 respondents perceived a package with a colour green, the grain image, the high on fibre claim and the 100% organic, 100% natural symbol as most natural. 25 respondents choose the green colour as most natural. Table a5 shows that 29 respondents perceived the grain image as most natural. Table a6 shows that the high on fibre claim was perceived most natural by 55% of the respondents. 35 out of 55 respondents perceived the 100% organic, 100% natural symbol was perceived as the most natural symbol.

3.1.4.4 Satiety

Table a7 and a8 show the frequencies in which the different levels of our visual and verbal attributes were chosen when constructing a package that is perceived as most satiating.

Table a7 Visual attributes on satiety			
Colour	frequency	Image	frequency
Brown	20	Fitness family	8
Red	22	Fitness couple	7
Blue	1	Consummatory woman	16
Green	5	Consummatory man	3
White	0	Cookie	13
Pink	4	Natural grain	5
No colour	0	No image	0

Table a8 Verbal attributes on satiety			
Claim	frequency	Symbol	frequency
Lowers cholesterol	0	100% organic 100% natural	6
Energy all day long	26	Stevia	5
Less sugar	2	Choices green	7
Improved Taste	1	Choices blue	18
50% less sugar, same taste	0	Eu eco	5
Improved Recipe	3	Eko	4
A tasty low-fat snack	0	No symbol	7
Rich on fibers	19		
No claim	1		

22 out of 52 respondents perceived the red colour as most satiating closely followed by the brown colour. The consummatory image of a woman was perceived as most satiating by 16 respondents. Table a8 shows that the energy all day long claim was perceived as most satiating by 26 respondents. The choices blue symbol was chosen as the most satiating by 18 respondents.

Based on these results the levels of each attribute for the main study were chosen. Two for each visual attribute and three for each verbal attribute. The choice was based to enable contrast in the main study between healthfulness and indulgence. The amount of levels was narrowed down for the main study in order for the design not to become too big. Of 1728 possible attribute combinations 36 remained in the main study.

Appendix b: All Stimuli used in the main study

Appendix c: Stimuli for the common part

	Healthy verbal attributes (claim and symbol)	Non-Healthy verbal attributes (claim and symbol)	No verbal attributes (no claim and no symbol)
Healthy visual attributes			
Visual attributes not healthful symbol			

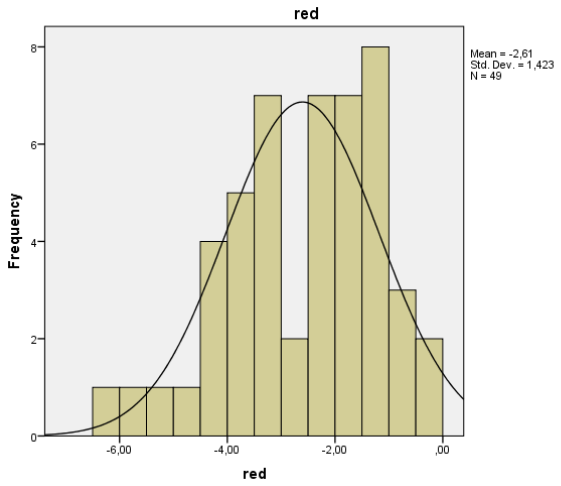
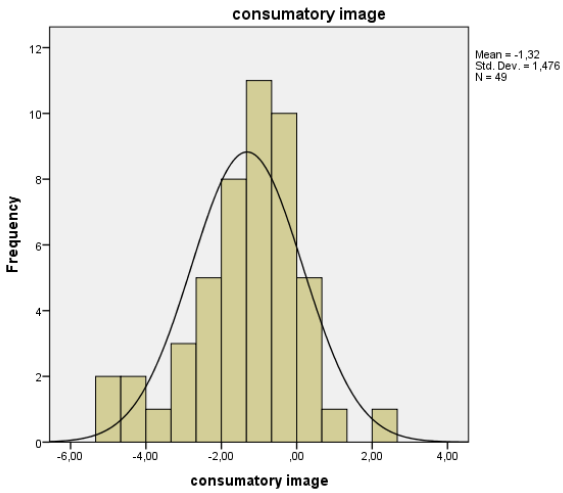
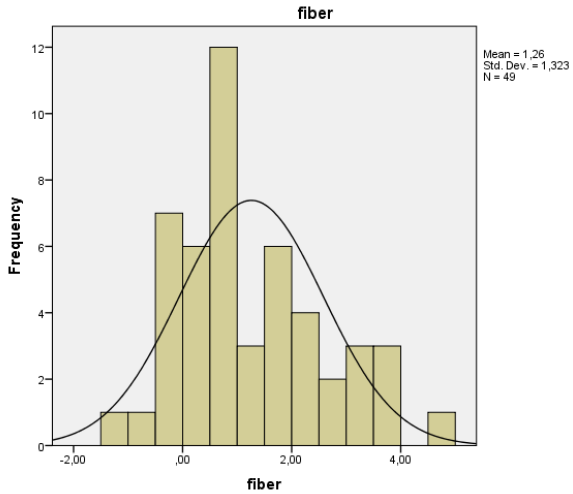
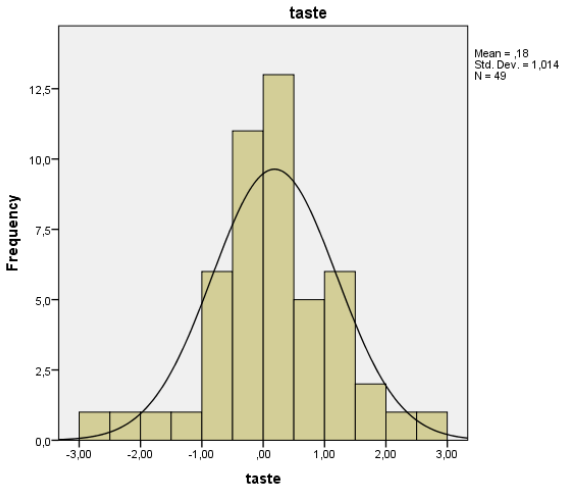
Appendix d: Link to questionnaire

https://wur.az1.qualtrics.com/SE/?SID=SV_0JJq3RluKh7Pobz

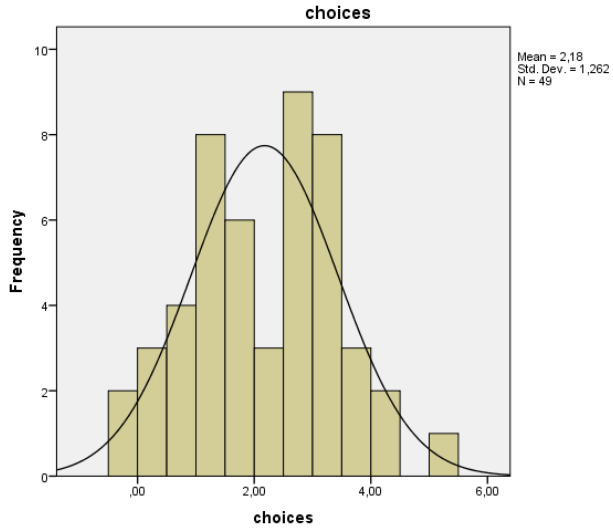
Appendix e: Congruency scale scoring system

	Red	Green	
Colour	-1	+1	
	Consummatory girl	Running couple	
Picture	-1	+1	
	Fiber claim	No claim	Taste claim
Claim	+1	0	-1
	Choices symbol	Organic symbol	No symbol
Symbol	+1	+.5	0

Appendix f 1-7: normality reports

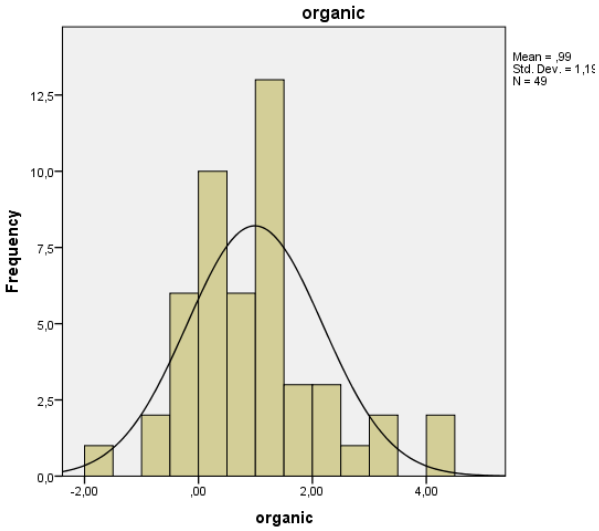
f1. Red colour beta coefficients.	f2. Consummatory girl beta coefficients
	
Although not perfect the data appears the be normally distributed for the beta coefficient of the colour red. The Shapiro-Wilk test supports this finding by rejecting the hypothesis that the data is significantly different from the normal distribution (p=.204). The highest beta for the colour red was -.12 and the lowest -6.31.	Like the colour red, the data for the consummatory girl image appears to be normally distributed. The Shapiro-Wilk test supports this finding by barely rejecting the hypothesis that the data is significantly different from the normal distribution (p=.055). The highest beta for the consummatory girl image red was 2.44 and the lowest -5.27.
f3. Fibre claim beta coefficients.	f4. Taste claim beta coefficients.
	
The data in the histogram for the fibre claim appears to be normally distributed. The Shapiro-Wilk test supports this finding by rejecting the hypothesis that the data is significantly different from the normal distribution (p=.135). The highest beta for the fibre claim was 4.74 and the lowest -1.36.	The data in the histogram for the taste claim appears to be normally distributed. The Shapiro-Wilk test supports this finding by rejecting the hypothesis that the data is significantly different from the normal distribution (p=.381). The highest beta for the taste claim was 2.7 and the lowest -2.53.

f5. Choices symbol beta coefficients.



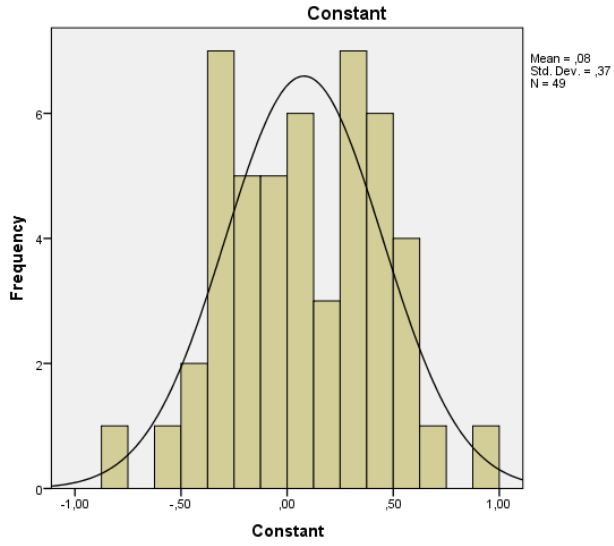
The data in the histogram for the choices symbol appears to be normally distributed. The Shapiro-Wilk test supports this finding by rejecting the hypothesis that the data is significantly different from the normal distribution (p=.832). The highest beta for the choices symbol was 5.45 and the lowest -.53.

f6. Organic symbol beta coefficients.



The data for the organic symbol however are found significantly different from a normal distribution (Shapiro-Wilk p=0.027) The highest beta for the organic symbol was 4.42 and the lowest -1.56.

f7. Constant beta coefficients.



The data in the histogram for the constant appears to be normally distributed. The Shapiro-Wilk test supports this finding by rejecting the hypothesis that the data is significantly different from the normal distribution (p=.857). The highest beta for the choices symbol was .88 and the lowest -.83.