Fluctuating Apple Quality

What is the impact of the fluctuating apple quality throughout the year upon the positioning and buy intentions of apple brands in the eyes of consumers

Name: Sanne Westerink

Registration number: 930826945100

First supervisor: Dr. Ir. F.J.H.M. Verhees

Second supervisor: Dr. I.A.C.M. van der Lans

Code: YSS-81812

MCB-51803

MCB-51802

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Acknowledgment

This research is the final part of my Bachelor Business- and Consumer Studies. During my bachelor I choose the specialization 'Business' and my minor (which I did at the University of Wisconsin-Madison, USA) was about Marketing Management. Since this thesis is related to marketing I was really happy when Frans Verhees asked me to do this subject. I loved working on my thesis from the very beginning, and learned a lot about SPSS, analyzing data and doing an experiment. Although it was sometimes hard to write this paper in English, because of my dyslexia, I managed it and improved my English writing skills.

There are different people who supported me during my thesis, and which I would like to thank. Special thanks to Frans Verhees, who helped me when I got stuck with SPSS and gave me feedback and support. I would also like to thank my family and friends who were always there for me. The last person I would like to thank is Dene, a master student who did the same research before I did, for sharing the first measurements with me. Without all these people I was not able to hand in my Thesis in the way it is now, thank you!

Sanne Westerink,
December 2014

Abstract

In an environment where competition is growing and consumers have more choices, good product quality becomes more important than ever before. Product quality is important for a business because it has a significant impact on consumer satisfaction and on the buy intention of consumers. To get the consumer satisfied, the perceived product quality must be better or equal to the expected product quality. For a seasonal and perishable fresh food product like an apple, constant quality is hard or even impossible to fulfil. Although product quality is important, it is not clear what the impact is of a fluctuating apple quality throughout the year upon the positioning and buy intention of apple brands in the eyes of consumers. This research is therefore designed to gain more insight into answering this question.

To answer the general research questions, there were several hypotheses drawn:
H1: Time after harvest decreases expected product quality
H2: Time after harvest decreases perceived product quality
H3: Time after harvest decreases satisfaction
H4: Intention to buy decreases over time, because the perceived quality is lower.

This research uses a longitudinal design to answer the hypotheses. This means that there were two measurement on two different moments in time, with a gap of 6 months. The first measurement was in May and the second measurement took place in November. The apples used in this research are the Kanzi and Junami apple (they both stop selling there apples after 8 months), the Elstar and Jonagold apple (produced in the Netherlands and for sale almost the whole year), and the Pink Lady and Royal Gala apple (imported after 8 months, for sale the whole year). This research uses a Dutch questionnaire which was designed with the online survey tool Qualtrics. Participant of this research were approached in the Leeuwenborgh, and most of them were students of Wageningen University between 18 and 26 year old. In the first measurement 59 students were measured and for the second measurement 51 students filled in the questionnaire.

To test the (longitudinal) hypotheses *H1*, *H2* and *H3*, an independent T-test was conducted between measurement t=0 and t=2. To answer the last hypothesis (*H4*) some regression analyses were done.

The first conclusion that can be drawn from this research is that the expected product quality of apples does not significantly change over time. Since the expected product quality is based on the marketing positioning of a product, there can be conclude that the marketing positioning did not changed over time because of a fluctuating product quality.

The second area worth noting is that the perceived quality varied over time. Especially the Elstar apple and Royal Gala apple were significantly worse in November.

Although there are some small changes in the level of satisfaction, none of them were significant. This means that consumers were not significantly more or less satisfied during the year, even though the perceived quality was changing.

The last area worth noting is that the intention to buy decreases over time, because the perceived product quality is lower.

Although this research gave insight in the main question, there are some implications and suggestions for further research. Suggestions are related to optimizing the questionnaire and in order to improve the reliability of this research. Managers could use this research to analyze the changes in quality, satisfaction and buy intention over the year.

1.   Introduction

In an environment where competition is growing and consumers have more choices, good product quality becomes more important than ever before (Garvin, 1984). Product quality can be defined as *'The group of features and characteristics of a saleable good which determine its desirability and which can be controlled by a manufacturer to meet certain basic requirements'* (Steenkamp, 1990). Product quality is important for a business because it has a significant impact on consumer satisfaction and on the buy intention of consumers (Padberg and Alvensleben, 1997; Akpinar et al., 2000; Tsiotsou, 2005; Kotler and Armstrong, 2010). To get the consumer satisfied, the perceived product quality must be better or equal to the expected product quality. Customers who are satisfied are more likely to repurchase products and to recommend it to friends. Porter (1980) posits that superior quality is an effective product differentiation strategy to create customer loyalty, lower price elasticity and present barriers to competition. Peters and Waterman (1982) identify quality as one of the key variables determining the success of a corporation.

The expected product quality is influenced by the marketing positioning of a product. Marketing positioning is defined as; *'the customer's perceptions of the place a product or brand occupies in a market segment'* (AmericanMarketingAssociation, 2014). In other words, the position which a brand/product has in a consumers mind. The position of a brand depends on both the intrinsic cues[1] and extrinsic cues[2]. For a firm it is important to keep the cues stable over time in order to fulfil the expectations of a consumer. A constant quality will prevent a fluctuating market positioning and will higher the level of satisfaction (Giese and Cote, 2000). For example, if the consumer buys a specific apple brand and that tastes delicious and has a nice crunch, the consumers will position that brand as delicious and crunchy. When the consumer is faced with the decisions of choosing between different apple brands once again, they will take the brand with the best 'position' in mind. If a consumer buys a product again it means that the consumer has some expectations about that product. In order to keep the customer satisfied, the quality must be equally as good or better than the last time (their expectations).

Although product quality is important, the impact of a fluctuating product quality is not clear (Padberg and ALvensleben, 1997: Tsiotsou, 2005; Kotler and Armstrong 2010). For a seasonal and perishable fresh food product like an apple, constant quality is hard or even impossible to fulfil (Dijk, 2014). Due to the harvest time, apple growers are not able to deliver the same constant quality throughout the year. The intrinsic quality cues of the apples are excellent in September, but the same intrinsic quality cues of a 1 year old apple are poor by August (Watskins et al., 2004).

Since the quality of apples fluctuates during the year, firms have different ways to approach the intrinsic quality problem:
1.   Kanzi and Junami: stop selling apples after 8 months because of poor quality.
2.   Elstar and Jonagold: keep selling the apples after 8 months with declining quality.
3.   Pink Lady and Royal Gala: start importing apples after 8 months to keep the quality 'stable'.

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[1] Intrinsic cues are defined as cues which cannot be changed without changing the physical composition of the product, examples of intrinsic cues are smell, taste, colour, shape and size (Hausen, 2005).

[2] Extrinsic cues are defined as cues which are changeable without changing the physical composition of the product, examples of extrinsic cues are price, store image, or brand (Teas and Agarwal, 2000).

Each of these options will influence both the consumer's expectation and market positioning of an apple brand. The best option for each brand depends on who your target group is and why they are buying your brand. Some consumers may prefer a brand which can be bought the whole year (like Jonagold and Elstar), while others prefer an apple which has been exclusively grown in the Netherlands and has a more stable quality (Kanzi). Additionally, given that the price of importing is only a few cents more per kilogram, the price difference of importing will be negligible (Riezebos and Zimmermann, 2005).

1.2 Definition of the problem

For a business it is important to have products with a good quality. Before purchasing the product consumers have some expectations about product quality, but they can only evaluate the perceived product quality after consuming it. If the perceived quality is better than the expected quality, the consumer will be satisfied and the re-buy intention will be increased. The quality of a product will also influence how consumers position a brand. Although it is important for a brand to have a good product quality, it is impossible for a fresh product, like apples, to have a constant product quality. Until now it is not clear what the impact is of the fluctuating apple quality upon the positioning and buying intention of brands in the eyes of consumers. This research is therefore designed to gain more insight into answering this question.

The general research question:

What is the impact of the fluctuating apple quality throughout the year upon the positioning and buy intention of apple brands in the eyes of consumers?

2. Research of Literature

This literature research uses the 'Satisfaction-Loyalty Model' (figure 1). In this study 'quality' is an important factor. It is therefore important to know what quality entails and to know how consumers perceive quality, and in turn why consumers (re-)buy products.

Figuur 1 The Satisfaction-Loyalty Model

2.1 Quality

Quality is an umbrella term which can be interpreted in both 'safety' (Grunert, 2005) and 'consumer related aspects' (Gryna et al., 1974). Since this research is only focussing on the expected and perceived quality of apples in the eyes of consumers, the definition of food safety is not taken into account. Although a number of definitions of perceived quality have been proposed in the literature, many of them are basically variants of 'fitness for use, given the needs of the consumer' (Box, 1984; Gent, 1981; Juran, 1974; Kawlath, 1969; Kotler, 1984; Kuehn and Day, 1962; Thurston, 1985). Another more specific definition is '*Quality is the index that reflects the extent to which the customer feels that his need, the product and his expectations for that product overlap*' (Thurstone, 1985; Steenkamp 1987). The terms (perceived) product quality and perceived quality can be used interchangeably (Steenkamp, 1990).

In order to gain an enhanced understanding of perceived quality, one needs to distinguish between quality cues and quality attributes. Quality cues are defined as '*informational stimuli that are, according to the consumer, related to the quality of the product, and can be ascertained by the consumer through the senses prior to consumption*'. Quality cues can be categorised as either intrinsic or extrinsic (Olson, 1972; Olson and Jacoby, 1972). Quality attributes are the functional and psychosocial benefits or consequences provided by the product. Quality attributes are unobservable prior to consumption (Steenkamp, 1990). Thus, cues are used to predict the quality of product attributes and therefore product quality. If the perceived product attributes are equal or better than expected, the consumer is more satisfied. The likelihood of re-buying the product and loyalty to the product grows (Riezebos and Zimmermann, 2005).

2.2 Models for understanding consumer perception of food quality

Several models and theories have been proposed for the purpose of understanding consumer perceptions of the quality of food. Four main research approaches to *the study of consumer food quality perception* can be identified in the literature (Hansen, 2005). The first one is '*The economics of information approach*', which classifies the properties of a food product into two groups of attributes; search and experience attributes (cues) (Nelson, 1970, 1974). Search cues are product properties that can be determined by the consumer before actually purchasing the product. Examples of search cues are colour, hardness, brand, shape and size (Becker, 2000). Experience attributes are product properties that can only be evaluated by consumers after using the product (Hansen, 2005). For example smell, flavour, crunchy, juiciness and texture are experience attributes. The experience attributes are used as a valuable input for a brand and for potential repeat purchases

in the future (Becker, 2000). In this research the experience attributes are used to confirm or refute the expected intrinsic quality, which is based on the extrinsic cues provided in the search phase.

The second approach is '*The Multi-attribute approach*'. In this approach a consumer's overall evaluation of a food product is based on the summed set of beliefs (attributes multiplied by the importance given to these attributes by the consumer) (Fishbein and Ajzen, 1975). The multi-attribute approach makes no distinction between search and experience attributes, and more importantly possible relationships between attributes are not taken into account. Thus, this approach will only be partly used in this study.

The next approach is the 'Cue utilization theory' of Easterbrook. This approach explains how the increasing complexity of the marketplace results in consumers not always capable of perceiving and evaluating all relevant product attributes. Consumers do not always possess well-defined preferences for all choice problems. In some choice situations consumers may instead 'construct' their preferences on 'the spot' rather than referring to a master list of preferences from memory (Gregory et al., 1993; Bettman et al., 1998). According to the 'cue utilization theory', consumers try to overcome their uncertainty and lack of information by selecting one or more cues to assess the quality of the food product. Examples of cues which consumers use to evaluate the quality of the product range from brand name, store name, market share to product composition (Hansen, 2005).

The last approach is '*The hierarchical approach and means-end chain theory*'. This suggest a hierarchical approach in which the stimuli concept only comprises product elements, which the consumer can perceive with his or her senses before actual consumption takes place (Andersen, 1994; Steenkamp and Meulenberg, 1985; and Steenkamp, 1990). It links product attributes to higher and more abstract levels/values which are important to a consumer (Zeithaml, 1988; Hansen, 2005). For example, a product label indicates that an apple is grown without the use of pesticides, which a consumer could link to a higher level of healthiness and thereby a healthier life. In this example the information on the label is the product attribute, the good quality is the consequence, and the healthier life is the value which is important to the consumer. Since this approach is unique for every consumer, it will be very time consuming to use this approach. Thus, this approach will not be used in this research.

For this study 'The economics of information approach' and the 'Cue utilization theory' will be taken into account. The next paragraphs will take a closer look at the cues/attributes which consumers use before purchasing (sight, smell and touch) and after purchasing (taste).

2.3 Cues and attributes

Prior to purchasing a product, consumers cannot rate the product on the quality attributes as they can only ascertain them at the moment of consumption (Acebrón and Dopico, 2000). For this reason, consumers at the supermarket, will predominantly use quality cues in choosing between alternatives (Steenkamp, 1989, 1990). In this research the cues before purchasing a product are 'sight', 'smell' and 'touch', and after purchasing a product the attribute that will be used is 'taste'.

2.3.1 Sight

One of the reasons why people will prefer one product over another is because it looks better. This is because sight is an important factor during the pre-purchase phase. Sight includes all the cues which can be seen from the outside, but in this research the cues colour, shape, size and the brand will be

used. Some visible cues like storage image and product placement as well as the cue price will not be used in this research. By omitting the price aspect, participants are forced to judge the apple purely based upon the cues given by the apple.

The first intrinsic cue which influences the consumer during pre-purchase is **Colour**. Numerous studies have shown the dramatic effect of colour on taste recognition and taste intensity (Roth et al, 1988), on flavour detection and identification (Dubose et al., 1980) and on acceptability (Cardello et al, 1983). For example red fruit is perceived as more sweet, green fruit as more fresh and yellow as more sour (Delwiche, 2003). Additionally, consumers will associate brown spots as a cue for possible rotten pulp under the peel. All of these colour cues have a big impact before the actual consumption takes place (Dubose et al., 1980; Delwiche, 2003).

Next to colour, **Shape and Size** form the appearance of an apple (Gamble et al., 2006; Rouphaela et al., 2010). Consumers will prefer a well-shaped round apple above a misshaped elongate-concave apple (Gamble et al., 2006). Shape and size are seen as quality indicators and thus will influence the purchase intention.

Another (extrinsic) cue which is important in a consumer's choice is the **Brand** of the apple. A brand is defined as *'A name, term, sign, symbol, design or a combination of them intended to identify the goods or services of one seller, or a group of sellers and to differentiate them from those of competitors'* (Kotler, 1997). Almost all of the apples have a sticker which shows the Brand name. By seeing the brand logo, consumers will recognise the brand image and will choose among the options. A brand image is based upon the actual perception which consumers memorise of the brand, based on their earlier experiences, thoughts, feelings and perceptions of a brand (Keller et al., 2006). For a brand it is important to have a stable quality to satisfy the expectations of the consumer. When the brand is good/well-known consumers will repurchase it. Buying a well-known brand will reduce the risk of a bad buy for consumers (Riezebos and Zimmermann, 2005).

2.3.2 Smell
Another sense organ which consumers use during the pre-purchase is smell. The intrinsic cue smell is important for a consumer to perceive the flavour of the apple. The more smell is perceived, the more flavour is perceived by consumers (Delwiche, 2003). Since the consumer can't taste the apple before purchasing it, smell is a really important factor for a consumer to buy a certain apple. Smell can also be an indicator of the quality of apples. For example the smell of ethylene is an indicator of how mature the apple already is (Golding et al., 1998).

2.3.3 Touch
The third, and last sense organ which consumers use during pre-purchase is 'touch'. Touching a product is really important because by doing this consumers create more confidence in their evaluation, which leads to an increase in purchase intention increase (Peck and Wiggins, 2006). For example, when analysing apples, the firmness is really important. A soft apple which you can press indicates that the apple is old and of poor quality. Thus, by feeling an apple the consumer tries to predict the texture of an apple once bitten into (Shewfelt and Prussia, 1993).

2.3.4 Taste
Taste is one of the most important quality attributes (Acebrón and Dopico, 2000) and can be separated into texture and flavour (Delwiche, 2003). By consuming the apple, the consumer will

experience the taste of the apple, the level of sweetness and the level of crunchiness. As said before, it is important that the actual taste corresponds to the expected taste or is better than the expected taste, in order to ensure that the consumer is satisfied and will buy the product again.

2.4 Consumer satisfaction

Satisfaction and perceived quality are highly intercorrelated (Bitner and Hubbert, 1994; Churchill and Surprenant, 1982). Satisfaction can be defined as 'The consumer's fulfilment response, the degree to which the level of fulfilment is pleasant or unpleasant' (Oliver, 1997). After consumers have experienced satisfaction, they prefer emotional terms to describe their level of satisfaction (Selnes, 1993). Examples of these terms are, 'very satisfied', 'cheated', 'frustrating', 'pleasant' and 'extraordinary' (Giesen and Cote, 2000). The quality performance will indicate how satisfied the consumer is (Dabholkar et al., 2000; Oliver, 1997).

2.5 Loyalty and repurchase intention

Loyalty has been defined in many different ways (Jacoby and Chestnut, 1978). Dick and Basu (1994) defined customer loyalty as the relationship between relative attitude and repeat patronage. The most common assessments of loyalty are behavioural measures expressed over time as well as repurchase patterns (Bloemer and Kasper, 1995). According to Jacoby and Chestnut (1978) the only way to understand a single-brand loyalty is to examine the belief, affect, and conative structure of the consumer's orientation to the brand. Their conceptual framework, based on the expectancy-value theory[3], makes it possible to include several factors, which may mediate or moderate the attitude-behaviour relationship (Dick and Basu, 1994). Some studies have tested the relationship between quality, satisfaction, and loyalty (Dabholkar et al., 2000; Gotlieb et al., 1994) and assume these relationships to be positive (Johnson et al., 2001). So when the perceived quality is equal or better than the expected quality, the consumer will be satisfied and furthermore more likely to rebuy the product. As said before, the level of involvement is rather low for fresh products. This is called behavioural loyalty (Kandampully and Suhartanto, 2000) and means that consumers that are used to buying the same apple every time, will easily switch to another brand when the preferred brand is out of stock (Riezebos and Zimmermann, 2005). Measuring the level of satisfaction and the (re-)buy intention before and after consumption will give more insight in the loyalty of consumers in choosing apples.

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[3] Expectancy-value theory: the theory that behaviour is a function of the interaction between a person's expectancies about the outcomes of actions and the value they place on those outcomes.

3. Theoretical model
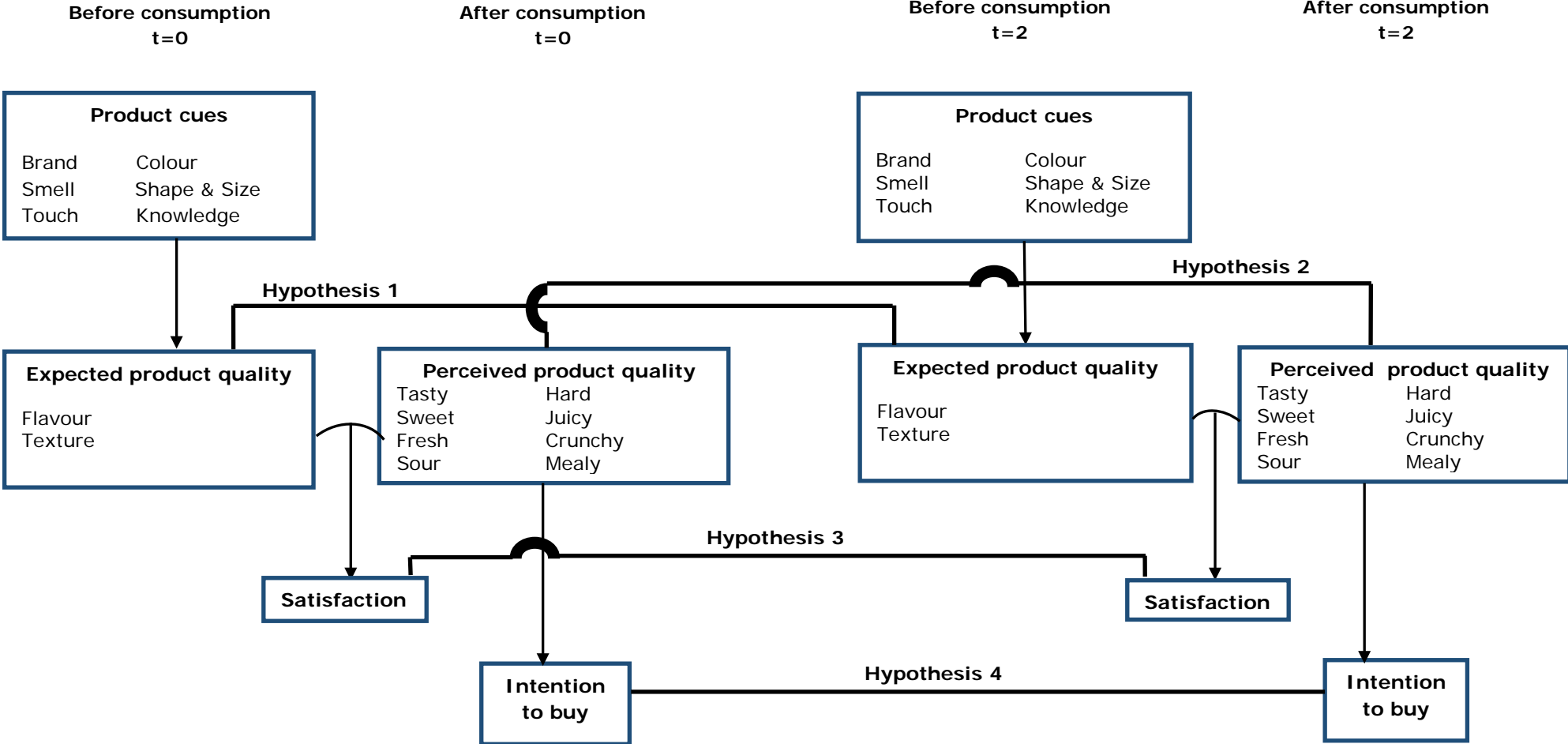
3.2 Hypotheses

For a fresh product, like an apple, the product quality will fluctuate during the year. This research will gain more insight in what the impact is of the fluctuating apple quality throughout the year upon the positioning and buy intention of apple brands in the eyes of consumers. To answer the general research questions, there are several hypotheses drawn.

The quality consumers expect before really purchasing the product is called the expected product quality. This has also to do with the position your brand has in the mind of consumers. Although the (perceived) quality of apples declines after harvesting (Dris and Jain, 2004), it is not clear if and how the consumers expectation changes. To test if the expected product quality declines significantly after harvesting time, the following hypothesis was formed:

H1: Time after harvest decreases expected product quality

Next to the expected product quality, also the perceived product quality is important. This is how the consumer evaluates your product after buying and tasting the product. The quality of apples declines rapidly after harvesting (Dris and Jain, 2004), which means that the 'real' quality will be lower. Although the 'real' quality goes down, it is not clear if the consumer significantly perceives a lower product quality after time of harvesting goes by. To test this, the following hypothesis was formed:

H2: Time after harvest decreases perceived product quality

Before purchasing a product, consumers already have some expectations about a product. The expected product quality must be equally as good or lower than the perceived product quality (after purchasing) to keep the consumer satisfied. If a consumer is satisfied, he/she is more likely to re-buy the product again. Since it is not yet clear whether the expected product quality will change over time, and the perceived product quality is expected to decrease, it is expected that the level of satisfaction goes down after harvesting time. To test if this is significantly true, the third hypothesis was formed:

H3: Time after harvest decreases satisfaction

For a business it is important that consumers buy your product. It is even better when consumers become loyal to your product and rebuy it. The model used in this research (paragraph 3.1) shows that the perceived product quality has influences on the buy intention of a consumer. It also shows that there could be a difference between the buy intention at t=o and t=2. To test if the intention to buy is significantly influenced by the perceived product quality, the last hypothesis was formed:

H4: Intention to buy decreases over time, because the perceived quality is lower

4. Apples in the experimental design

Worldwide there are more than hundreds of apple varieties (Pippin, 2014). In this research two disparities between apple brands were taken into account. First of all a clear distinction was made between apples which are available for 6 till 8 months and apple brands which are available 10 till 12 months. Secondly the difference between apple brands who are/are not importing their apples after 6 or 8 months was taken into account. Taking the two distinctions together gives four quadrants (see table 1). Since all apple brands, who were imported, were sold for at least 10 months, there are no apples in the quadrant 'Imported/Not sold after 6-8 months'. For each of the other quadrants 2 different apple brands are used in this research. By making different groups of apple brands, the differences between groups on quality, buy intention and loyalty can be measured.

	Not sold after 6-8 months	Sold after 6-8 months
Produced in The Netherlands	Junami Kanzi	Elstar Jonagold
Imported (after 6-8 months)	-XXX- All import apples are available after 8 months	Pink Lady Royal Gala

Table 1 Selected Apples for Research

4.2 The apples

4.1.1 Kanzi

The Kanzi apple is a Dutch club apple which is harvested in October and available till may (8 months available). Kanzi is a fresh red apple with a unique sweet-sour flavour and a crunchy bite. To guaranty a constant quality, all Kanzi apples are stored by a distributer which ensures a stable quality. Kanzi is a well branded apple with a well-defined character and growing market share.
(http://kanziapple.com/)

4.1.2 Junami

Junami originally came from Switzerland, but is now grown by Dutch farmers. Junami can be seen as a sweet, fresh and juicy apple and is available in Dutch supermarkets from January till June (so 6 months available). All the apples are grown under stringent and controlled conditions to guarantee a perfect taste and optimum quality. Junami is a well branded apple which has his own webpage and advertisements in newspapers.
 (http://www.junami-apple.com/)

4.1.3 Elstar

The Elstar apple is the best known and most appreciated apple in the Netherlands. This apple is for sale from September till June/July (almost 10 months). Elstar farmers are independent from each other. Each farmer stores their own apples and sells them at the moment they think is the best. Because Elstar farmers are not working together, a constant apple quality cannot be guaranteed.
(http://programma.groentenenfruit.nl/elstar)

4.1.4 Jonagold

Next to Elstar, also the Jonagold is really famous in The Netherlands. Jonagold apples are quite big, juicy and they have a sweet/sour taste. After harvesting in September, the Jonagold can be stored in cold storages by the farmers. Like the Elstar apple, the Jonagold apple is grown and sold by the farmer itself. This makes it hard to guarantee a constant product quality.

4.1.5 Pink Lady

The Pink Lady is a fresh, naturally sweet and juicy apple which is available the complete year. Not every farmer can produce Pink Lady apples since there are strict criteria to guarantee consistent quality. To guarantee this stable quality, the Pink Lady apple is imported from different countries during the year. Pink Lady is a well branded apple with a well-defined character.
(http://pinkladyapples.co.uk/)

4.1.6 Royal Gala

Royal Gala is a juicy apple with a mild and sweet flavor. It can be harvested in The Netherland in September and can be sold till February. After that, Royal Gala apples are imported from France, Brazil, Argentina, Chili or New Zealand. Since Royal Gala imports their apples, they are available the complete year.

5.   Method and Material
This chapter describes the methods and materials used in this research.

5.1. Design
This research uses a longitudinal design. This means that there were two measurement on two different moments in time, with a gap of 6 months. The first measurement was in May and included 8 months old Kanzi, Junami, Jonagold and Elstar apples. Next to that the Pink lady and Royal Gala apples were 1 month old. The second measurement was in November and by than the Kanzi, Jonagold, Elstar and Royal Gala apples were 2 months old. The Pink Lady apple, which was imported from New-Zealand, was 4-5 months old. The Junami apple was not available during the second measurement.

This research uses a Dutch questionnaire which was designed with the online survey tool Qualtrics (see appendix 1). The respondent had to answer the questions on a laptop in order to ensure that the questions were randomized, so the respondent stayed focused. Another advantage of Qualtrics was that the results were converted into SPSS easily.

Since this paper is additional research, the first measurement was conducted by Dene (a master student at Wageningen University). He conducted the online questionnaire and used it in his first measurement (t=0). In order to keep the outcomes of both measurements (t=0 and t=2) in line, the same questionnaire was used during the second measurement in May. The data collected with Dene's first measurement (t=0) was used in this research.

5.2 Data Collection
This paragraph discusses the pre-test and the real experiment. Next to that, the sample group of this research will be examined.

5.2.1 Sample
Before starting the real experiment, a pre-test was conducted to test the questionnaire on small errors. The pre-test was conducted with nine respondents. After the pre-test the questionnaire was optimized and ready to use for the experiment. The respondents used in the 'real' study were approached in the Leeuwenborgh, and most of them were students of Wageningen University between 18 and 26 year old. In the first measurement 59 students were measured and for the second measurement 51 students filled in the questionnaire. During both measurements the same questionnaire and apple brands were used to keep the measurements as equally as possible. Since most of the participants were students, it is most likely that this research is mostly representative among students.

5.1.1 Process of the experiment
When a participant entered the research room, he/she was seated behind a computer. The questionnaire started with asking which of the six apples he/she already buys. After that, the respondent was asked about his preference towards apples (small, expensive, red, country of origin etc.). When the general questions were done, the respondent started with judging the first apple. Initially, the respondent was only allowed to look, touch and smell the apple. Based on their expectations, they were asked to fill in some questions about expected price, taste, hardness, bite, country of origin etc.. Furthermore the likability that the respondent would buy the apple within 2 weeks, and the overall mark of the apple (based on expectations) was asked. After answering the

questions before tasting the apple, the respondent was allowed to taste a small peach of the apple and had to answer the same intrinsic questions again. This process was repeated for the Kanzi, Elstar, Jonagold, Pink Lady and Royal Gala apple. Since the Junami was not for sale during the second measurement, only the questions about their expectation were asked. After finishing the questions about the different apples, the respondent was allowed to pick one of the six apples as a reward for filling in the questionnaire. Their choice was recorded by asking the last question 'chosen apple'.

5.3 Measurements

The following paragraph describes what and how data for this research was gathered.

5.3.1 Expected quality

The first thing that can be measured from the questionnaire is the expected quality. To build up the same situation as during pre-purchase, the respondent was only allowed to smell, touch and look at the apple. By doing this the respondent needs to follow the cues given by the apple, and their earlier experience with that particular brand. To measure the expected product quality participants had to fill in some questions about their expectations related to price, taste, country of origin, sweetness, crunchiness and hardness. All questions were answered on a five point Likert Scale, where 1 means totally disagree and 5 means totally agree. Especially the questions about taste, sweetness, crunchiness and hardness are related to the expected quality.

5.3.2 Perceived quality

After tasting the apple, the perceived quality was formed. To measure the perceived quality, respondents were asked to fill in questions related to taste, freshness, hardness, juiciness and bite. All questions were answered on a five point Likert Scale, where 1 means totally disagree and 5 means totally agree.

5.3.3 Satisfaction

The level of satisfaction indicates how well the expected and perceived quality are overlapping. If the perceived quality is equally as good or better than the expected quality, the participant is satisfied. If this is not the case, they are not satisfied. After the questions about perceived and expected quality, the respondent had to score the apple on an eleven point interval scale, from 0 till 10 (where 10 was the best). The level of satisfaction can be measured by comparing the two overall marks. If the mark before tasting the apple was lower than the mark after tasting the apple, the respondent was satisfied.

5.3.4 Loyalty / Buy Intention

To measure the buy intention of a respondent, the question *'How big is the chance that you are going to buy the apple in the supermarket within 2 weeks?'* was asked. This question was answered on a 11 point interval scale where 0 means 'No chance, almost no chance' and 10 means 'Certain, practically certain'. The first measurement of the buy intention was before tasting the apple, the second one after tasting the apple. Comparing both measurements gives insight in how the buy intention changes. Since this experiment was done two times on different periods in time, the loyalty can also be measured. By comparing the intention to buy after tasting the apple at t=0 and t=2, the loyalty of consumers was found.

5.4 Analyses

After conducting the data from both experiments, the data can be analysed. How the hypotheses are analysed will be explained in the following paragraphs.

5.4.1 T-test

H1: Time after harvest decreases expected product quality
H2: Time after harvest decreases perceived product quality
H3: Time after harvest decreases satisfaction

To test the (longitudinal) hypotheses *H1*, *H2* and *H3*, an independent T-test was conducted between measurement t=0 and t=2. The reason to choose for an independent T-test is because different respondents were participating in the measurements t=0 and t=2. To test if the variances in the two groups are equal, an Levene's test was done. After doing the Levene's test, it was clear which of the rows to use; 'Equal variances assumed' or 'Equal variances not assumed'. The number which is stated by 'Sig. (2-tailed)' indicates if there is a significant different between the two measurements. The T-tests uses a significant level of 0.05.

5.4.2 Regression analyse

H4: Intention to buy decreases over time, because the perceived quality is lower.

To give insight in the problem of this hypothesis, the Mediator Model of Baron and Kenny (1986) will be used (Figure 6.4). Since a regression analysis indicates if there is a (predictive) relationship between variables, regression analyses were done to test this hypothesis. First of all a regression analysis between the factors time and intention to buy was done. After that a regression analysis between time, quality and intention to buy was done. Next to the regression analyses, also a factor analysis was done to identify which quality variables were related to each other. After doing a factor analysis, two other regression analysis were done to test which of the components are significantly influencing the intention to buy.

6.   Results

In this chapter the data will be analyzed and the hypotheses are accepted or rejected.

6.1 Time after harvest decreases expected product quality

An independent t-test was conducted to compare the expected product quality at t=0 and t=2. Table 6.1.1 shows an overall evaluation of all the apple brands, while table 6.1.2 till table 6.1.7 present the outcomes of one particular brand. For the measurement in May (t=0) there were 59 participants, while N=51 at t=2 (in case N is different this will be mentioned explicitly). During the whole evaluation in SPSS an 95% confidence interval was used. Next to that the significant level was 0.05, which means that when the P-value is lower than 0.05 there is a significant different between t=0 and t=2. In this research the significant values are **Bold** and **Underlined**.

Looking at the overall expected product quality (table 6.1.1), only the factor 'Fresh' shows a significant positive impact over time. Although 'Fresh' has a significant differences, eleven out of twelve variables do not have a significant differences. Overall there can be conclude that the expected product quality is not significantly changing over time for consumers. Thus, this hypothesis is rejected.

Table 6.1.1 Expected product quality throughout time, all apples

All apples	Mean Measurement May	Mean Measurement November	P-value
Cheap	2.98	2.92	0.505
Expensive	3.05	3.10	0.507
Tasty	3.75	3.70	0.447
Dutch	2.99	3.08	0.296
Imported	2.98	3.00	0.820
Sweet	3.82	3.71	0.070
Fresh	**3.76**	**3.64**	**0.041**
Sour	2.73	2.71	0.694
Hard	3.56	3.56	0.940
Juicy	3.72	3.72	0.987
Crunchy	3.62	3.59	0.652
Mealy	2.60	2.51	0.222
N	**354**	**306**	

The N in this table is found by doing the amount of participants times 6 (since they had to evaluate 6 apples).

In this research there are three groups of apples. The first group are the Kanzi and Junami apple (which both stop selling after 8 months). Looking at table 6.1.2 and 6.1.3, none of the apple brands showed a significant difference between the measurements in May and November. A note for this outcome is that for the second measurement the Junami apple was not for sale. Participants filled in their expectation without looking, touching or smelling the apple. Although there is not a significant difference between the measurements, the outcomes at t=2 are really close to 3 (which was the answer, 'neutral'). Since also a lot of participants asked the researcher what to fill in, since they did not know the brand, this result could indicate that participants do not have a strong idea about (the Junami) apple brand(s) in memory.

Table 6.1.2 Expected product quality throughout time, Kanzi

Kanzi	Mean 8 months old	Mean 2 months old	P-value
Cheap	2.88	2.67	0.230
Expensive	3.14	3.37	0.203
Tasty	3.93	3.98	0.714
Dutch	2.53	2.55	0.884
Imported	3.51	3.51	0.994
Sweet	3.90	3.73	0.185
Fresh	3.98	3.84	0.288
Sour	2.59	2.71	0.535
Hard	3.78	4.00	0.175
Juicy	3.86	3.90	0.776
Crunchy	3.88	3.96	0.572
Mealy	2.32	2.16	0.392

Table 6.1.3 Expected product quality throughout time, Junami

Junami	Mean 8 months old	Mean 2 months old	P-value
Cheap	3.03	2.88	0.328
Expensive	2.93	3.20	0.120
Tasty	3.39	3.37	0.898
Dutch	2.76	2.78	0.904
Imported	3.14	3.33	0.227
Sweet	**3.69**	**3.29**	**0.003**
Fresh	3.44	3.31	0.370
Sour	2.68	2.82	0.319
Hard	3.14	3.08	0.692
Juicy	3.44	3.29	0.241
Crunchy	3.39	3.22	0.236
Mealy	2.85	2.69	0.331

Also the brands which are for sale the whole year (Jonagold and Elstar) do not have a significant differences between the measurements in May and November (table 6.1.4 and 6.1.5). This indicates that the expected product quality does not fluctuates over time for whole year round sold, Dutch produced apples.

Table 6.1.4 Expected product quality throughout time, Elstar

Elstar	Mean 8 months old	Mean 2 months old	P-value
Cheap	3.69	3.80	0.521
Expensive	2.29	2.22	0.654
Tasty	4.07	3.80	0.080
Dutch	3.78	4.18	0.017
Imported	2.05	1.86	0.246
Sweet	3.92	3.82	0.482
Fresh	3.90	3.75	0.289
Sour	2.85	2.73	0.528
Hard	**3.56**	**3.08**	**0.006**
Juicy	3.81	3.82	0.942
Crunchy	3.64	3.35	0.108
Mealy	2.47	2.78	0.132

Table 6.1.5 Expected product quality throughout time, Jonagold

Jonagold	Mean 8 months old	Mean 2 months old	P-value
Cheap	3.46	3.57	0.530
Expensive	2.56	2.43	0.473
Tasty	3.61	3.51	0.584
Dutch	3.68	3.94	0.103
Imported	2.34	2.14	0.199
Sweet	3.66	3.51	0.360
Fresh	3.63	3.61	0.908
Sour	3.05	2.94	0.559
Hard	3.80	3.94	0.410
Juicy	3.64	3.61	0.826
Crunchy	3.64	3.80	0.361
Mealy	2.81	2.59	0.261

Looking at the apples which are imported after 8 months (Pink Lady and Royal Gala), the Pink Lady apple does shows a significant difference (table 6.1.6). Five out of twelve variables (Cheap (+), Expensive(-), Dutch (+), Import (-), and Hard (-)) have a significant difference. During the second measurement in November (where the Pink Lady Apple was older than during the first measurement in May), participants expected the Pink Lady more expensive, harder and with a bigger change of being imported. Besides for the Pink Lady apple, expected quality does not significantly decrease over time for the Royal Gala apple (table 6.1.7).

Table 6.1.6 Expected product quality throughout time, Pink Lady

Pink Lady	Mean 1 month old	Mean 4-5 months old	P-value
Cheap	**2.24**	**1.82**	**0.016**
Expensive	**3.85**	**4.24**	**0.033**
Tasty	3.78	3.98	0.159
Dutch	**2.49**	**2.04**	**0.010**
Imported	**3.51**	**4.08**	**0.001**
Sweet	3.92	4.04	0.380
Fresh	3.98	3.75	0.094
Sour	2.66	2.59	0.704
Hard	**3.56**	**4.00**	**0.009**
Juicy	3.81	3.90	0.504
Crunchy	3.61	3.86	0.099
Mealy	2.41	2.20	0.241

Table 6.1.7 Expected product quality throughout time, Royal Gala

Royal Gala	Mean 1 month old	Mean 2 months old	P-value
Cheap	2.58	2.80	0.530
Expensive	3.51	3.16	0.473
Tasty	3.73	3.57	0.584
Dutch	2.69	2.98	0.103
Imported	3.32	3.06	0.199
Sweet	3.83	3.88	0.360
Fresh	3.63	3.57	0.908
Sour	2.58	2.45	0.559
Hard	3.51	3.27	0.410
Juicy	3.76	3.80	0.826
Crunchy	3.54	3.33	0.361
Mealy	2.75	2.63	0.261

6.2 Time after harvest decreases perceived product quality

To compare the perceived product quality at t=0 and t=2 an independent t-test was conducted. Table 6.2.1 shows an overall evaluation of all the apple brands, while table 6.2.2 till table 6.2.6 presents the outcomes of one particular brand. For the measurement in May (t=0) there were 59 participants, while N=51 at t=2 (if N is different from this, it will be mentioned in the table). During the whole evaluation in SPSS an 95% confidence interval was used. Next to that the significant level was 0.05. Since the Junami apple was not available during the second measurement, the Junami apple will not be taken into account in this evaluation.

Looking at the overall perceived product quality (table 6.2.1), five out of the eight variables show a significant difference. Fresh, sour, hard and crunchy have a positive t-value, which means that the outcome at t=0 was significantly higher than the outcome of t=2. The variable 'Mealy' is the only variable which has a negative t-value. Taking into account that most apples were 'older' during the first measurement (t=0), the variables 'Fresh', 'Sour', 'Hard' and 'Crunchy' were increasing after time of harvesting went by. The variable 'Mealy' decreases after harvesting time. These results are exactly the opposite as what was expected, so the hypothesis will be rejected.

Table 6.2.1 Perceived product quality throughout time, all apples

All apples	Mean Measurement May	Mean Measurement November	P-value
Tasty	3.69	3.52	0.063
Sweet	3.64	3.72	0.325
Fresh	**3.77**	**3.50**	**0.001**
Sour	**2.76**	**2.40**	**0.000**
Hard	**3.44**	**2.96**	**0.000**
Juicy	3.63	3.68	0.535
Crunchy	**3.78**	**3.29**	**0.000**
Mealy	**2.33**	**2.66**	**0.001**
N	**295**	**255**	

Although the overall apple evaluation shows a significant difference between the two measurements, not all perceived apple qualities separately are significantly different over the year. For the Kanzi apple (which is the only apple which stops selling after 8 months) there was no significant differences between the perceived product quality at both measurements (table 6.2.2). Since the reason why Kanzi apples are not for sale after 8 months is to guarantee a stable quality, the findings of this experiment are in line with what was expected (a stable quality).

Table 6.2.2 Perceived product quality throughout time, Kanzi

Kanzi	Mean 8 months old	Mean 2 months old	P-value
Tasty	4.03	4.24	0.201
Sweet	3.64	3.57	0.652
Fresh	4.25	4.29	0.735
Sour	**2.64**	**3.04**	**0.044**
Hard	3.71	3.73	0.937
Juicy	**3.90**	**4.25**	**0.010**
Crunchy	4.27	4.29	0.866
Mealy	1.83	1.61	0.163

Looking at the Dutch farmed apple brands Jonagold and Elstar, a big difference between both apples can be seen (table 6.2.3 and 6.2.4). The perceived quality of the Jonagold is stable over time, but the Elstar apple has six variables which are significantly different. The Elstar apple was 8 months old at measurement t=0 and only 2 months old at t=2. From the results of this research there can be conclude that after harvesting time, the freshness, sourness, hardness and crunchiness goes up and that the variables sweet and mealy are going down. This actually means that the quality will increase after time of harvesting, which is in contrast with the expectations.

Table 6.2.3 Perceived product quality throughout time, Elstar

Elstar			
	Mean 8 months old	**Mean 2 months old**	**P-value**
Tasty	3.86	3.59	0.150
Sweet	**3.19**	**3.82**	**0.001**
Fresh	**4.03**	**3.37**	**0.000**
Sour	**3.68**	**2.33**	**0.000**
Hard	**3.66**	**2.00**	**0.000**
Juicy	3.69	3.73	0.846
Crunchy	**3.92**	**2.41**	**0.000**
Mealy	**2.00**	**3.37**	**0.000**

Table 6.2.4 Perceived product quality throughout time, Jonagold

Jonagold			
	Mean 8 months old	**Mean 2 months old**	**P-value**
Tasty	3.71	3.73	0.943
Sweet	3.56	3.78	0.177
Fresh	3.61	3.57	0.829
Sour	2.80	2.57	0.249
Hard	3.41	3.08	0.083
Juicy	3.69	3.82	0.426
Crunchy	3.81	3.53	0.118
Mealy	2.39	2.39	0.991

Also in the last group of apples (imported after 8 months) only the Royal Gala shows a significant difference between the two measurements. While the Pink Lady has a stable perceived quality over time, the Royal Gala apple has seven variables which are significant different (see table 6.2.5 and 6.2.6). The variables taste, sweet, fresh, sour, hard, juicy and crunchy are all positively significant for the Royal Gala, but the variable mealy was negatively significant. Since the Royal gala apple was 1 month old at t=0 and 2 months old at t=2, this indicates that the variables, which are positively significant, are going down after harvesting time and the variable mealy went up.

Table 6.2.5 Perceived product quality throughout time, Pink Lady

Pink Lady			
	Mean 1 month old	**Mean 4-5 months old**	**P-value**
Tasty	3.59	3.51	0.639
Sweet	3.73	3.92	0.242
Fresh	3.75	3.61	0.396
Sour	2.68	2.20	0.015
Hard	3.66	4.00	0.052
Juicy	3.59	3.47	0.471
Crunchy	3.93	4.08	0.335
Mealy	2.05	2.12	0.712

Table 6.2.6 Perceived product quality throughout time, Royal Gala

Royal Gala	Mean 1 month old	Mean 2 months old	P-value
Tasty	**3.24**	**2.53**	**0.002**
Sweet	**4.08**	**3.49**	**0.001**
Fresh	**3.19**	**2.65**	**0.006**
Sour	2.00	1.88	0.430
Hard	**2.75**	**2.00**	**0.000**
Juicy	3.29	3.14	0.440
Crunchy	**2.97**	**2.14**	**0.000**
Mealy	**3.39**	**3.80**	**0.037**

Overall there can be said, that there is no differences between the three different groups (apples which are sold the whole year, apples which are imported after 8 months or which are not for sale after 8 months). Within each group there were differences between apple brands.

6.3 Time after harvest decreases satisfaction

To compare the level of satisfaction at t=0 and t=2 an independent t-test was conducted. Before using an independent t-test, the overall mark before tasting the apple was subtracted from the overall mark after tasting the apple. These outcomes were used to calculate the overall mean and P-value with a t-test (table 6.3.1). A positive mean means that the perceived quality was higher than the expected quality, while a negative mean means the opposite. For the measurement in May (t=0) there were 59 participants (N), while there were 51 participants (N) in November (t=2). During the whole evaluation in SPSS an 95% confidence interval was used. Next to that the significant level was 0.05.

Looking at table 6.3.1, none of the apples showed a significant difference between the measurements at t=0 and t=2. This means that the level of satisfaction did not changed significantly over time. Thus, this hypothesis can be rejected. Looking at the different brands, some are positively evaluated while others have a negative level of satisfaction. Remarkable is that the level of satisfaction for both the Elstar and the Royal Gala are positive, while both scored really low on the level of perceived quality. Likely reason for this is that because both apples felt really mealy and old, the expected quality mark was already really low. The perceived product quality than, could only be better than the expected quality. If the mark about perceived quality was a little higher (but still low), this will give a positive level of satisfaction.

Remarkable is also that the Kanzi and Jonagold have a negative level of satisfaction on both measurements. This means that participants have higher expectations about the Kanzi and Jonagold, than they can realize.

Table 6.1.1 Satisfaction Level

Satisfaction level			
	Mean Measurement May	**Mean Measurement November**	**P-Value**
Kanzi	-0.6102	-0.5098	0.615
Elstar	0.1695	0.4510	0.216
Jonagold	-0.1356	-0.2941	0.539
Pink Lady	-0.0169	0.3922	0.162
Royal Gala	1.5424	2.0196	0.446

<u>Chosen apple in the end:</u>

The last question of the questionnaire was 'Chosen apple'. By asking this question, participants choose the apple which they liked the most (or at least, which one they wanted to get after the experiment). The percentage of how many times each apple brand was chosen, is summed in table 6.3.2. In both t=0 and t=2 the Kanzi apple was the most popular one (35.6% and 52.9%). Apples which went down a lot in percentage of choose were the Elstar and Royal Gala (this is in line with their significantly decreased perceived product quality). Both apple brands went down with almost 10% in comparison with t=0. Although most other apples were quite stable over time, the Chi-Square is really low (0.059). This means that there is a significant differences in the apple choice between the two measurements.

Table 6.3.2 Percentage Appel Choice

Percentage Apple

Choice	t=0	t=2	P-value
Kanzi	35.6%	52.9%	
Junami	3.4%	-	
Elstar	13.6%	3.9%	
Jonagold	11.9%	17.6%	
Pink Lady	16.9%	19.6%	
Royal Gala	18.6%	5.9%	
Total	100%	100%	
Pearson Chi-Square			0.059

Comparing table 6.3.1 and 6.3.2, it is remarkable that although consumers were not totally satisfied about the Kanzi apple, they still choose this apple the most. It is also remarkable that although the Elstar and Royal gala were having the highest level of satisfaction, they were the least chosen apples. This indicates that the level of satisfaction is not a guarantee that the consumer choose your apple. Reason why consumers choose your apple has more to do with the perceived quality.

6.4 Intention to buy decreases over time, because the perceived quality is lower

To answer this hypothesis, the article 'The Moderator-Mediator variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations' of Baron and Kenny (1986) will be used. For this research the independent variable is time, the mediator is (perceived) quality and the outcome variable is intention to buy. The N of this research is 550, since there were 110 participants who all tasted five apple brands (and filled in five times their intention to buy).

The influences of time on (perceived) quality (Figure 6.4, **a**) was already discussed in paragraph 6.2, and showed a significant difference on quality between the two measurements. To analyze if quality (figure 6.4, **b**) and time (figure 6.4, **c**) have influence on the intention to buy, two Regression Analyses were conducted.
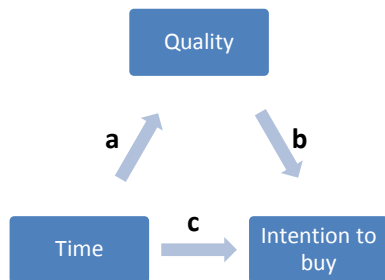
Figure 6.4 Mediator Model

The first regression analysis gave answer on the first part of the hypothesis (intention to buy decreases over time (**c**)). For this regression analysis the dependent variable was 'intention to buy' and the independent variable was 'time'. Looking at the outcomes (table 6.4.1, **c**), a P-value of 0.057 was found. Although this is a little higher than the average significant level of 0.05 the P-value is still really low, so this part will be assumed. The Beta related to the P-value was 0.081, which means that when time increases with one standard deviation, the standard deviation of intention to buy will increase with 0.081. Taking the P-value and Beta coefficient into account, there can be conclude that intention to buy decreases over time.

Table 6.4.1 Regression Analyses

	Influence time on Intention to buy (c)		Influence quality on intention to buy (b)	
	Beta	**P-value**	**Beta**	**P-value**
Time	**0.081**	**0.057**	0.033	0.340
Quality				
- Tasty			**-0.626**	**0.000**
- Sweet			0.053	0.188
- Fresh			-0.034	0.481
- Sour			-0.064	0.101
- Hard			0.031	0.528
- Juicy			-0.049	0.248
- Crunchy			-0.006	0.911
- Mealy			**-0.092**	**0.054**
R^2	0.007		0.395	
F	3.634		39.191	
N	550		550	

A second regression analysis (table 6.4.1, **b**) was conduct to test if intention to buy is influenced by quality (**b**). This time the dependent variable was still 'intention to buy', but the independent variables were 'quality' and 'time'. Looking at quality variables in table 6.4.1, some of the variables (tasty and mealy) are significantly influencing the 'intention to buy'. Another interesting outcome is that the variable 'time' no longer influences the intention to buy (P-Value of 0.340). This indicates that when you look at the overall situation, time does not influence intention to buy directly (c). Time only has influence on quality, and quality will influence the intention to buy.

Since not all quality variables are significant and variables could influence each other as well, a factor analysis was conducted for identifying clusters of variables. Looking at the Rotated Component Matrix (table 6.4.2), 3 components were identified:
Bite (Component 1): Hard, Crunchy, and not Mealy
Taste (Component 2): Tasty, Fresh, and Juicy
Flavor (Component 3): Sweet and not Sour

Table 6.4.2 Rotated Component Matrix

	Bite	Taste	Flavor
Tasty	,287	,791	,167
Sweet	,092	,332	,792
Fresh	,336	,775	-,049
Sour	,221	,167	-,836
Hard	,889	,110	-,036
Juicy	,109	,822	,033
Crunchy	,842	,306	-,051
Mealy	-,783	-,287	,081

After knowing the different components, two other regression analyses were done (table 6.4.3). The independent variables for the first regression analysis were 'time' and the 'components', while the independent variable for the second regression was only 'time'. For both regression analyses the dependent variable was 'intention to buy'. The first regression gives a P-value of 0.057, which is higher than the P-value of the second regression (0.000). So, the intention to buy is more significantly influenced when both time and the components were the independent variables. Looking at the different components there can be seen that 'Bite' and 'Taste' were significant in both regressions. This means that Hard, Crunchy and not Mealy are influencing the intention to buy over time. The same holds for Tasty, Fresh and Juicy. Since the third component (Sweet and not Sour) is more about preferences of people, it is logical that this component is not significantly influencing the intention to buy.

Table 6.4.3 Regression with components

Components	1 Predictors 'time' and the 'Components'	2 Predictor 'time'
REGR factor score Bite	**0.004**	**0.016**
REGR factor score Taste	**0.000**	**0.000**
REGR factor score Flavor	0.596	0.596
R^2	0.295	0.007
F	56.911	3.634
N	550	550
P-Value	**0.000**	0.057

Overall there can be said that the intention to buy decreases over time because the perceived quality in Taste, Freshness, Juiciness, Hardness and Crunchiness went down and mealy up after time of harvesting. Although intention to buy decreases over time, time does not influence intention to buy directly. Time influence the perceived product quality, and in addition to that quality is significantly influencing the intention to buy.

7. Conclusion

In an environment where competition is growing and consumers have more choices, good product quality becomes more important. Although good quality is important for a business, for a fresh product like an apple it is hard or even impossible to guarantee a stable quality. In this paper, the influences of a fluctuating quality upon the positioning and buy intention of apple brands in the eyes of consumers is investigated. This chapter will give the conclusions.

The first conclusion that can be drawn from this research is that the expected product quality of apples does not significantly change over time. The only apple which showed a significant difference between the measurement in May and November was the Pink Lady apple. Since the expected product quality is based on the marketing positioning of a product, there can be conclude that (except for the Pink Lady apple) the marketing positioning did not changed over time because of a fluctuating product quality. A constant marketing positioning means that consumers have a strong constant idea about your product in their mind.

The second area worth noting is that the perceived quality varied over time. Looking at the perceived quality of all apples (table 6.2.1), five out of eight variables were significantly different in November and May. The variables 'Fresh', 'Sour', 'Hard' and 'Crunchy' were better in May than in November, while the apple was more 'Mealy' in November. This is not in line with the literature, since the literature expected that apples were better in November (just after harvesting). Especially the Elstar apple and Royal Gala apple were significantly worse in November. For the perceived product quality there were no apparent differences between the three groups ('imported after 8 months', 'Dutch apples sold after 8 months' and 'not sold after 8 months'). Although there were no apparent differences between the three groups, within the groups there were differences.

Both the expected and perceived product quality of the Kanzi and Junami apple did not changed significantly over time. This means that the expected and perceived quality was stable during the year, which is in line with the goals of both apple brands (stop selling after 8 months to guarantee a stable quality).

Another topic which is important in this research is the level of satisfaction. Although there are some small changes in the level of satisfaction (table 6.3.1), none of them were significant. This means that consumers were not significantly more or less satisfied during the year, even though the perceived quality was changing. Since the perceived quality significantly changed, but the expected quality stayed stable, a significant change in satisfaction would have been expected (which is not the case).

The last area worth noting is that the intention to buy decreases over time, because the perceived product quality is lower. Time does influences the intention to buy when quality is not taken into account. But when 'quality' was added as a variable, time did only influence the quality, and then quality had a significant influence on the intention to buy. So, in this research the variable 'perceived product quality' was used as a Mediator between the factors 'time' and 'intention to buy'.

Overall it can be said, that although the expected quality did not change during the year, the perceived quality did change. Since the expected quality does not change over time, the marketing position of apple brands will not change either. Next to that the buy intention of consumers did changed because of a fluctuating quality.

8.   Discussion

The results reported in this research do hold several important implications which could influence the usability of this research for apple firms. This research answers the main question and is therefore valid. Although this research is valid, there are problems related to the reliability of this research. Paragraph 8.1 explains why this research is valuable for apple firms/managers, and paragraph 8.2 appoints the problems in reliability and suggestions for further research.

8.1 Managerial implications

This research gives managers more insight in the perceived and expected product quality in the eyes of consumers. When comparing the expected and perceived product quality, this will give managers an idea about the level of satisfaction of their product. Also, these results allow a firm to determine the buy-intention of consumers over the year. Thus, managers could use this research to analyze the changes of quality, satisfaction and buy intention over the year.

8.2 Research implications and suggestions for further research

The findings and implications of this research indicate the need to further research on the changes in positioning and buy-intention of consumers throughout the year. In this paragraph the shortcomings will be listed, and suggestions for further research will be appointed.

8.2.1 Literature study and Questionnaire

Before doing the first measurement, a literature study was done. Although some quality variables were found, further literature research should be done in order to determine whether these are the only quality variables.

Although a pre-test was conducted to optimize the questionnaire, more improvements on the questionnaire should be made in further research. Some questions used in this research were not formulated in the right way or consumers did not exactly knew what was meant. For example, in the beginning of this research it was not explained what was meant with each particular quality variable. Since participants gave their own interpretation on it, this could have led to varying responses. Further research should include a list of explanations.

Another improvement of the questionnaire which could be made, is the randomization of the order of apples. The questionnaire used in this research always started with the Kanzi apple, followed with the Junami, Elstar, Jonagold, Pink Lady and Royal Gala. Participants will take the Kanzi apple as their null measurement and compare other apples with the Kanzi. This could influence the data, so for further research randomization of appels in necessary.

For this research the factor 'price' was not taken into account. Although price is not directly an indicator for quality, people will take it into account when buying an apple. An improvement for further research is to test if price influence the buy intention and if this influence the way people think about quality. In this research the question (how likely is it that you will buy 'x' apple within two weeks'), was asked. Although price was not taken into account directly, there were people who said '*I loved this apple, but I know it is expensive, so I am not going to buy it within two weeks'*. This indicates that people not only made their final decision (buying an apple) based on quality, but also on price.

8.2.2 The apples

In this research six apple brands were tested in May and five apples in November. Despite the fact that there was a good estimate about when apples normally are harvested, it is not exactly clear which day the apples used in this research were harvested. For example for the Pink Lady and Royal Gala, which both were imported, it is hard to find out where the apples used in this research came from and when they were harvested. Since the apples used in this research were bought in Supermarkets, it is hard to trace were the came from. In further research the apples must be bought two times at the same place and preferably directly from the apple firm to know exactly when they are harvested.

As said before, the apples used in this research were purchased in Supermarkets. Although the apples used in the second measurement were bought in the AH (Elstar, Royal Gala, Jonagold and Kanzi) and C1000 (Pink Lady), it is not exactly clear were the apples from the first measurement (done by a master student of Wageningen University) came from. Different Supermarkets could have different purchase channels, which means different quality. In case the apples did not came from the same supermarket, this could have influenced the quality standard.

8.2.3 The outcomes

In this research some of the outcomes were in contrast to what was expected. Especially the Elstar and Royal Gala apples were showing a significant difference in perceived quality, wherein the 'old' apples were better in quality than the ones which were just harvested. Even though this is in contrast with what was expected, there could be a reason for. Apple producers are not putting their 'bad' apples in cooling cells, they will sell them first. It could be that these 'worse' apples were used in the second measurement, and therefore the 'wrong' outcome was conducted.

Another reason for the opposite outcomes could be the different harvest years of the apples. Although the same apple brands were used, the apples used for this research, came from different harvest years. Apples used in measurement 1 (May), were mostly harvested in 2013, while the apples used in November came from harvest year 2014. It could be that 2014 was a worse year for apples compared with 2013 (or the other way around). This influence the quality, something which was not taken into account in this research. To prevent this 'problem', in further research the first measurement should be in November and the second measurement in May (so the apples are from the same harvest year).

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Appendix 1: Questionnaire

This research uses a questionnaire. This appendix shows the general questions and the questions related to the Kanzi apple. The questions about the Kanzi apple were repeated for the Elstar, Jonagold, Pink Lady and Royal Gala apple. Since the Junami was not for sale during the second measurement in November, only the questions related to the expected quality was asked for this apple.

Introduction

Thank you for participating in this research. The research will take approximately 15 minutes, you will be asked to answer several questions and you need to taste and judge 6 apples. At the end of the research you will receive a compenstation for your time. If you would like to rinse your mouth, you can use the bottle and cup. Good luck!

Buying behavior before the research

Which of the following apples do you buy?

	Never	Rarely	Sometimes	Often	Always
Jonagold	○	○	○	○	○
Kanzi	○	○	○	○	○
Junami	○	○	○	○	○
Elstar	○	○	○	○	○
Royal gala	○	○	○	○	○
Pink Lady	○	○	○	○	○

Preferences for market segments.

WAGENINGEN UR
For quality of life

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 about Kanzi (repeated for all brands)

WAGENINGEN UR
For quality of life

Ask the researcher for the **Kanzi** apple. You can feel, watch, and touch the apple, but **not taste**.

[>>]

Expected quality:

WAGENINGEN UR
For quality of life

Imagine yourself that you are standing in the supermarket and that you are going to buy an apple. The following questions are about your expectations of the **Kanzi** apple.

>>

WAGENINGEN UR
For quality of life

I <u>expect</u> that the **Kanzi** apple:

	Strongly disagree	disagree	neutral	agree	Strongly agree
Is produced in the Netherlands	○	○	○	○	○
Is hard	○	○	○	○	○
Is sweet	○	○	○	○	○
Is sour	○	○	○	○	○
Is expensive	○	○	○	○	○
Is fresh	○	○	○	○	○
Is imported	○	○	○	○	○
Is tasty	○	○	○	○	○
Is crunchy	○	○	○	○	○
Is mealy	○	○	○	○	○
Is cheap	○	○	○	○	○
Is juicy	○	○	○	○	○

Buying intention before consumption

How big is the chance that you are going to buy the **Kanzi** apple in the supermarket within 2 weeks?

- ○ 10. Certain, practically certain. (99 op 100)
- ○ 9. Almost sure (9 op 10)
- ○ 8. Very probable (8 op 10)
- ○ 7. probable (7 op 10)
- ○ 6. Good possibility (6 op 10)
- ○ 5. Fairly good possibility (5 op 10)
- ○ 4. Fair possibility (4 op 10)
- ○ 3. Some possibility (3 op 10)
- ○ 2. Slight possibility (2 op 10)
- ○ 1. Very slight possibility (1 op 10)
- ○ 0. No chance, almost no chance (1 op 100)

I give the **Kanzi** apple the following grade:

- ○ 10
- ○ 9
- ○ 8
- ○ 7
- ○ 6
- ○ 5
- ○ 4
- ○ 3
- ○ 2
- ○ 1
- ○ 0

>>

Perceived quality

Ask the researcher for a piece of **Kanzi** apple. You can taste this piece.

>>

Taste the piece of **Kanzi** apple. Then answer the questions below.

I think the **Kanzi** apple:

	Strongly disagree	Disagree	neutral	Agree	Strongly agree
Is sour	○	○	○	○	○
Is fresh	○	○	○	○	○
Is mealy	○	○	○	○	○
Is crunchy	○	○	○	○	○
Is hard	○	○	○	○	○
Is sweet	○	○	○	○	○
Is juicy	○	○	○	○	○
Is tasty	○	○	○	○	○

>>

Buying intention after consumption

WAGENINGEN **UR**
For quality of life

How big is the chance that you are going to buy the **Kanzi** apple in the supermarket within 2 weeks?

- ○ 10. Certain, practically certain. (99 op 100)
- ○ 9. Almost sure (9 op 10)
- ○ 8. Very probable (8 op 10)
- ○ 7. probable (7 op 10)
- ○ 6. Good possibility (6 op 10)
- ○ 5. Fairly good possibility (5 op 10)
- ○ 4. Fair possibility (4 op 10)
- ○ 3. Some possibility (3 op 10)
- ○ 2. Slight possibility (2 op 10)
- ○ 1. Very slight possibility (1 op 10)
- ○ 0. No chance, almost no chance (1 op 100)

I give the **Kanzi** apple the following grade:

- ○ 10
- ○ 9
- ○ 8
- ○ 7
- ○ 6
- ○ 5
- ○ 4
- ○ 3
- ○ 2
- ○ 1
- ○ 0

>>

General questions

Gender:

    Male   Female

    ○   ○

Age

Born in the Netherlands?

    Yes   No

    ○   ○

No, in a foreign country, namely:

>>

This is the end of the research. Thanks a lot for your participation. You will receive your reward from the researcher.

If you have any remarks, you can share them in the box beneath:

>>

Chosen apple after finishing the questionnaire.

Gekozen appel
- Kanzi
- Junami
- Elstar
- Jonagold
- Pink Lady
- Royal Gala
- Geen keuze

>>