BSc Thesis

A clear distinction between determinance and relevance of food dimensions

Author: Daan van Delden
Registration number: 921113-177-010
Date: 01-07-2015
Chair group: Marketing and Consumer Behaviour (YSS-81812)
Supervisors: Frans Verhees & Ivo van der Lans
Wageningen University

Preface

Presented here my bachelor thesis which provides a clear distinction between determinance and relevance of food dimensions. With this thesis, I will complete my bachelor study Management and Consumer studies.

I would like to thank everybody who has contribution to my thesis. First of all, I would like to thank my supervisor Frans Verhees. Since I had to finish my thesis within seven weeks, we met up every week. Besides that, he gave me feedback when I needed it. At last, I want to thank my friends and family for their support.

Daan van Delden

Wageningen, July 2015

Abstract

Previous study shows that different methods measure different dimensions of attribute importance. (Van Ittersum et al., 2007). In this study different methods are used in order to measure relevant and determinant attributes. First of all, segmentation based on the respondents' personal values and desires when buying an apple show which attributes are considered relevant for the different segments. These attributes are relevant when a customer decides whether to buy an apple or not. However, a false assumption is that these attributes also have significant influence on judgement and choice when the customer has to choose between different apples in the supermarket. Therefore, attributes that are determinant in judgement and choice are also used as segmentation basis. Perception attributes are used as independent variables and regressed against intention to buy in order to estimate the determinant attributes for each segment.

Segmentation based on determinant attributes provides a 2-segment solution. This study shows that the attributes 'fresh' and 'juicy' are highly relevant and determinant for the 2-segment solution. Besides that, the attributes 'hard' and 'crunchy' are considered relevant, however, not determinant in judgement and choice. This means that these attributes do have influence on the decision whether to buy an apple or not, but do not have influence when the customer has to choose between two different apples. Finally, the attribute 'sour' scores low on relevance, but is determinant in judgement and choice. When the respondents thinks about whether to buy an apple or not, sourness does not have influence on making that decision. However, when he or she has to choose between different type of apples in the supermarket, sourness influences judgement and choice.

In further research it is interesting to find out what the exact value of relevant and non-determinant attributes is. Previous research shows that brand awareness has significant positive impact on consumers' buying intention. (Aaker & Keller, 1990) However, there is no consensus about which attributes have significant impact on brand awareness. When research is conducted on this topic, one can conclude what the exact value of relevant attributes is.

Table of Contents

1. Introduction

It is important to understand the diversity of consumer preferences for different marketing activities. This in order to determine what products to offer, what prices to charge and how products should be promoted and delivered. This has been one of the greatest challenges in market and consumer research. (Onwezen, Reinders, et al., 2012)

The diversity in preferences between consumers for a certain product has traditionally been the basis for segmentation. The existence of this diversity in preferences between consumers suggest a need for development of market segmentation strategies. It is more profitable to treat market segments in different ways than to treat them all the same. (Block, Uncles, 2002). Since consumers differ in terms of importance they attach to different benefits provided by products and services, these differences provide a justification for segmentation. (Haley, 1968, Haley, 1971).

It is a key objective to obtain and identify these important product attributes. There are multiple methods that measure the importance of attributes. However, the basic assumption is that attribute importance is a unidimensional concept that can be measured with different methods. This assumption leads to a lack of convergent and nomological validity that exists among the ten most common methods for measuring the importance of attributes in behavioural science. (Van Ittersum et al., 2007)

There are three different dimensions of attribute importance, these are: salience, relevance and determinance. With the classification of these different dimensions there is a substantial increase in convergent validity and discriminant validity. (Van Ittersum et al., 2007). A comparison of relevance and determinance reveals four general attribute categories. The attributes within these four categories are considered important for different reasons. (Milkulic, et al., 2012)

Furthermore, there is no consensus about the value of relevant but non determinant attributes, such as sustainability. Previous study shows that organizations who wish to contribute to sustainable development is proved to be an element which influences consumers' brand awareness. (Mattera et al., 2012). It is also shown that the higher the brand awareness, the higher the purchase intentions (Aaker & Keller, 1990) This means that there should be a direct positive link between sustainability and consumers' intention to buy. However, there is a gap between favourable attitude towards sustainable behaviour and behavioural intention to purchase sustainable products. (Vermeir & Verbeke, 2006)

The aim of this study is to provide a clear distinction between relevant and determinant apple attributes. At last, this study provides relevant attributes that may have influence brand awareness and therefore the overall buying intentions from consumers.

2. Literature

In the first section, benefit segmentation, pitfalls in benefit segmentation and the different evaluation criteria in segmentation are discussed. After that, taste perception is discussed, followed by an explanation of the different dimensions of attributes and the four general attribute-categories. These categories are used in this study in order to show why and when attributes are important in marketing activities, although they score low on relevance or determinance. Besides that, brand equity, brand awareness, brand association, perceived quality, brand loyalty and its relation to purchase intentions is discussed. Finally, the impact of environmental orientation on brand awareness is discussed.

2.1 Benefit segmentation

Indications for marketing strategy from an increased understanding of the market structure is used as a starting point for segmentation. There are several segmentation methods, the choice of the most suitable one is crucial in determining the market segments. (Frochot et al., 2000)

However, traditional segmentation has many limitations. Psychographic and general attitudinal approaches are less helpful in deriving effective marketing strategies. Therefore, benefit segmentation is the preferred technique for understanding the market, product positioning, introduction, pricing, advertising and distribution. (Wind, 1978)

Benefit segmentation is an approach whereby it is possible to identify causal factors, rather than only descriptive factors. Benefits in consuming lead to the existence of true market segments. This type of segmentations has a higher predictive value in buying behaviour than traditional segmentation methods. Marketers should focus on benefits sought by consumers as a primary source of purchasing behaviour. (Haley, 1971) Besides that, benefit segmentation provides a more clear picture of consumers, since this type of segmentation is also able to profile the segments. This by using different descriptive variables, such as geographies, demographics and other factors. (Frocot, et al., 2000)

The different segments are identified by the benefits they seek. However, the total configuration of benefits sought differentiates the segments. Individual benefits will likely have appeal for multiple segments. Individuals prefer as many benefits as possible. However, the relative importance they attach to individual benefits can differ significantly. These differences in relative importance can be used as an effective lever in segmenting markets. (Haley, 1968)

The benefit segmentation approach rarely fails to provide new insights to the market. A number of relatively homogeneous groups are uncovered when benefit segmentation is used. The description of homogenous groups in terms of average are more meaningful and suitable as marketing guides. (Haley, 1968)

2.1.1 Benefit segmentation pitfalls

There is no single approach that is appropriate to segment all markets. The specific competitive structure and environment determine the most suitable approach. Markets need to be analysed carefully to insure that approaches relevant from a marketing standpoint are considered. (Young et al., 1978)

In previous studies, benefit segmentation is from a marketing standpoint the most suitable for segmentation. It facilitates product planning, positioning, advertising communications and many other factors. However, benefit segmentation is not always suitable in marketing (Young et al., 1978). Benefit segmentation could be irrelevant in several important situations, three common situations are described below.

Some markets are segmented into traditional price lines, all marketing activities are based on those price levels. For many product categories, the market size for a particular price line is too low to permit further segmentation. This is the case for products such as, clothing, cosmetics and automobiles. (Young et al., 1978)

The occasion of purpose for which the product is used determines the benefits desired. When it comes to clothing, occasion of purpose is of high influence. Desires could vary in different occasions, Kingsday in the Netherlands for example. Orange clothing is of high importance around these days, while in other occasions this may be unimportant. In this case consumer desires must be segmented on the basis of usage occasion. This type of segmentation is necessary to derive the competitive framework in order to provide meaningful information. (Young et al., 1978)

The style or appearance of the product is the overriding criterion of success. Styling preference segmentation is necessary in order to market a successful line of styles to each segment. This is the case when fashion appeal is the major consideration in marketing success. Examples of style oriented lines are furniture, silverware and fashion accessories. (Young et al., 1978)

2.1.2. Evaluation criteria segmentation; identifiability, substantiality, accessibility stability, responsiveness and actionability

For the valuation of market segmentation the marketing literature has put forward six criteria: identifiability, substantiality, accessibility, stability, responsiveness and actionability.

Identifiability means that segments can be distinguished from each other on the basis of information that is obtained objectively and easily. Customers in each segment need to be identified easily on the basis of variables. (Van der Zanden et al., 2014)

Substantiality means that the targeted segments represent a large enough portion of the market to ensure the profitability of targeted marketing programs. Substantiality is closely related to the marketing goals and cost structure of the firm in question. (Wedel & Kistemaker, 2000) However, the criterion of substantiality may be applied to each individual customer. The purpose is to target each individual customer who produces marginal revenues that is greater than the marginal costs of the firm. (Van der Zanden et al., 2014)

Accessibility means that targeted segments can be reached with marketing efforts through multimedia or in a store in such way that it is not too costly. It is the degree to which managers are able to reach the targeted segments through promotional or distributional efforts. Media profiles, which are based on demographics, provide information on how marketers can access segments. (Van der Zanden et al., 2014)

Responsiveness indicates that segments respond uniquely to marketing efforts targeted at those segments. Differentiated marketing mixes will be effective when each segment is homogeneous and unique in its response. Besides that, it is not sufficient for segments to react to price change and advertising campaigns, they should react differently in order to prevent price discrimination. (Wedel & Kistemaker, 2000)

Segments that are stable for at least the time that the marketing efforts takes place in terms of size, behaviour or consumer membership, are considered as stable. (Van der Zanden, et al., 2014) If the segment, to which a particular marketing effort is targeted, changes during the implementation, the effort is unlikely to succeed. (Wedel & Kistemaker, 2000)

Segments are actionable if their identification provides instructions for the development of marketing efforts within the scope of a company's capabilities. This criterion is different from the responsiveness criteria, since that only states that segments should react uniquely. The customers in the segments and the marketing mix – which is essential to satisfy the customers' needs - need to be consistent with the goals and the core competencies of the firm (Wedel & Kistemaker, 2000)

2.1.3. Benefit segmentation variables

Food choice motives are determined by product benefits which arise from product attributes. These food choice motives are more general consumer motives, whereas the attributes and benefits together often differ across different types of food. (Van der Zanden et al., 2014)

As described earlier, the fact that consumer seek differences in benefits provides a justification of why market segments exist. General consumer population in the functional food market have been segmented on the product attributes and benefits they seek. (Van der Zanden et al., 2014)

Besides food-specific attributes, such as "functional ingredients", these functional foods may differ on a range of general product attributes. Some examples are product price, brand and packaging. These attributes also contribute to the benefits of a specific product. The total configuration of benefits sought that differ between segments results in unique responsiveness. (Van der Zanden et al., 2014)

Segments based on product attributes and benefits sought are actionable. They can directly be translated into marketing efforts and product design. For example by highlighting certain benefits and using particular carrier-ingredient combinations. (Van der Zanden et al., 2014)

However, identifiability is limited since consumers often do not exactly know why they do or want to purchase a certain product. Instead, researchers usually let participants evaluate different product formats. After that, a statistical method is used to derive the attributes and benefits sought. (Van der Zanden et al., 2014)

Segments based on product attributes and benefits sought are substantial, only moderately stable. Sought attributes and benefits are linked to food choice that are most important at the time of food choice. However, these motives vary across different situations and over time. When these attributes and benefits sought are measured for a specific context, these segments may be stable. (Van der Zanden et al., 2014)

In addition, products and attributes sought cannot always be directly linked to specific demographics, this means that it provides little information on the accessibility of segments. (Van der Zanden, et al., 2014)

2.2 Taste perception

When consumers make decisions about food, taste of food products is very important. (Sjitsema et al., 2012) The five basic tastes of taste are: sour, sweet, salty, bitter and umami. The most important tastes for consumers in their preferences are sweet and sour. (Centre, 1997). Furthermore, the texture attributes 'hardness' and 'juiciness' are important as well. (Harker et al., 2002) Previous study has also shown that mealy apples is considered to be a negative quality attribute, thus less preferred by consumers. (Jaeger et al., 1998). Odour and taste are considered to be the most important attributes when the food is consumed, and therefore the most important sensory attributes. (Blair, 2012) Tastiness, juiciness, sweetness and freshness are considered to be the most important factors in consumer decision making. An apple is perceived as tasty when it is juicy, sweet, fresh and not mealy or sour. (Timmermans, 2014)

2.3 Dimensions of attributes

There is no single definition of attribute importance. Instead, attribute importance is a multidimensional concept. This means that different methods measure different dimensions of attribute importance. Although there is a wide variety of methods that is used to measure attribute importance, there is lack of validity among those methods.

The convergent validity and nomological validity of different methods that occur is frequently low. (Jaccard et al., 1986) Convergent validity identifies whether different measurements reflect the same construct. This means that if measures are expected to measure the same concept, do in fact, measure the same concept. Nomological validity examines whether measures are related to other constructs in a theoretically meaningful way. This represents constructs that seem to have a relation without being directly related to each other. (Van Ittersum et al., 2007)

As described earlier, one of the key determinants of the lack of validity is the multi-dimensionality of attribute importance. A distinction between these different dimensions of attribute importance leads to an increase in convergent and nomological validity among the ten most common methods used in behavioural science. These three dimensions are: salience, relevance and determinance. (Van Ittersum et al., 2007)

Consumer researchers are concerned with how consumers perceive and make decisions among products and brands. They are interested in the specific attributes or product characteristics that consumers perceive as more "salient". (Olson, et al., 1979) Salience is about internal attribute importance and is largely determined by the accessibility of attribute information in people's memory. (Alba et al., 1991). It is about how easy an attribute comes to mind when seeing, or only thinking about the object. Salience of an attribute is measured by an open ended question to let people specify which attributes they believe are important. It has to do with the order of elicitation of product/service features that are perceived as more "important" by consumers. Salient attributes are considered more important than non-salient attributes (Steenkamp & Van Trijp, 1997) Salience only has market implications when the attribute information is available in customers' memory during the decision process. (Klopčič et al., 2013)

Relevance is largely based on personal values and desires, and is measured by directly asking people to judge the relevance of attributes. In this study, via a direct rating method that asks individuals when they buy an apple, how desirable is it that for example the apple is expensive (1 = very undesirable to 5 = very desirable). Relevance is positively related to determinance, which means that relevance has implications for marketing planning. Relevance is important when consumers decide whether to buy or not to buy at all. When a customer thinks about eating something healthy, he could decide to buy an apple. However, when the customer is in the supermarket the attribute 'healthy' is not determinant in judgement and choice, since all apples are equal in healthiness. Besides that, relevant attributes identify opportunities for attribute levels that are outside the range of existing attribute levels. (Klopčič et al., 2013) When the attributes of a product are seen as more relevant, which means high in value or desires, it is considered as being more important than products that are not relevant. (Van Ittersum et al., 2007)

Determinance represents external attribute information, which implies attributes and attribute-level information. Whereas relevance is only about attributes that are provided, determinance is also about the attribute-level that is provided. It signifies the influence of a specific attribute level on the

overall liking for a specific product of object. (Van Ittersum et al., 2007) It is assumed that the relationship between relevance and determinance is high, since relevance positively affects determinance. (Alpert, 1971) However, determinance is not only influenced by its relevance, but also influenced by manifestations of attribute-performances within a certain investigated research setting. (Mikulic et al., 2012) Attribute-level information frames the participants when they respond to questions concerning attribute-importance. The larger the differences in attribute-levels, the more determinant an attribute becomes. The more determinant an attribute is, the more important compared to a non-determinant attribute. (Van Ittersum et al., 2007) Determinance has the most clear implications for marketing planning because it is closely related to consumer behaviour. It is mostly important when consumers need to decide between two products, which means important for a product's competitive position in the market. (Klopčič et al., 2013)

2.3.1 Four general attribute-categories

In order to understand the four different general attribute-categories, which will be used within this study, a brief explanation of these categories is described below. (Mikulic & Prebezac, 2012)

The "higher-impact core attributes" are attributes that score high on relevance and determinance, which means they score high on personal values and desires, but also influence actual judgement and choice. Management should mainly focus on this category, since it would lead to the highest general priority in improvement strategies. (Mikulic & Prebezac, 2012)

Secondly, the lower-impact core attributes are the attributes that are perceived as being very relevant, but they score low on determinance. This means they have a low influence on judgement and choice. However, under-performance towards typical levels of performance for these specific attributes may result in a strong competitive disadvantage. These attributes might have a strong negative impact, that is why these attributes need to be treated with particular care. The attribute 'sustainability' could be an example. At first, consumers only buy an apple since it is cheaper than the other apples. The attribute "price" is determinant for the consumers. However, when the consumers realizes that the cheap apple is non-sustainable, he or she could decide to not buy that apple anymore. At first, sustainability was not determinant in choice, however, it became highly determinant in a negative way. (Mikulic & Prebezac, 2012)

Thirdly, higher-impact secondary attributes are perceived as being less relevant in consuming than the core/product services as described above. However, they do have a strong influence on

judgment and choice. These attributes are usually part of the augmented product/service. They score high on determinance, but low on relevance. When only using methods which measure the attribute-importance according to relevance, these attributes will be underestimated. (Mikulic & Prebezac, 2012)

Finally, lower-importance attributes score both low on determinance and relevance. This means they score low in personal values and desires, including judgment and choice. The attributes usually have lower priority in improvement strategies than the attributes categories which are described earlier. (Mikulic & Prebezac, 2012)

2.4 Brand equity

Brand equity is defined as a set of brand assets and liabilities linked to a brand, name and symbol. It adds to or subtracts from the value provided by a product or service to the firm's customers. When a consumer is familiar with the brand and holds some favourable, strong and unique brand associations this leads to customer-based brand equity. (Chen et al., 2010) Consumer-based equity is defined as the differential effect of brand knowledge on consumer response to the marketing of the brand. Knowledge includes brand awareness, which means brand recall and recognition. Brand image incudes types, favourability, strength and uniqueness of brand associations. The different dimensions of brand equity, which are brand awareness, brand associations, perceived quality and brand loyalty are described below. (Chen et al., 2010)

2.4.1 Brand awareness

Brand awareness refers to whether consumers can recall or recognize a brand, or whether a consumers knows something about a brand (Keller, 2008). It is a key determinant in almost every brand equity model. Consumers may link the related brand knowledge to the brand name, which finally leads to brand value (Aaker, 1991 & Keller, 1993) This leads to a kind of learning advantage for the brand, which affects consumer decision-making. Brand awareness could be used as a heuristic, which increases brand market performance. Brand awareness significantly impacts consumer decision-making: when a brand is known it has a much better chance of being chosen by a consumer over an unknown brand. (Hoyer and Brown, 1990). This well-known brand performs better in the marketplace than brands which are less known. This means that there is a positive relationship between brand awareness and consumers' buying intentions.

Conclusively, previous studies suggest that brand awareness has a positive association with desirable market outcomes, such as sales and market share. Besides that, there is also a positive association between brand awareness, customer mind-set brand equity and brand equity market outcome measures. (Choi, 2014)

2.4.2 Brand associations

Brand associations represent the basis for purchase decision and brand loyalty. It is therefore the most accepted aspect of brand equity. Brand associations consist of all brand-related thoughts, feelings, perceptions, images, experiences, beliefs and attitudes. (Aaker, 1992)

2.4.3 Perceived Quality

Perceived quality is considered as added value of a product. It is defined on the basis of users' recognition while objective quality is defined on manufacturing orientation or on basis of the product. The perceived quality is determined by internal and external attributes which is an evaluation basis for consumers (Olshavsky, 1985 & Zeithaml, 1988). It is different from real quality since a previous bad image of a product will influence consumers' judgement on product quality in the future. Even though the quality has changed, consumer will not trust that product because of their bad experiences in the past. (Aaker, 1996) Furthermore, manufacturers and consumers do not have the same view on judgement of quality dimensions. (Morgan 1985 & Aaker 1996) Finally, consumers rarely hold enough information to evaluate a product objectively. When consumers do have enough information, they can be insufficient in time and motivation to do a further judgment. In the end they are only able to select little important information and make an evaluation on quality. Conclusively, perceived quality is a consumer's subjective judgement on product quality, based on previous experiences and feelings. (Chi et al., 2011)

2.4.4 Brand loyalty

Brand loyalty is defined as a consumers' attitudes based on a brand preference from previous use and shopping experience of a product. It can be measured on repurchase rate on the same brand. Brand loyalty represents repurchase behaviour, and loyalty attitude means the psychological commitment to a brand. True brand loyalty can only be derived when consumers are inclined to these two factors. It can be called a spurious brand loyalty if only attitude or behaviour factors are found (Baldinger & Rubinson, 1996). Previous study states that action loyalty and affective loyalty are positively related to purchase intention. (Aaker & Keller, 1990)

2.4.5 Relation between Brand awareness, Perceived Quality, Brand loyalty and Purchase intention

Previous studies shows that the higher the brand awareness is, the higher the perceived quality is. (Monroe, 1990; Dodds and Grewal, 1991; Wall, Liefeld, & Heslop, 1991; Lo, 2002;
Lin, 2006) Besides that, brands with high awareness and good image can promote brand loyalty to consumers. The higher the brand awareness, the higher the brand trust and purchase intentions. (Aaker & Keller, 1990) Brand awareness has the greatest total effect on brand loyalty. (Peng, 2006) Consumers will have higher purchase intention with a familiar brand (Kamins & Marks, 1991). A product has a higher market share and better quality information if it has high brand awareness. Besides that, a well-known brand will have higher purchase intentions than a brand that is less known (Hsu, 2000). At last, the higher the perceived quality and perceived value of the brand, the higher the buying intention from consumers. (Ho & Lee, 2007) Conclusively, brand awareness, perceived quality and brand loyalty all have a positive influence on purchase intention. Besides that, all these three concepts are strongly interrelated.

2.4.6 Environmental orientation in relation with brand awareness

Previous research shows that social and environmental concerns, stated as sustainability, leads to a greater level of importance in consumers' product choice and supplier selection decisions. (Cleveland et al., 2005). The ecological environment is likely to be at or near the list of social concerns. In order to retain and acquire such customers, more cooperation will shift towards a societal marketing concept. This means that the organization will seek to meet the needs of its target markets more effectively and efficiently than its competitors, as well as maintaining and improving both customers' and society's well-being. (First et al., 2010) Previous studies also shows that better environmental performance would provide firms with a reputational advantage. (Klassen & Mclaughlin, 1996; Sharma & Vredenburg, 1998). From a business' perspective there is a large degree of consensus regarding the potential business impact of sustainability on brand image. However, most companies are not acting decisively or are falling short on execution. (Berns et al., 2009). Furthermore, sustainable development is also proved to be an element influencing consumer's brand awareness. Besides that, sustainable development is evidenced as influential of consumers' loyalty and high perceptions. (Mattera, 2012)

According to these previous studies, sustainability leads to an improved brand awareness and brand image. An improved brand awareness and brand image consequently leads to more consumer purchase intentions. This suggests that an increase in branding sustainability would lead to higher

purchase intentions. However, previous research also shows that most consumers claim to consider sustainability issues as important and desirable, however, this does not translate into sustainable consumer behaviour. What people say is important is not always a good predictor of which attributes determine their food choice. (van Dam et al., 2013) Therefore there is reason to believe that there is little impact of the consumer perception of environmental orientation on brand value and thus purchase intentions. (First et al., 2010) Conclusively, the question is what the value of an attribute as sustainability is. Sustainability is seen as an attribute that scores high on value and desires, which means is relevant, but does not determine actual food choice. This means it is an attribute that is not determinant in judgement and choice. There is no consensus about the exact value of relevant, but non-determinant attributes such as sustainability. The question is whether these type of attributes have influence on brand awareness. When these attributes do have significant impact on brand awareness, under-performance of the attributes could lead to marketing failures. In order to investigate whether these relevant but non-determinant attributes have influence on brand awareness, a distinction between relevant and determinant attributes must be made.

3. Methodology

3.1 Data collection and sample used

Most of the sample are students from Wageningen University between 18 and 26 years old. Data consists of 125 respondents and measurement took place in a time period of five days, Monday till Friday. Since 98% of the respondents are students, this study is only representative for students. (Rodenburg, 2015)

3.2 Design of research

With aid of the online survey tool 'Qualtrics' a questionnaire is designed, the questionnaire can be found in the Appendix. (Rodenburg, 2015)

3.3 Measures

The questionnaire, considered six different apple available in the Netherlands: Kanzi, Elstar, Jonagold, Junami, Pink Lady en Royal Gala. Respondents were questioned about: 1) The relevance given to attributes when buying an apple; 2) Their perception of the apples' attributes; 3) The intention of buying the apples within two weeks. The questionnaire also asked some socio-economic information as gender, age and country of origin. (Rodenburg, 2015)

3.4 Procedure

The questionnaire starts by asking which of the six apples included in the research the respondent already buys. After that, the values and desires of the respondent when buying an apple is asked. After filling in the questions about the values and desires, the respondent receives the first out of six apples. The respondent receives a slice of the apple in order to measure the perceived quality, which is based on texture and flavour. Then buying intention is asked to the respondent. The process is repeated until the respondents judged all six different apples included in the research. (Rodenburg, 2015)

3.5 Relevance of apple attributes

The relevance of the respondents was measured by asking the respondents their relevance given to attributes when buying an apple. They were asked to answer on a five point-scale having “very undesirable” and “very desirable” as extremes. The question was: When you buy an apple, how desirable is it that apple is (for example) expensive?” By asking this, the values and desires of the respondents are estimated. The most relevant score is the highest in values and desires for the different segments. (Klopčič, et al., 2013) This type of measurement allows to make direct comparisons about the relevance of the different apple attributes between and within the different segments.

3.5.1 Analyse relevance

A cluster analysis will be conducted, in order to create homogeneity within the clusters and heterogeneity between the clusters. (Sclove, 2001). This in order to find out what the relevant attributes between and within the segments are.

First of all, the principal component analysis is conducted. A principal component analysis is mainly used in order to replace correlated variables by a smaller number of uncorrelated variables. If six variables are highly correlated with each other, the component which is constructed, highly correlates with all these six different variables. Based on the eigenvalue, plus the total variance explained, the amount of factors will be determined. The eigenvalue should be larger than 1, the variance explained should be larger than 50%. (Rodenburg, 2015)

The second step in this cluster analysis will be a hierarchical cluster analysis, which starts from N clusters to 1 overall cluster. A cut-off level of 10% based on the agglomerative table of the hierarchical cluster analysis is used. In the hierarchical cluster analysis there are clusters closest to each other that are combined, these cases are called ‘trapped’. In order to create more homogeneous segments a non-hierarchical cluster analyses is used. The number of clusters and centroids of the hierarchical cluster analysis are used as input for the non-hierarchical cluster analysis. (Rodenburg, 2015).

The Ward Method is used, which chooses the object which creates the smallest degree of variance possible in each cluster. When using the Ward method, the data must be checked on outliers, since the analysis otherwise would be inefficient (Sclove, 2001)

The next step is analysing the differences between segments upon attributes that score high on relevance. These attributes are: green, red, cheap, expensive, round, cylindrical, tasty, Dutch apple, import, sweet, fresh, sour, hard, juicy, crunchy, mealy, big and small. By mapping different mean scores on relevance of attributes per segment, segments distinguish themselves on the basis of relevant attributes. A post hoc multiple comparisons test is conducted in order to see whether the differences in relevant attributes between different segments are significant.

3.6 Determinance of apple attributes

3.6.1 Choice of attributes

Perceived quality for a certain apple is measured with eight perception attributes. These perception attributes, which are based on texture and flavour, are: sour, fresh, mealy, crunchy, hard, sweet, juicy and tasty. Since the attribute 'tasty' most probably will have a high positive impact on 'intention to buy' for each segment, it is left out the dataset when measuring determinance. The assumption is made that every segment finds tastiness determinant in judgement and choice.

Perceptions were measured by asking respondents to rate on a five-point scale with "strongly disagree" and "strongly agree" as extremes. This in order to evaluate whether the respondents think that apples offer the considered apple attribute. The perceptions reflect how the respondents view a certain attribute level. After completion on the questions about perception of the different apples, the respondents are asked to rate their intention to buy of that specific apple within two weeks. Their intention to buy was measured using the 11 point Juster scale, in which 1 = No Chance. "Almost no Chance (1 out of 100 times) and 11 = "Certain, practically certain (99 out of 100 times). The perception attributes are used as independent variables and regressed against the dependent variable intention to buy. By doing this, it allows to make comparisons about the determinance of the different apple attributes between and within the different segments.

3.6.2 Measure determinance

At first, SPSS is used in order to find out which attributes are determinant in judgement and choice for the different segments. However, this is an intermediary step. The segments that are created are based on the respondents' relevance given to apple attributes. The perception attributes are used as independent variables and regressed against intention to buy for each segment. A multiple regression is used in order to find out which attributes have significant impact on intention to buy. The regression coefficients show how big the impact of an attribute is on intention to buy. By using this procedure, one can conclude which attributes are determinant for the different segments. Since the segments are based on relevance given to apple dimensions, results need to be interpreted with caution.

Secondly, Glimmix is used to determine an optimal number of segments. In this case, segmentation is based on attributes that are determinant in judgement and choice, thus based on determinance given to apple attributes. The optimal number of segments needs to be determined. By re-estimating the model ten times with different starting values the risk of choosing sub-optimal solutions is limited. The best solution is the one having the lowest Consistent Akaike's Information Criterion value. After the optimal amount of segments is estimated, the regression coefficients show how big the impact of an attribute is on intention to buy for a specific segment. The T-value shows whether the impact of the specific attribute is significant. This procedure allows to compare the attributes within and between the different segment. The attribute with the highest regression coefficient is the most determinant for that specific segment.

The difference between the multiple regression used in SPSS and latent-class analysis used in Glimmix is that segmentation is based on determinant attributes in Glimmix and based on relevant attributes in SPSS.

3.7 Comparison between relevance and determinance

Conclusively, most probably there will be a difference in optimal segments when using relevance or determinance as a segmentation basis. This because relevance and determinance measure two different dimensions. In order to make direct comparisons between relevant and determinant attributes for a specific segment, a cross tabulation will be created. The cross tabulation shows to which segment a respondent belongs, both the segment based on relevance and the segment based on determinance. Besides that, a chi-square test is used in order to determine whether there is correspondence between the segmentation based on relevance and the segmentation based on determinance.

4. Analysis

4.1 Analysis Relevance

The principal component analysis reduced the amount of variables from 18 to 7 factors, all 7 factors explain 66.1% of the data. Besides that, all factors have an eigenvalue above 1. There are six significant clusters found by using a cut-off level of 9% based on the agglomerative table of the hierarchical cluster analysis, based on the seven factors. The input of hierarchical clustering is used as input for the non-hierarchical cluster analysis. The non-hierarchical cluster analysis has constructed six new heterogeneous clusters. (Rodenburg, 2014)

When measuring relevance scores it is important to make a distinction between relevance scores between segments, and relevance scores within a segment. It could be possible that an attribute scores relatively high on relevance between the segments, but has a low score within that particular segment. Below a distinction between the different segment is made, based on relevance scores between the segments. However, it is necessary to test whether these scores are significantly different than the scores in other segments .

First of all, it interesting to find out which relevance attributes score the lowest and highest within the different segments. Then we are able to conclude what attributes are considered most relevant for the segments. After that, it is necessary to find out which relevance attributes score the highest on relevance between the different segments.

In order to conclude whether the differences in relevance scores on attributes between segments are significant, a post hoc multiple comparisons test is used. Below the segments are described according to the difference in relevant attributes between the segments.

Segment 1; Harvested in the Netherlands, sour and not mealy
Segment 2; Red, Green, Not Cylindrical but round, Very Fresh, Hard and not mealy apple
Segment 3; Not green, Red, Not sour, Sweet, Big. Imported
Segment 4; Not too hard, Not too crunchy, Colour does not matter, Small apple.
Segment 5; Cheap, small and crunchy apple, Country of origin does not matter
Segment 6; Big apple, Willingness to pay more. (Rodenburg, 2014)

Table 1: Mean relevance scores per segment on desirability of an attribute when buying an apple

		Segments					
		1	2	3	**4**	**5**	**6**
Green #2	Sig. 0.000	**2.59**	**3.50**	**1.67**	3.00	**2.91**	3.10
Red #2	Sig. 0.000	**4.33**	**4.50**	4.33	**3.00**	**2.36**	**3.38**
Cheap #5	Sig. 0.000	4.09	**3.80**	4.28	**3.80**	**4.38**	**3.24**
Expensive #6	Sig. 0.000	**1.59**	**1.80**	**1.78**	2.30	**1.44**	**2.52**
Round #2	Sig. 0.004	**2.77**	**3.80**	3.28	**3.15**	**2.97**	**3.19**
Cylindrical #5	Sig. 0.000	**2.73**	**1.70**	2.94	2.85	**2.97**	2.95
Tasty #1	Sig. 0.000	**4.95**	**4.50**	4.89	**4.50**	4.94	4.81
Dutch apple #1	Sig. 0.000	**4.18**	**3.60**	**3.56**	**3.25**	**2.85**	**3.05**
Import #3	Sig. 0.000	**1.68**	**2.40**	**2.83**	2.60	2.82	2.81
Sweet #3	Sig. 0.009	**3.64**	4.20	**4.22**	3.90	4.18	**3.57**
Fresh #2	Sig. 0.000	4.64	**4.90**	**4.33**	**3.90**	4.76	**4.29**
Sour #1	Sig. 0.001	**3.27**	2.50	**1.83**	2.75	**2.56**	3.10
Hard #2	Sig. 0.000	4.18	**4.40**	**3.22**	**2.85**	4.18	4.05
Juicy #2	Sig. 0.031	**4.09**	**4.70**	4.17	**3.90**	4.47	4.14
Crunchy #5	Sig. 0.000	4.32	4.40	**4.32**	**3.45**	**4.50**	**4.05**
Mealy -	Sig. 0.742	1.55	2.00	1.72	2.00	1.74	1.62
Big #3	Sig. 0.000	**2.86**	**3.10**	**4.00**	**2.45**	**2.85**	3.95
Small #5	Sig. 0.000	3.00	3.50	**2.28**	**3.55**	**3.55**	**1.86**
N = 125		22	10	18	20	34	21

*1= Undesirable 5 = Very desirable

The '#' represents a specific segment. The attribute 'tasty' for example scores the highest on relevance - compared to other segments - in segment 1. This means that the attributes 'tasty' and 'Dutch apple' score the highest on relevance for segment 1 in comparison with other segments. The difference in **bold between a particular segment represent statistical differences in relevance scores between the segments. For segment 1 again, the attribute 'tasty' differs statistically with segment 2 and 4, and does not differ significantly with segment 3, 5 & 6. That is why the mean scores for the attribute 'tasty' are not bold for segment 3, 5 & 6.

Scores above 4, which means an attribute is desirable when buying an apple, are considered relevant. Table 2 shows that tastiness scores above 4.5 for each segment. This means that this attribute is highly relevant for each segment. However, there are significant differences in relevance for tastiness (see Table 1). Besides that, freshness, juiciness, crunchiness are also considered as relevant for almost all segments. Only segment 4 has a score which is lower than 4. Since all these attributes score high in every segment, or at least five segments, these are relevant attributes.

Furthermore, the question is whether there are significant differences between the segments according to the relevance attributes. In the table below, for all attributes there are significant differences (Sig. < 0.05). However, for the attribute “mealy” there are no significant differences in scores between the segments. It is interesting to find out whether the relatively high scores on relevance between the segments differ significantly. When these relevant attributes between segments do not differ significantly, it is impossible to conclude that the particular attribute is the reason for the difference in segments. Attributes that score relatively the highest between the segments are considered relevant as well.

Table 1 shows that segment 1 has a significant difference in relevance for Dutch apples with all segments. The assumed difference in relevance for tastiness is only significant for segment 2 and 4. The assumed difference in relevance for sourness is only significant for segment 3 and 5. All segments prefer apples that are not mealy, there are no statistical differences.

Segment 2 scores both high on relevance for green and red apples, they prefer both colours. For the green apple there is a difference in relevance with the segments 1, 3 and 5. For the red apple with the segments 1, 4, 5 and 6. Besides that, there is a significant difference in relevance for an apple to be fresh with segment 3, 4 and 6. For the attribute hard, only segment 3 and 4 differ in relevance with segment 1.

Segment 3 scores high on relevance for red apples. The high score on relevance differs significantly with the segments 1, 4, 5 and 6. The high scores on relevance for big apples differ with the segments 1, 2, 4 and 5. The relevant attribute ‘sweet’ differs significantly with the segments 1 and 2.

Segment 4 has a significant difference in relevance with all segments for the attribute ‘crunchy’. The attribute ‘crunchy’ scores low on relevance, where the attribute ‘small’ scores high on relevance. There is a significant difference in relevance for small apples with the segments 1,3,5 and 6. At last, the attribute ‘hard’ scores low on relevance in segment 4. There is a significant difference in relevance for hard apples with segment 1,2,5 and 6.

Segment 5 scores the highest on the relevant attribute ‘cheap’, however, there is only a significant difference in relevance between segment 2,4 and 6. Segment 5 also differs significantly with segment 3,4 and 6 on relevant attributes as ‘crunchy’ and ‘small’.

Segment 6 scores relatively high on relevance for the attribute ‘expensive’, and differs significantly with segment 1,3,4 and 5. Besides that it scores low in relevance for small apples, these scores differ significantly with segment 1,2,4 and 5.

Conclusively, the segments that are created according to the relative mean scores need to be interpreted with caution. Only segment 1,3 and 4 differ significantly in relevance scores with all segments on the attributes ‘Dutch’, ‘green’ apple and crunchy. Besides that, the attributes that are relevant within the segments are tastiness, juiciness, freshness and crunchiness. However, these scores on relevance do differ significantly between the segments. The attributes that score the highest on relevance between the segments can be found in Table 1. In the next chapter a multiple regression and latent class analysis will be used in order to measure determinant attributes. After that a distinction between relevant and determinant attributes can be made.

4.2 Analysis determinance (Multiple regression)

In this analysis, a multiple regression with perception attributes as independent variables and intention to buy as dependent variables is used in order to find out what the determinant attributes for each segment are. However, as stated earlier, in this section segmentation is based on the respondents' values and desires. Table 2 shows the regression coefficients. The determinant attributes for each segment will be compared with the relevant attributes for each segment.

Table 2: Regression coefficients for each segment. The determinance of apples' dimensions are estimated as regression coefficients in SPPS

	Segments					
	1	**2**	**3**	**4**	**5**	**6**
Sweet	0.202*	0.234	0.123	0.156	0.130*	0.096
Fresh	0.289*	0.532***	0.119	0.318**	0.386***	0.153
Sour	0.155	-0.014	-0.179	0.210*	-0.024	0.196*
Hard	0.122	0.037	0.223	0.026	-0.025	0.113
Juicy	0.207*	0.035	-0.016	0.126	0.054	0.264**
Crunchy	-0.063	0.037	0.026	0.035	0.201*	0.211
Mealy	-0.121	-0.157	-0.197	0.038	-0.044	0.056

* = (Sig. < 0.05) ** = (Sig. < 0.01) *** = (Sig. < 0.001)

Firstly, table 2 shows that the attributes sweetness, freshness and juiciness are significant for segment 1. This means that all these attributes have significant influence on intention to buy. The regression coefficient shows how large the impact of an attribute is on intention to buy. Freshness is the most determinant attribute for this segment (β = 0.289). After that juiciness and sweetness follow (β = 0.207, β = 0.202) The attributes 'sour', 'hard', 'crunchy' and 'mealy' do not have significant impact on intention to buy.

The relevance scores for segment 1 can be found in Table 1. We can conclude that sweetness, freshness and juiciness all score on relevance. This means that these attributes are highly relevant for segment 1 as well. These high-core impact attributes are important when customers decides whether to buy or not to buy an apple. These attributes do also have influence on this decision.

However, there are also attributes that score high on relevance, but are not significant measuring determinance. The attribute 'hard' for example. This attribute is highly relevant (M = 4.18) but not determinant in judgement and choice. The attribute is 'hard' is called a lower-impact core attributes, which means it has low influence on judgement and choice. On the other hand, under-performance towards typical levels of performance for these specific attributes may result in a strong competitive disadvantage.. (Mikulic & Prebezac, 2012)

For segment 2, freshness has a high significant influence on intention to buy (β = 0.532). Besides that, freshness is the most relevant attribute for segment 2 (M = 4.90) The attribute fresh scores the highest on relevance compared to all other segments. This means it scores the highest between and within the segments. However, there are many other attributes that score high on relevance, these are: sweet, hard, juicy and crunchy.

For segment 3, there are no determinant attributes that have significant influence on intention to buy. The attributes that score high on relevance are: sweet, fresh, juicy and crunchy. These attributes are called lower-impact core attributes, which means these attributes have low influence on judgement and choice. However, as stated earlier, under-performance towards typical levels of performance for these specific attributes may result in a strong competitive disadvantage. When a customer in this segment finds out that an apple is not fresh, sweet, juicy or crunchy he or she could decide to not buy that apple anymore. These relevant attributes become determinant in a negative way. However, again the results need to be interpreted with caution since segmentation in this case is based on values and desires. (Mikulic & Prebezac, 2012)

For segment 4, there are two attributes that have significant influence on intention to buy. These determinant attributes are freshness and sourness (β = 0.318, β = 0.210). However, Table 2 shows that sourness is not relevant for segment 4 (M = 2.75). This means it is determinant in judgement and choice, but not considered a relevant attribute for the respondent. Sourness is called a higher impact secondary attribute. When managers want to differentiate themselves from the competition it should focus on these type of attributes.

For segment 5, the attributes sweet, fresh and crunchy have significant influence on intention to buy. Table 1 shows that these attributes are also relevant. The attributes are called higher-impact core attributes, they score high on values and desires, but also influence actual judgement and choice. When a customer decides on whether to buy an apple or not, the attributes sweet, fresh or crunchy

do have influence on that choice. Besides that, when the customer is in the supermarket and has to choose between apples, the attributes sweet, fresh or crunchy are also determinant in judgement and choice. Besides that, hardness scores high on relevance (M = 4.18), however, is not determinant in judgement and choice.

In the last segment, the attributes that have significant influence on intention to buy are sourness and juiciness. (β = 0.196, β = 0.264). The attributes that are relevant are crunchy, fresh, juicy and hard (M = 4.05, M = 4.29, M = 4.14, M = 4.05) Sourness is again determinant in judgement and choice, but scores low on personal values and desires.

Conclusively, table 3 shows where the alignment and relevance-determinance gaps within the different segments lie. Especially the attribute 'hard' scores high on relevance within the different segments, but is never determinant in judgement and choice. This means that when a customer discovers an apple is not hard, he or she could decide to not buy that apple anymore. The highly relevant but non-determinant attribute suddenly becomes determinant in a negative way. Besides that, sourness is in two segments determinant in judgement and choice, but not relevant. When a customer has to choose between two different apples, sourness has influence on judgement and choice. However, when he or she has to decide on buying an apple or not, sourness does not have influence. However, as stated earlier, results need to be interpreted with caution since segmentation in this case is based on values and desires .

Table 3: Comparison of relevant dimensions and gaps using the 6 segments solution. Segmentation is based on the respondents' values and desires, thus on their relevance given to apple attributes.

Seg. 1	**Seg 2.**	**Seg 3.**	**Seg 4.**	**Seg 5.**	**Seg 6.**
1) Hard (High rel. but not det.)	1) Sweet, hard, juicy, crunchy (High rel. but not det.)	1) Sweet, fresh, juicy, crunchy (high rel. but not det.)		1) Hard (high rel. not det.)	1) Crunchy, fresh, hard (high rel. not det.)
2) Sweet, fresh, juicy (alignment)	2) Fresh (alignment)		2) Fresh (alignment)	2) Sweet, fresh, crunchy (alignment)	2) Juicy (alignment)
			2) Sour (High det. But not rel.)		3) Sour (high det. but not rel.)

4.3 Analysis determinance (Latent Class Analysis)

The analysis is started by estimating the finite-mixture model ten times, including all seven concomitants. The CAIC values are reported in table 4, where the last line represents the smallest CAIC value for the particular segment. The lowest value is found for the 2-segment solution, for all re-estimations. In this analysis, segmentation is based on attributes that are determinant in judgement and choice. In the previous analysis segmentation was based on relevant attributes.

Table 4: CAIC values of the model including all the seven concomitants

N. of segments	1	2	3	4	5
Start# 1	3552.27	**3495.52**	3518.51	3578.17	3635.36
Start# 2	3552.27	**3495.52**	3518.51	3578.17	3633.88
Start# 3	3552.27	**3495.52**	3518.51	3577.85	3608.38
Start# 4	3522.27	**3495.52**	3518.51	3578.17	3625.51
Start# 5	3552.27	**3495.52**	3518.51	3547.19	3636.47
Start# 6	3552.27	**3495.52**	3518.51	3568.27	3634.90
Start# 7	3552.27	**3495.52**	3527.14	3550.01	3636.47
Start# 8	3522.27	**3495.52**	3518.51	3578.17	3636.47
Start# 9	3552.27	**3495.52**	3518.51	3578.14	3634.16
Start# 10	3552.27	**3495.52**	3518.51	3578.17	3606.77
Smallest CAIC	3552.27	**3495.52**	3518.51	3547.19	3606.77

Table 5 represents each regression coefficient of the determinance measured. Next to that the rank order is given for the most determinant apple dimensions. The stars ('*') represent the T-values for the different attributes. Some attributes have a T-value in between 1.65 and - 1.65, which means these attributes do not have significant impact on consumers' buying intention.

Segment 1 represents 63% of the sample. For this segment the attributes fresh, sweet, sour, juicy and crunchy are the determinant dimensions when buying apples (β = 0.69, β = 0.29, β = 0.25, β 0.32, β = 0.50) Especially the attributes fresh and crunchy are highly significant and also have a regression coefficient which is higher than 0.5. The attributes hard and juicy do not have significant impact on buying intention, thus are not determinant in judgement and choice.

Segment 2 represents 37% of the sample. The attributes which are determinant in judgement and choice for this segment are: sweet, fresh, hard and juicy. (β = 0.93, β = 0.82, β = 0.49, β 0.81). All these attributes are highly significant and have a regression coefficient which is higher than 0.49. This means these attributes are highly determinant for respondents in segment 2. The attributes sour,

crunchy and mealy do all have a negative influence on buying intentions for respondents. However, these attributes do not have a significant impact on buying intention, thus are not determinant in judgement and choice.

Normally, it is important to make a distinction between segments, based on their gender and age. However, the respondents who filled in the questionnaire are mainly students from Wageningen University. Besides that, it is irrelevant for this study. Therefore, it is not necessary to find out whether there are statistical differences in year of birth or differences in gender.

Table 5: 2-segment solution including all concomitants

	Segments			
	1 (63%)	**#**	**2 (37%)**	**#**
Sweet	0.29**	4	0.93***	1
Fresh	0.69***	1	0.82***	2
Sour	0.25**	5	- 0.05	5
Hard	0.16	*6*	0.49***	4
Juicy	0.32**	3	0.81***	3
Crunchy	0.50***	2	- 0.22	7
Mealy	- 0.17	7	- 0.16	6

R^2= 0.316; * = T-value= > 1.65 or < = -1.65; ** = T-value = > 1.96 or < = -1.96; *** = > 2.58 or < = -2.58

4.3.1 Comparison between 6-segment solution based on relevance and 2-segment solution based on determinance

The cross tabulation allows to make direct comparisons between the 6-segment solution based on relevant attributes and the 2-segment solution based on determinant attributes. It shows which respondent belongs to which segment. Besides that, the chi-square test is used in order to determine whether there is correspondence between segmentation based on relevance and segmentation based on determinance. The Pearson Chi-square (χ^2) shows a value of 0.081 ($X^2 > 0.05$), which means that there is weak to zero relation between segmentation based on relevance and segmentation based on determinance. There is no clear correspondence between the 6-segment solution and the 2-segment solution, these two different types of segmentation are independent of one another.

Table 6: The cross tabulation shows to which segments the respondents belong.

	Segments based on determinance 1 (63%)	Segments based on determinance 2 (37%)	
Segments based on relevance			**Total**
1 (17.6%)	19	3	22
2 (8%)	5	5	10
3 (14.4%)	8	10	18
4 (16%)	10	10	20
5 (27.2%)	22	12	34
6 (16.8%)	13	8	21
Total	77	48	125

* Pearson Chi-square (χ^2) = 0.081 > 0.05

First of all, the distribution within the first segment based on relevance suggests that segmentation based on relevance and determinance are highly dependent of one another. This because 86% of the respondents in segment 1, which is based on relevance, can be found in segment 1 based on determinance. However, it is important to conclude that in the other segments based on relevance that there is no clear distribution of respondents into the segments based on determinance. In segment 4 for example, 50% of the respondents can be found in segment 1 and the other 50% of the respondents can be found in segment 2. This suggests that there is no relation between segmentation based on relevance and segmentation based on determinance.

Table 5 shows which attributes are only relevant, only determinant and which attributes are both determinant and relevant for the different segments. Table 5 allows to make a comparison between the different segments.

Table 5: Comparison of relevant and determinant attributes between the different segments

	Segments based on determinance 1	(100%)	Segments based on determinance 2	(100%)
Segments based on relevance				
1	**Hard** Juicy, crunchy, fresh *Sweet, sour*	(24.7%)	**Crunchy** Hard, fresh, juicy *Sweet*	(6.3%)
2	**Hard** Juicy, crunchy, fresh, sweet *Sour*	(6.5%)	**Crunchy** Hard, fresh, juicy, sweet -	(10.4%)
3	- Juicy, crunchy, fresh, sweet *Sour*	(10.4%)	**Crunchy** Fresh, juicy, sweet *Hard*	(20.8%)
4	- - *Juicy, crunchy, fresh, sour, sweet*	(13%)	- Sweet *Fresh, hard, juicy*	(20.8%)
5	**Hard** Juicy, crunchy, fresh *Sweet, sour*	(28.6%)	**Crunchy** Hard, fresh, juicy, sweet -	(25%)
6	**Hard** Juicy, crunchy, fresh *Sour*	(16.9%)	**Crunchy** Juicy, hard, fresh *Sweet*	(16.7%)
		N = 77		N = 48

*The **bold** attributes are relevant but not determinant. The *italic* attributes are determinant but not relevant. The attributes that are not bold or italic are both relevant and determinant. The percentages show how much the segment based on relevance is represented in the segment based on determinance.

The four relevant attributes in the first segment are: juicy, crunchy, hard and fresh. (M = 4.09, M = 4.32, M = 4.18, M = 4.64). The determinant attributes within the first segment are fresh, sweet, sour, juicy and crunchy (β = 0.69, β = 0.29, β = 0.25, β 0.32, β = 0.50). This means that there is alignment between the attributes juicy, crunchy and fresh. However, the attribute 'hard' is relevant for segment 1, but not determinant in judgement in choice. This means that if a customer has to choose between two apples the attribute 'hard' is not determinant in judgement and choice. However, the attribute 'hard' could become determinant in a negative way when it is not handled with care. When customers finds out that an Elstar apple is not hard he or she could decide to buy another apple. The attribute 'hard' does not explain why a customer chooses between two different brands, which means that the predictive value on consumers' buying intention for a specific apple is low. Besides that, the attributes sour and sweet are determinant in judgement and choice for segment 1, but not relevant. When a customer doubts whether to buy an apple or not, these attributes do not have influence on that choice. However, when he or she has to choose between two different types of apple in the supermarket, these attributes do have influence on judgement and choice. Table 5 also shows that the segments 2, 5 and 6 also think the attribute 'hard' is highly relevant, however, does not have influence on judgement and choice. The attribute sour scores low on relevance for each segment, but is determinant in judgement and choice.

For the second segment based on determinance, the attribute 'crunchy' is highly relevant for segment 1, 2, 3, 5 and 6. Crunchiness is never determinant in judgement and choice, which means that when people think of buying an apple or not, crunchiness has influence on that decision. However, when the customer is in the supermarket and has to choose between two different apples, crunchiness does not have significant impact on judgement and choice. Besides that, the attributes sweet is not relevant in segment 1 and 6. The attribute hard is not relevant for segment 3 and segment 4. Again, this means that these attributes are influential in judgement and choice, however, these attributes score low on values and desires.

At last, the attributes juicy and fresh are relevant and determinant for all segments, except for segment 4 these attributes are not relevant. These high-impact core attributes lead to the highest general priority in improvement strategies. When customers think of buying an apple or not, the attributes juicy and fresh do have influence. After that, when they have to choose between different apples, these attributes are also determinant in judgement and choice.

Finally, it must be stated that the segments based on relevance and segments are independent from each other. The weak relation implies that relevance and determinance measure different dimensions of attribute importance.

5. Conclusion

The main goal of this thesis is to make a distinction between relevant and determinant attributes given to the different food dimensions. Besides that, this study shows what the predictive value of relevant attributes is. Segmentation based on the respondents' values and desires provides an optimal six-segment solution. Besides that, segmentation is also based on the respondents' attributes that are determinant in judgement and choice. This type of segmentation provides an optimal two-segment solution.

At first, the mean relevance scores per segment are used in order to determine the most relevant attributes. A distinction is made between attributes that score high on relevance within and between the segments. In order to measure determinance, perception attributes are used as independent variables and regressed against intention to buy. By doing this, the determinant attributes are estimated for the six-segment solution. Finally, the determinant attributes for the two-segment solution, which is based on attributes that are determinant in judgement and choice, are estimated as well.

This study shows that the attributes 'fresh' and 'juicy' are highly relevant and determinant for the different segments. This means that the predictive value of these relevant attributes is high, since these attributes are also highly determinant in judgement and choice for each segment. The attribute 'crunchy' and 'hard' are relevant for almost all segments, however, score low on determinance. This means the predictive value of these relevant attributes is low. Besides that, the attribute 'sour' scores high on determinance, but low on relevance. This means the attribute is determinant in judgement and choice, however, unimportant in deciding whether to buy an apple or not. Furthermore, this study provides evidence that determinance measured with values and desires as a segmentation basis provides the same results as segmentation based on determinance. At last, this study shows that segmentation based on relevance and segmentation based on determinance are independent from one another.

Conclusively, the acknowledgement of the different food dimensions relevance and determinance provide a better understanding of consumers' heterogeneity. The acknowledgement of these dimensions reduces the risk of marketing failures. The relevance-determinance gaps explain why relevance is not highly predictive in actual judgement and choice for consumers. Besides that, focusing on only determinant attributes could also lead to marketing failures. These attributes could be become determinant in a negative way when a negative occurs. Products may not meet a

threshold in relation to the considered attribute or fail to comply with regulations. (Passuello, 2013)

6.1 Discussion

The limitation in this research is that determinance is only measured with the attributes mealy, hard, sweet, fresh, sour, juicy and crunchy. However, attributes as 'expensive' and 'cheap' could also have influence on intention buy, which means that these attributes could be determinant in judgement and choice. A new experiment must be conducted in order to create a database with more attributes that could be used to measure relevance-determinance gaps. Again, these attributes are then used as independent variables and regressed against intention to buy. By doing this, the comparison between relevant and determinant attributes could be extended.

At last, there are contrasts between results in this thesis and those found in the literature. The literature shows that the attribute 'tasty' has positive influence on intention to buy, thus important in consumer decision-making The attribute 'sour' should have negative impact on tastiness, which means it should have negative influence on intention to buy. (Timmermans, 2014) However, in this study sourness has positive impact on intention to buy for segment 1. This means that the attribute is determinant in judgement and choice.

6.2 Future research

In future research it is interesting to find more attributes that could be determinant in judgement and choice and compare these with attributes that score high on relevance. After the comparison is made, distinguish the relevant and determinant attributes from each other. The relevant and non-determinant attributes can be used in order to measure which attribute has the most influence on brand awareness. Previous research shows that an increase in brand awareness leads to higher behavioural buying intentions. When these attributes have significant impact on brand awareness one can conclude what the exact value of relevant but non-determinant attributes is.

6.3 Implication

This study contributes in various ways. First of all, this study shows the importance of making a distinction between the different food dimensions. Besides that, it provides a clear distinction between relevant and determinant attributes in food dimensions. Attributes may score high on values on desires for segments, however, are not determinant in judgement and choice. On the other hand, some attributes score low on values and desires, however, are determinant in judgement and choice. That is why benefit segmentation needs to be done carefully, benefit segmentation based on

values and desires is not the same as benefit segmentation based on attributes that are determinant in judgement and choice. These different types of segmentation are independent of one another.

7. References

Aaker, D. A., & Equity, M. B. (1991). Capitalizing on the Value of a Brand Name. *New York*.

Aaker, D. A. (1996). Measuring brand equity across products and markets. *California management review*, *38*(3), 103.

Baldinger, A. L., & Rubinson, J. (1996). Brand loyalty: the link between attitude and behavior. *Journal of advertising research*, *36*, 22-36.

Batra, R., Homer, P. M., & Kahle, L. R. (2001). Values, susceptibility to normative influence, and attribute importance weights: A nomological analysis. *Journal of consumer psychology*, *11*(2), 115-128.

Berns, M., Townend, A., Khayat, Z., Balagopal, B., Reeves, M., Hopkins, M. S., & Kruschwitz, N. (2009). The business of sustainability: what it means to managers now. *MIT Sloan Management Review*, *51*(1), 20-26.

Blair, R. Is Organic Food more Nutritious and "Tasty"?. *Organic Production and Food Quality: A Down to Earth Analysis*, 227-241.

Bock, T., & Uncles, M. (2002). A taxonomy of differences between consumers for market segmentation. *International Journal of Research in Marketing*, *19*(3), 215-224.

Center, D. N. (1997). Zo eet Nederland: resultaten van de Voedselconsumptiepeiling 1997-1998. *Results of the food consumption study*, *1998*.

Chen., H.C., Green., R.D., (2010) Brand equity, marketing strategy, and consumer income: A hypermarket study., *Journal of Management and Marketing Research*

Chi, H., Yeh, H. R., & Tsai, Y. C. (2011). The influences of perceived value on consumer purchase intention: the moderating effect of advertising endorser. *Journal of International Management Studies*, *6*(1), 1-6.

Cleveland, M., Kalamas, M., & Laroche, M. (2005). Shades of green: Linking environmental locus of control and pro-environmental behaviors. *Journal of Consumer Marketing*, *22*(4), 198-212.

Dodds, W. B., Monroe, K. B., & Grewal, D. (1991). Effects of price, brand, and store information on buyers' product evaluations. *Journal of marketing research*, 307-319.

Evans, G., & Mills, C. (1998). A latent class analysis of the criterion-related and construct validity of the Goldthorpe class schema. *European Sociological Review*, *14*(1), 87-106

Feskens, R. C. W., Schmeets, J. J. G., & Hox, J. J. (2012). Looking for homogeneous groups of respondents and nonrespondents using latent class analysis. *Social science research*, *41*(3), 671-680.

Frochot, I., & Morrison, A. M. (2000). Benefit segmentation: A review of its applications to travel and tourism research. *Journal of Travel & Tourism Marketing*, *9*(4), 21-45.

Haley, R. I. (1968). Benefit segmentation: a decision-oriented research tool. *The Journal of Marketing*,

30-35.

Haley, R. I. (1971). Beyond benefit segmentation. *Journal of Advertising Research*, *11*(4), 3-8.

Harker, F. R., Marsh, K. B., Young, H., Murray, S. H., Gunson, F. A., and Walker, S. B. (2002). Sensory interpretation of instrumental measurements 2: sweet and acid taste of apple fruit. *Postharvest Biology and Technology*, *24*(3), 241-250.

Ho, C. I., & Lee, Y. L. (2007). The development of an e-travel service quality scale. *Tourism Management*, *28*(6), 1434-1449.

Hsu, Y. Y. (2000). The impact of brand awareness, reference price, product knowledge and product characteristics on brand evaluation and consumers'
purchase intention. Unpublished master thesis, National Cheng Kung University, Taiwan.

Van Ittersum, K., Pennings, J. M., Wansink, B., & Van Trijp, H. C. (2007). The validity of attribute-importance measurement: A review. *Journal of Business Research*, *60*(11), 1177-1190.

Jaccard, J., Brinberg, D., & Ackerman, L. J. (1986). Assessing attribute importance: A comparison of six methods. *Journal of Consumer Research*, 463-468.

Jaeger, S. R., Andani, Z., Wakeling, I. N., and MacFie, H. J. (1998). Consumer preferences for fresh and aged apples: a cross-cultural comparison. *Food Quality and Preference*, *9*(5), 355-366.

Keller, K. L. (1993). Conceptualizing, measuring, and managing customer-based brand equity. *the Journal of Marketing*, 1-22.

Keller, K. L., Parameswaran, M. G., & Jacob, I. (2011). *Strategic brand management: Building, measuring, and managing brand equity*. Pearson Education India.

Klassen, R. D., & McLaughlin, C. P. (1996). The impact of environmental management on firm performance. *Management science*, *42*(8), 1199-1214.

Klopčič M., Kuipers A., Hocquette J.F. (2013)., Consumer Attitudes to Food Quality Products: *Emphasis on Southern Europe,* EAAP publication No. 133

Krech D., Crutchfield R.S. (1948) Theory and Problems of Social Psychology (New York: McGraw-Hill Book Co., 1948).

Lin, S. Y. (2006). The impact of warranty and brand awareness on customer loyalty. *Chinese Management Review*, *8*(1), 1-20.
Lo, Z. W. (2002). The study of the impact of product categories, price discount and brand awareness on consumers' brand evaluation and repurchase
intention. Unpublished master thesis, Providence University, Taiwan.

Malik, M. E., Ghafoor, M. M., Iqbal, H. K., Ali, Q., Hunbal, H., Noman, M., & Ahmed, B. (2013). Impact of brand image and advertisement on consumer buying behavior. *World Applied Sciences Journal*, *23*(1), 117-122.

Mattera, M., Baena, V., & Cerviño, J. (2012). Analyzing social responsibility as a driver of firm's brand awareness. Procedia-Social and Behavioral Sciences,58, 1121-1130.

Monroe, K. B. (1979). *Pricing: Making profitable decisions* (pp. 37-46). New York: McGraw-Hill.

Morgan, L. A. (1985). The importance of quality. In *Perceived quality* (pp. 61-64). Lexington Books Lexington, MA.

Mikulić, J., & Prebežac, D. (2012). Accounting for dynamics in attribute-importance and for competitor performance to enhance reliability of BPNN-based importance–performance analysis. *Expert systems with applications*, *39*(5), 5144-5153.

Myers J.H., Alpert M.L (1977) Semantic Confusion in Attitude Research: Salience Vs. Importance Vs. Determinance", in NA - *Advances in Consumer Research Volume 04*, eds. William D. Perreault, Jr., Atlanta, GA : Association for Consumer Research, Pages: 106-110.

Olson., J.C.., Muderrisoglu A., (1979) The Stability of Responses Obtained By Free Elicitation: Implications For Measuring Attribute Salience and Memory Structure", in NA - *Advances in Consumer Research Volume 06,* eds. William L. Wilkie, Ann Abor, MI : Association for Consumer Research, Pages: 269-275.

Olshavsky, R. W. (1985). Perceived quality in consumer decision making: an integrated theoretical perspective. *Perceived quality*, *4*, 3-29.

Onwezen, M. C., Reinders, M. J., van der Lans, I. A., Sijtsema, S. J., Jasiulewicz, A., Guardia, M. D., & Guerrero, L. (2012). A cross-national consumer segmentation based on food benefits: The link with consumption situations and food perceptions. *Food Quality and Preference*, *24*(2), 276-286.

Peng, W. T. (2006). The relationship among brand awareness, brand image and brand loyalty-an empirical study of domestic rice wine market. Unpublished master thesis, National Dong Hwa University, Taiwan.

Rodenburg D., (2015). The Impact of fluctuating quality

Sclove, P.S.L (2001). “Notes on cluster Analysis”

Sharma, S., Vredenburg, H., (1998). Proactive corporate environmental strategy and the development of competitively valuable organizational capabilities. *Strategic Management Journal* 19, 729–753.

Shavitt S., Fazio R.H. (1990).,"Effects of Attribute Salience on the Consistency of Product Evaluations and Purchase Predictions" *Association for Consumer Research,* Pages: 91-97.

Sijtsema, S. J., Reinders, M. J., Hiller, S. R., and Guàrdia, M. D. (2012). Fruit and snack consumption related to sweet, sour and salty taste preferences.*British Food Journal*, *114*(7), 1032-1046

Timmermans, A.C.M (2014). Consumers’ intention to buy a fresh food product: the influence of brands

Wall, M., J. Liefeld, J., & Heslop, L. A. (1991). Impact of country of original cues on consumer judgment in multi-cue situation: A covariance analysis. *Journal of the Academy of Marketing Science*, 19(2), 105-113.

Wedel, M., & Kistemaker, C. (1989). Consumer benefit segmentation using clusterwise linear regression. *International Journal of Research in Marketing*, *6*(1), 45-59.

Wind Y. (1973) "A new procedure for concept evaluation", *Journal of Marketing*, Vol. 37, pp. 2-11.

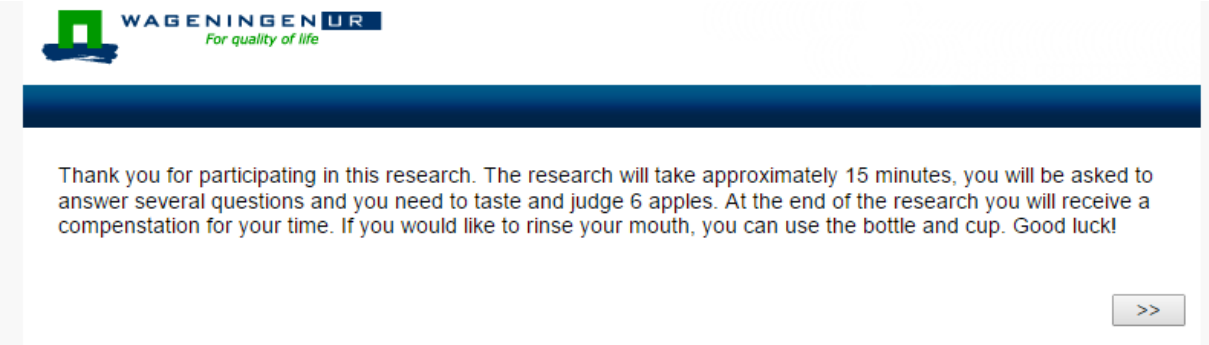
Young S., Ott L., Feigin B.(1978). Some practical considerations in Market Segmentation, *"Journal of Marketing Research* " Vol. 15, No. 3 pp. 405-412

van der Zanden, L. D., van Kleef, E., de Wijk, R. A., & van Trijp, H. (2014). Understanding heterogeneity among elderly consumers: an evaluation of segmentation approaches in the functional food market. *Nutrition research reviews*, *27*(01), 159-171.

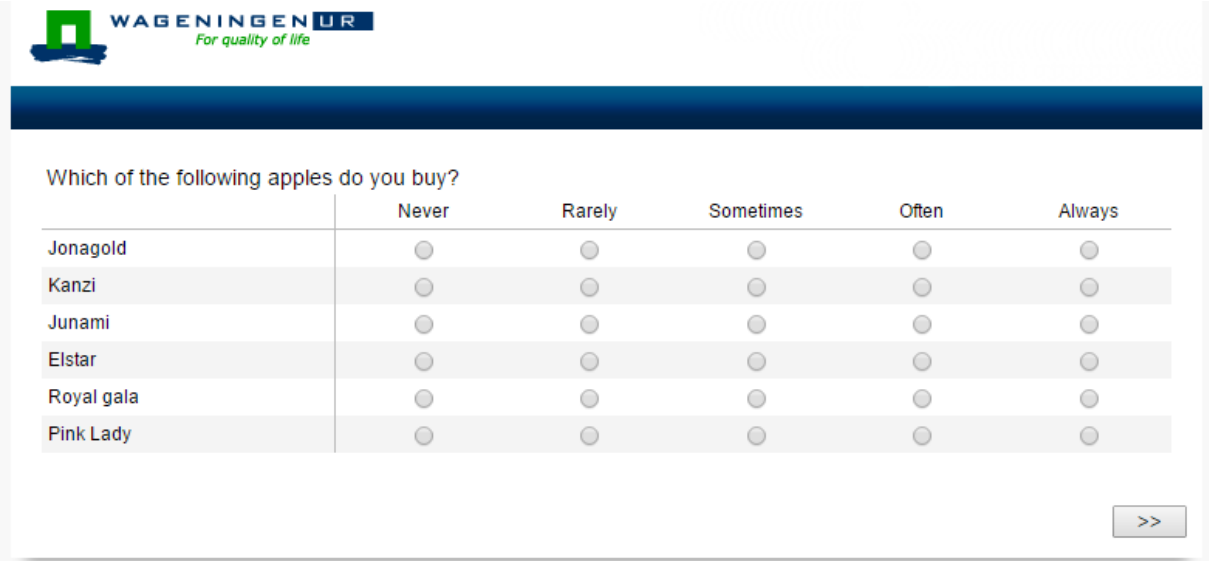
Zeithaml, V. A. (1988). Consumer perceptions of price, quality, and value: a means-end model and synthesis of evidence. *The Journal of marketing*, 2-22.

8. Appendix

Introduction



Buying behaviour before the research.



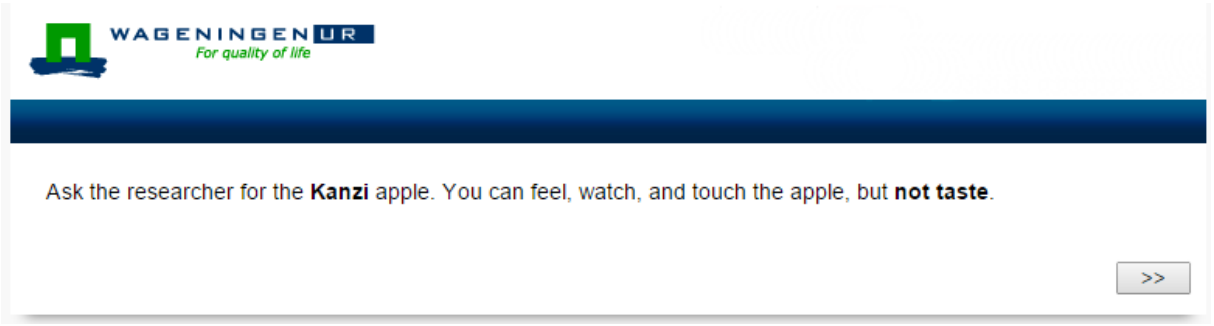
Preferences for market Segments.

With the question below you will indicate which attributes are important for you when you buy an apple. Indicate for each attribute how desirable it is when you buy an apple. *(In other words, how positive of negative the influence is of the attribute on your choise when buying an apple)*

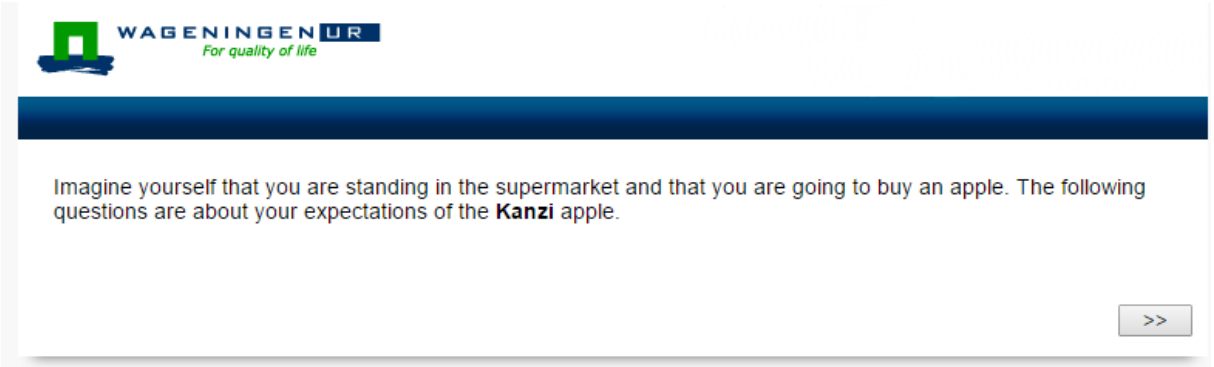
When you buy an apple, how desirable is it that:

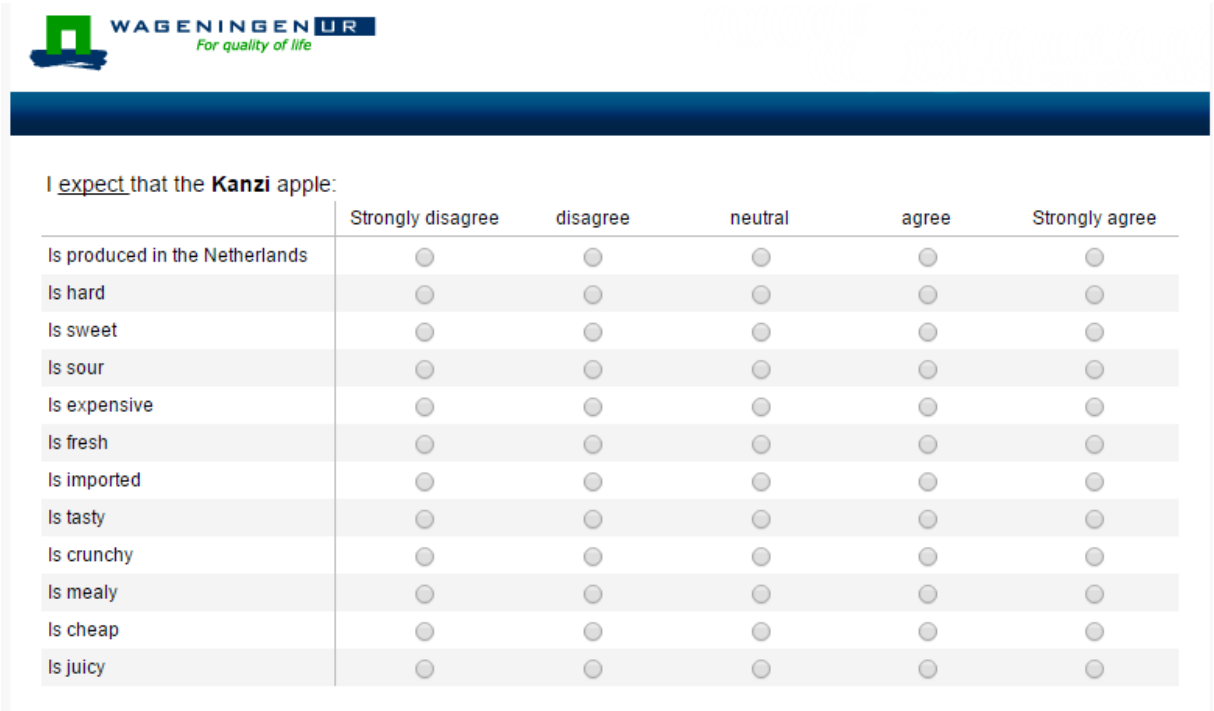
	Very undesirable	Undesirable	neutral	desirable	Very desirable
The apple is expensive	○	○	○	○	○
The apple is fresh	○	○	○	○	○
The apple is small	○	○	○	○	○
The apple is green	○	○	○	○	○
The apple is mealy	○	○	○	○	○
The apple is crunchy	○	○	○	○	○
The apple is tasty	○	○	○	○	○
The apple is juicy	○	○	○	○	○
The apple is big	○	○	○	○	○
The apple is round	○	○	○	○	○
The apple is sour	○	○	○	○	○
The apple is red	○	○	○	○	○
The apple is sweet	○	○	○	○	○
The apple is cylindrical	○	○	○	○	○
The apple is hard	○	○	○	○	○
The apple is imported	○	○	○	○	○
The apple is cheap	○	○	○	○	○

Questions per apple.
In this case the Kanzi apple, the same questions are asked for the Junami, Elstar, Jonagold, Pink Lady and Royal Gala. The questions are presented in a random order.

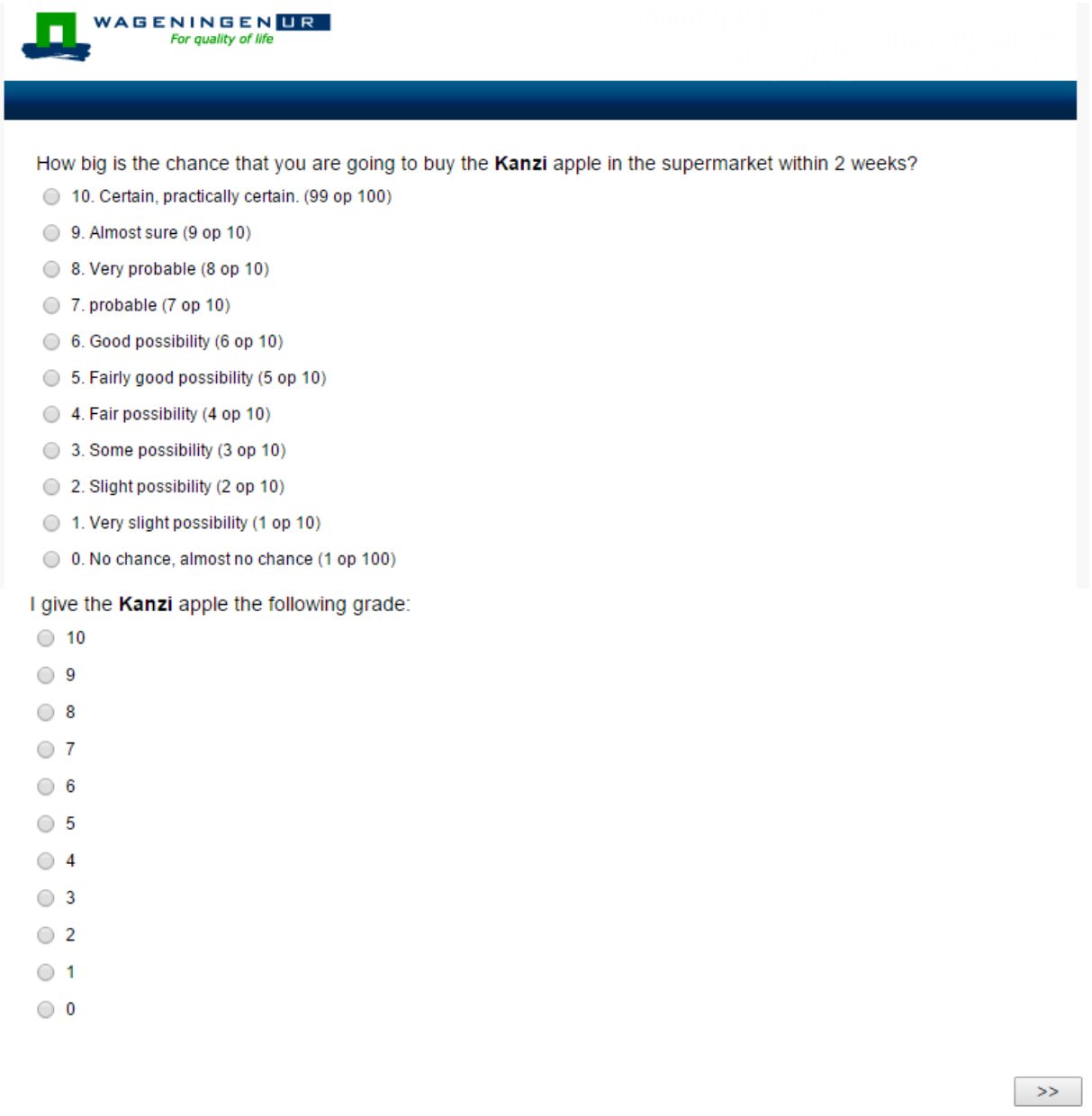


Expected quality:

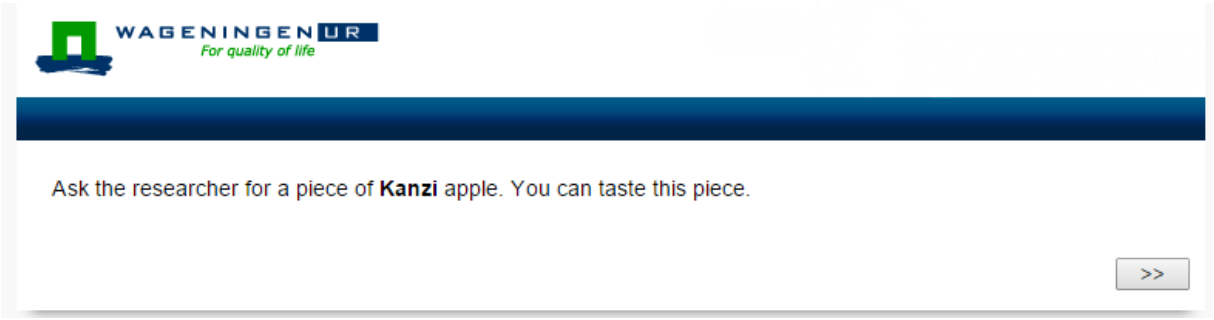


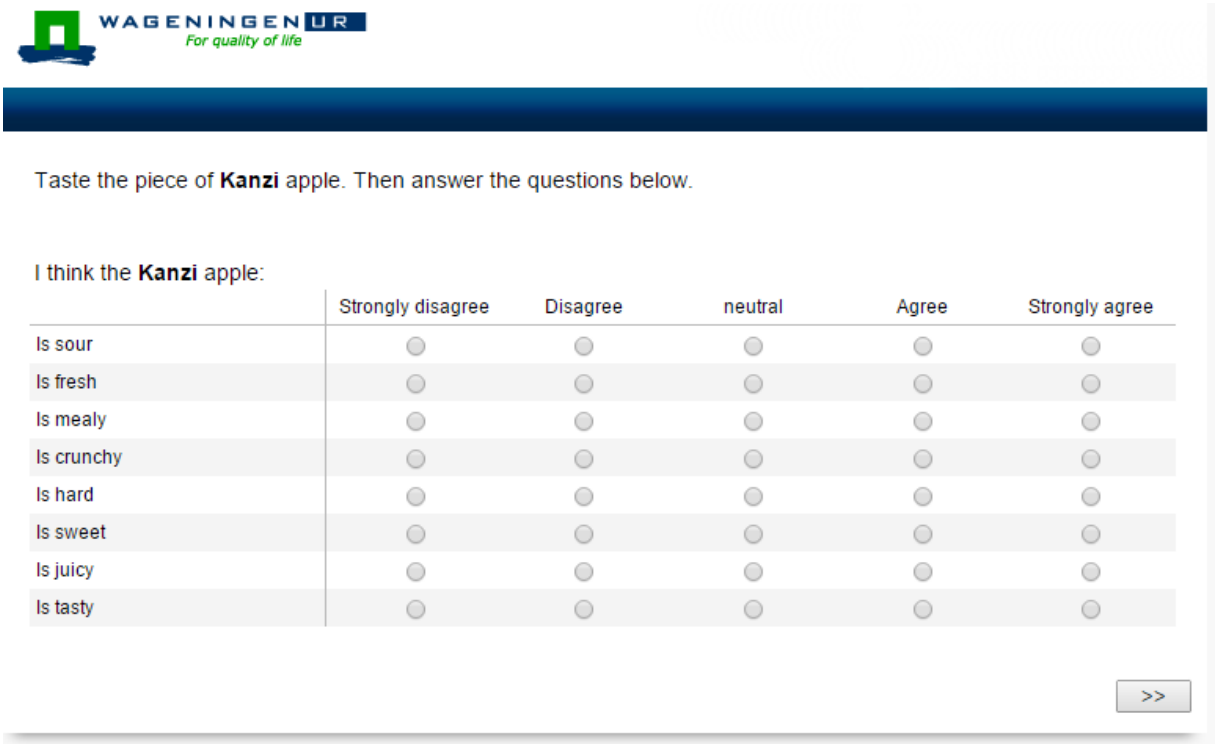


Buying intention before consumption

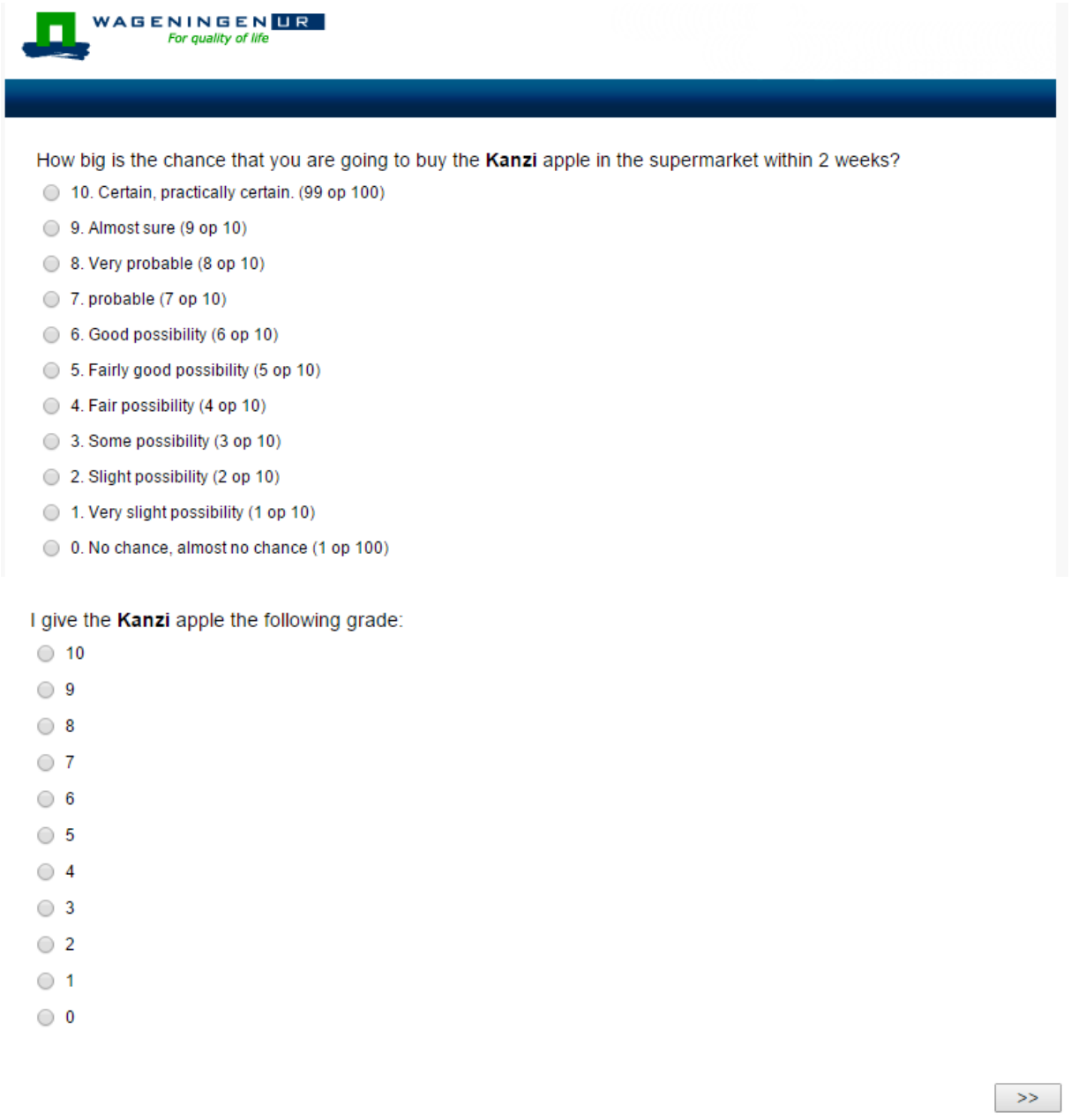


Perceived quality

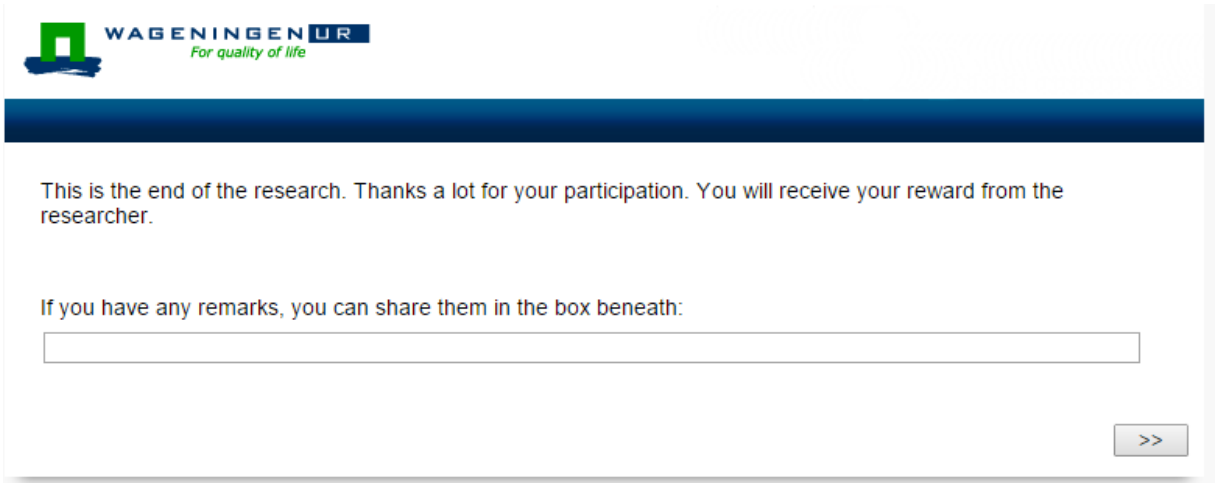




Buying intention after consumption



General questions



Chosen apple after finishing the questionnaire.