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Master's Thesis

The Effectiveness of Origin Marks on Product Packaging

When Consumers Are or Are not Placed under Time Pressure

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Foreword

I would like to thank my lovely girlfriend, my parents with a sympathetic ear, my two supportive brothers, and my patient friends for all the motivation and support. You definitely pulled me through the last eight months!

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Abstract

This thesis studies the effect of different origin marks on the consumer's preference when purchasing pieces of cheese. A country-of-origin mark in the form of a Dutch flag, a Geographical Indications mark in the shape of the Protected Designation of Origin mark, and a fake mark in the appearance of a cow image are tested to observe how they affect the product's buying intent. In addition to testing the different marks on the packaging, the same study is also tested in the following conditions: when consumers have all the time they require and the condition in which people are placed under time pressure.

A conjoint analysis is used to test the valuations of the different marks on the purchase preference. In an online experiment, respondents had to choose between two pieces of cheese, differing in price and presence of marks. The valuation of each mark can be determined by analysing the choices made by the respondents via a binary logistic regression.

The Geographical Indication mark should be the most effective because this mark is designed and introduced by the European Union in order to regulate and certify products for their origin and, thus, their quality. However, the results reveal that the GI mark is outperformed by the fake mark in both conditions. The COO mark, which is found in prior literature to be effective, is found to not have any value for Dutch consumers who are deciding which cheese to purchase.

The results of the study indicate that in both conditions, the most preferred piece of cheese in the Netherlands displays all three marks simultaneously.

Surprisingly, no significant differences are established between the condition of time pressure and the condition in which all required time was available. The marks' effectiveness is constant over both situations even when consumers experience time pressure.

Table of Contents

Chapter 1 – Introduction	11
Problem statement	14
The research approach.....	14
The structure	14
Definitions	15
Research questions	16
Academic and practical relevance.....	17
Chapter 2 – Theory	19
Literature review	19
Packaging & Decision making.....	19
Geographical Indication marks	21
Effectiveness of GI marks	24
Country-of-origin effects.....	28
Country-of-origin marks versus GI marks	32
The effectiveness of a fake mark	34
Decision making under time pressure	37
Hypotheses.....	43
Theoretical framework.....	45
Chapter 3 – Methodology	47
Design of the experiment.....	47
The product	47
The variables	47
Target respondents	48
Conjoint analysis	48
Multiple surveys.....	51
Visualisation of choices	51
Mediating factors	52
The online survey	52
Part A.....	53
Part B.....	53
Part C.....	56
Analysis.....	56
Chapter 4 – Results	57
The experiment	57
Conducting the survey	57

Cleaning the data	57
Preparing the dataset.....	58
Description of the dataset.....	59
Sample size	59
Gender	60
Age.....	60
Behaviour, knowledge, and awareness.....	61
Respondent's buying and eating behaviour	61
Awareness of GI marks.....	62
Knowledge of GI marks	62
Knowledge of the PDO mark	63
Statistical technique	64
Logistic regression	64
Assumptions	65
Main variables and interaction terms	66
Method.....	67
The model.....	67
Analysis of the 'control condition' data	68
Binary Logistic Regression	68
The model.....	71
Interpretation of the general effects	71
Probabilities, odds, and odds ratios	73
Presence of multiple marks.....	76
The influence of increasing the price	78
Analysing the residuals.....	80
The most preferred product.....	80
Analysis of the 'time pressure' data	80
The model.....	82
Interpretation of the general effects	83
Probabilities, odds, and odds ratios	84
Presence of multiple marks.....	84
The influence of increasing the price	85
Analysing the residuals.....	86
The most preferred product.....	86
Summary of the effects	87
Differences between conditions	87

Differences in effectiveness due to knowledge	89
Testing the hypotheses	90
The effectiveness of a GI mark.....	90
The effectiveness of a COO mark.....	90
The effectiveness of an additional COO mark.....	91
The effectiveness of a fake mark	92
Summary of support for hypotheses	93
Chapter 5 – General discussion	95
The research questions	95
Time pressure.....	100
The problem statement	101
The implications	101
The limitations.....	103
Ideas for further research	105
Chapter 6 – Conclusions	107
Reference list	109
Appendix.....	117
Example of the online survey.....	117
Text version of survey	117
Tables	125

Chapter 1 – Introduction

For most people, grocery shopping is a weekly or even daily activity, which takes a significant amount of time. In the retail store, multiple aspects for each product have to be considered and this results in a decision to buy a specific product or to postpone a purchase to a later moment in time. In this decision-making process, one of the key considerations is the appearance of the product's packaging (Soltani & Majidi, 2014). As there is no standardised way of presenting products, packaging is found to affect consumer's buying decision (Stravinskienė, Rūtelionė, & Butkevičienė, 2008).

One of the packaging's elements are its marks, signs, or logos. For every product category, a range of signs and marks exists, emphasising the product's particular features. These signs and marks attract attention to the product's particular feature or origin, which is important to highlight. When examining the products in the grocery store, on almost every product a kind of mark can be found (see Figure 1).



Figure 1. Examples of marks on packaging.

Although they are not always primarily visible or noticed, a sign appears on almost all product packaging in grocery stores. When focusing on the appearance, more and more products seem to be equipped with at least one of the many possible signs.

The categories of signs have different goals such as emphasising the healthy alternative, referring to the organic nature of the product, rating the animal welfare, or specifying the region of origin. In particular, the latter set of marks is interesting to examine. The purpose of marks, which focus on relating the product to a specific origin, is mostly to infer quality meaning from this connection (Van Ittersum, Meulenbergh, Trijp, & Candel, 2007). In this category of origin marks, there are various alternatives to consider. For example, Country-of-origin marks (henceforth COO marks) are marks that connect a product to the country in which the product is made. Another example is the Geographical Indication marks (hereafter GI marks), which were introduced in 1992 under the European Law (Tosato, 2013). Geographical Indication consists of a scheme of three different GI marks that possess different properties. The GI marks also link a product to its region of origin; however, the GI marks are inherently different from the COO marks because of the national organisation certifying only products, which are audited on internationally agreed standards (Geographical indications and traditional specialities, 2014).

The purpose of the origin marks is to present particular information and to have an influence on the consumer's decision process. As such, an interesting question is, to what extent do these types of "origin marks" affect consumer behaviour? And do these marks have any influence during the in-store purchase decision process of consumers?

When the marks reach a sufficient level of credibility, this positively influences the consumer's perceived quality of the product (Zeithaml, 1988). This level of credibility is found to be crucial in signalling quality (Carpenter & Larceneux, 2008). The GI marks are introduced with this purpose of communicating quality to the consumer achieved by linking the product to its origin (Aprile, Caputo, & Nayga Jr, 2012). The additional information a GI mark reflects is the technical production requirements the product has met (Menapace, Colson, Grebitus, & Facendola, 2011).

Nevertheless, as various kinds of marks appear on products, different messages are communicated via these marks. Thus, it is likely that there are differences in the marks' effectiveness. In a study in Italy (Vecchio & Annunziata, 2011), most people stated they knew and understood the meaning of the GI marks and its scheme. However, when having to judge the products, this was proven difficult due to other marks, which misled the consumers. For example, respondents state to understand GI marks; yet, when an Italian flag was present on the packaging, a large part of the customers had problems distinguishing the GI marks from the label

information. In sum, customers think they know what the marks entail and are able to identify them, but when tested, the identification was difficult for the majority of the respondents due to the other packaging elements.

The question is whether the marks' presence in general, and GI marks in particular, results in a higher preference to buy for the product carrying the mark. In the end, this is what marketers attempt to achieve when deciding on the packaging; their product should be preferred over the one from the competitor.

To determine the effectiveness of origin marks on product packaging, this thesis investigates Dutch consumers' shopping behaviour when purchasing pieces of cheese and whether these have origin marks. Cheese is chosen as the studied product because it fits the target respondents and the market best. The GI mark is tested against the COO mark, which also represents where the piece of cheese originates from yet without any quality assurance. Moreover, the GI mark is tested and against a fake mark, which has no inherent value and is merely a picture that may refer to a region of origin. This experiment asks consumers to choose between different sets of cheeses with different marks.

In addition to the marks' presence, another imperative factor in consumer shopping behaviour is time pressure. Time pressure has increased for all industrialised societies over the past decades (Zuzanek, Beck, & Peters, 1998); therefore, time pressure influences consumer's in-store purchase decisions (Connors, Bisogni, Sobal, & Devine, 2001). Nowadays, people tend to be in a hurry, and experiencing time pressure during shopping is not an exception. As such, it is interesting to examine whether this increased feeling of time pressure affects the effectiveness of GI marks, COO marks, or fake marks. As purchase decisions are influenced by time pressure, this may also influence the manner in which products are evaluated. Shopping under time pressure is the reality, and thus marketers have to deal with this. Ignoring to incorporate time pressure in studying the effects of origin marks would provide results, which do not match the real-life shopping situations consumers can experience. Especially for marketers, the outcomes and potential differences between the situations are important for their packaging decisions. Thus, the insights into mark's effectiveness are valuable and may guide marketers towards making the most effective use of their packaging in the future.

Problem statement

As previously discussed in the introduction, different origin marks may affect the preference to buy a particular product. At the same time, increasing time pressure during purchase decision may influence the effectiveness of these marks. Trying to determine the best choice of marks and to understand the influence of possible time pressure during grocery shopping, results in the following main problem statement:

Which type of origin mark on product packaging provides the highest preference to buy when the consumer is or is not placed under time pressure?

The dependent variable of this study is the preference to buy for a packaged piece of cheese. The factors affecting this preference are the presence of various marks emphasising the origin of the cheese, tested in multiple settings of presence and absence. Time pressure is proposed as a moderating variable for the preference to buy.

The research approach

This thesis is based on a quantitative research. A conjoint analysis is used to test the valuation of different origin marks in two conditions: when people have all the time they need and when people are placed under time pressure. The experiment is conducted via an online experiment. In this experiment, respondents are presented with two products, having to indicate the product they prefer to buy. Based on the experimental design of the conjoint analysis, the presented products differ in its packaging. This research method allows identification of the valuation of the marks and enables answering the main problem statement.

The structure

In the subsequent sections of this chapter, the research questions are presented and academic relevance is explained. In the next chapter, the existing literature relevant for this thesis is discussed, which results in the formulation of the hypotheses. In the third chapter, the methodology of the experiment is explained. In addition, the data is obtained, and the results are presented in Chapter Four. In the fifth chapter, the results are discussed and the research questions are answered. The conclusions are provided and the problem statement is answered in the final chapter. Finally, the reference list and the appendix can be found at the end of this thesis.

Definitions

In the studied literature the words marks, cues, and labels are used interchangeably. Moreover, in a large part of the studies, it is unclear which visual representation is used when testing for “COO cues”; for example, a flag, the national colours incorporated in packaging, or the text “Made in ...”.

In this thesis, the term “marks” refers to the small coloured stamps or signs, as previously indicated in Figure 1. Moreover, marks are the focus of this study. A “cue” is the more general term for any particular present sign, which the consumer may link to something he or she knows. Thus, a COO cue refers to any way of expressing an association with a country, for example the text “Made in ...” can be a cue, or the three colours of the Dutch flag incorporated in a brand logo. When talking about “labelling”, this refers to the entire product label on the packaging, including the product information, bar code, and all present marks.

For this research, the following marks are discussed: the GI mark, the COO mark, and the fake mark. The reference to “origin mark” is the general term for all the marks indicating any association to its origin. The three marks are used in the experiment and are presented by the following graphical visualisation:



Figure 2. References to “the GI mark”, “the COO mark”, and “the fake mark”, respectively.

Research questions

To answer the main problem statement, the following research questions are tested:

Research question 1: “Does adding an origin mark (a GI mark, a COO mark, or a fake mark) versus no origin mark to the packaging increase the preference to buy for a product?”

This research question assesses the general effectiveness of origin marks on product packaging in terms of preference to buy. Here, the real effectiveness of putting a mark on a product is discovered. To determine potential variances in the effect due to time pressure, the effect is tested both in a time-constraint setting and in a setting without time pressure.

Research question 2: “What is the effect of time pressure on the evaluation of a GI mark compared to a COO mark?”

This research question addresses the preference to buy products with a GI mark and products with a COO mark, as it is possible that there is a difference in evaluation of the COO mark and the GI mark. In the time-constraint situation, it is tested whether this difference applies when consumers are deciding under time pressure.

Research question 3: “What is the effect of time pressure on the evaluation of a GI mark compared to a fake mark?”

Research has demonstrated that fake marks are recognised by consumers as actual quality inferring marks (Vecchio & Annunziata, 2011). It is interesting to examine whether there is a difference in evaluation of the GI mark compared to a fake mark. Second, it could be that this evaluation changes when respondents are placed under time pressure.

Research question 4: “Does the preference to buy increase by adding a COO mark to a GI mark?”

This last research question determines the effect of using a COO mark together with the GI mark, which possibly leads to a higher preference to buy compared to only a GI mark. Moreover, the second dimension is whether adding a time limit influences the effectiveness of the combination.

By testing the hypotheses and answering these research questions, the answer to the problem statement about the most effective origin mark with or without time-constraint can be found.

Academic and practical relevance

This thesis contributes to the existing literature by providing additional insights into the effectiveness of COO marks. Moreover, this research examines another dimension of the literature studying GI marks by comparing the effectiveness of COO, GI, and fake marks. This study responds to the proposed further investigation of another geographical region (Aprile et al., 2012; Marcoz, Melewar, & Dennis, 2014; Van Ittersum et al., 2007; Vecchio & Annunziata, 2011; Teuber, 2011), and another product in order to improve the external validity (Carpenter & Larceneux, 2008; Marcoz et al., 2014; Verbeke, Pieniak, Guerrero, & Hersleth, 2012).

Menapace et al. (2011) is the only study comparing the effectiveness of GI marks and COO marks. There is, as far as I am aware, no other research published before comparing the effectiveness of GI marks to COO marks and fake marks. This thesis additionally tests all hypotheses under the circumstances of time pressure, resulting in comparable results between the situation of no time constraint and the situation in which consumers are placed under time pressure. This contributes and expands the research on decision making under time pressure.

The implication for marketing practice are inherent to the problem statement; finding the most effective strategy for using origin marks offers valuable insights into consumer purchase considerations when facing packaging. As a result, marketers can benefit from the insights by making informed decisions on how to design their product's packaging.

As such, the results are particularly interesting for marketers who are dealing with the question whether to use marks. Potential differences in preference to buy for a product due to various marks provide insights into managerial decisions of using origin marks on products. Furthermore, potential differences due to time pressure are extremely interesting, as marketers who base their packaging decisions solely on findings in the non-time constraint setting may ignore the effects of time pressure on the in-store purchase decision. In addition, this is interesting for marketers who are considering applying the GI mark and for the European Commission working on the GI marks.

Chapter 2 – Theory

Literature review

This study combines three different fields of research. In the succeeding parts, the existing literature on the origin marks is discussed. In order to formulate hypotheses, the literature on packaging and its influence on decision making is discussed first, as this is the basis for further discussion. Then, the existing literature in the field of Geographical Indication research is examined followed by the findings on effectiveness of using COO marks and the literature on using fake marks. Finally, the existing knowledge on the influence of time pressure is considered.

For each section, a hypothesis is formulated, resulting in four hypotheses in total. These four hypotheses concern the situation with no time pressure (H1a, H2a, H3a and H4a). For each of the four formulated hypotheses, a second hypothesis is formulated in the last section, which takes the influence of time pressure into account (H1b, H2b, H3b, H4b). Lastly, the four hypotheses for each situation are summarised.

Packaging & Decision making

A product's packaging and the decision-making process of which product to buy are fundamental factors in this thesis. First, both fields of research are discussed.

Packaging

Packaging is “the outer element of product, a feature that is associated with product but not as a part of physical product” and influences consumer's decision process in-store (Deliya & Parmar, 2012). It is the element which determines the physical appearance, including the used materials, the chosen colours, and the visual shape. As established by Prendergast and Pitt (1996), packaging has different basic functions, and the main objective is to protect the product during its logistic process. The second function is based on marketing for which packaging is used to attract attention and communicate certain attributes of the product. They also state that packaging has become one of the most important factors when it comes to deciding in-store. This is primarily relevant for this thesis, because origin marks are trying to influence the in-store decisions. According to Habibi (2001), besides guaranteeing the freshness of products, packaging also adds value in the transportation and stocking, and it enhances the relationship between the manufacturers and buyers. Furthermore, Lewis (1991) has identified packaging as a tool for recognition, and it signals the values of the product. Thus, recognised marks facilitate and support the overall recognition of the product. Moreover, results from Silayoi and Speece (2004)

indicate that well-designed packaging positively influences the confidence of people's perceived quality.

Decision making

Packaging influences the decision-making process of consumers (Deliya & Parmar, 2012). When consumers decide in-store on what to buy, extrinsic cues are found to be easier to recognise than intrinsic cues (Purwar, 1982). The decision-making process is affected by the packaging as an extrinsic cue by attracting attention, communicating information, positioning the product, make it stand out and enhance recognition because of a distinctive appearance (Stravinskienė et al., 2008). These extrinsic cues entail the writing, symbols, pictures, and signs (Soltani & Majidi, 2014). They state that besides information on the type of packaging, the way the product should be handled, how it should be maintained, and how the packaging should be treated is included in the extrinsic cues. The origin marks are part of these extrinsic cues and, therefore, are easier to recognise. In short, marks enhance product's visibility and communicate its origin and inherently its quality.

Within these cues, two categories of elements are identified which influence consumers' decision process. These are visual elements and informational elements; the latter includes the brand and product information (Silayoi & Speece, 2004). The combination of these two features attracts attention and is able to improve the attitude and perceptions of consumers towards the product (Deliya & Parmar, 2012). Silayoi and Speece (2004) also have investigated the differences between visual and informational elements, and indicated the trend towards more conscious choice decision based on product information; however, at the same time, people tend to become annoyed by the small fonts and dense texts, which causes confusion. The graphical representation has a strong impact on purchase decisions; this is especially true for low-involvement products such as food products (MacKenzie, Lutz, & Belch, 1986). According to Silayoi and Speece (2004), the product needs to stand out in a display, which was verified by 'colour' and 'graphics' established as the most highly noticeable factors. Furthermore, they found when people are not fully considering their purchase decision, graphics become the most important factor. Therefore, the use of marks on food products can benefit from this, as they are part of the packaging' graphics.

Similarly, Stravinskienė et al. (2008) have concluded that non-verbal visual information affects emotions, which helps to position the product and influences the decision-making process. Additionally, Rundh (2005) states that the packaging works as an attraction method, influencing the brand image and perception. Packaging is the manner to express the product's uniqueness, underlining its originality and proposing its quality (Silayoi & Speece, 2004). In the study

conducted by Wells, Farley, and Armstrong (2007) 21% of the respondents used packaging to infer meaning of the product's quality. Furthermore, over 73% used the packaging in their purchase decision. As Soltani and Majidi (2014) argue, packaging has turned into a part of the product and it is nowadays the most important element affecting the consumer's attitude and preferences. Soltani and Majid (2014) and Wells et al. (2007) state that packaging itself can even become a sustainable competitive advantage, which makes it a key marketing tool. Overall, it is clear that marks can play an important role in packaging and decision making.

As can be concluded from the literature, packaging and extrinsic cues are vital in the consumers' in-store decision-making process. The product's packaging is the only way of expressing the origin marks. Moreover, the packaging contributes to the product's associations, preferences, and perceived quality. As such, the origin marks are part of these contributions. The strength of this contribution depends on different dimensions. Stravinskienė et al. (2008) have identified three dimensions which influence the communication strength such as the type of choice, consumer involvement, and time pressure. This last factor is interesting to examine, as several studies appoint time pressure as one of the influencing factors for the effectiveness of packaging communication. All factors that could influence consumer behaviour become less effective when time pressure is involved; the decision-making process itself becomes limited. As previously pointed out, the influence of time pressure on the effectiveness of using marks is examined in this thesis. The literature on time pressure is discussed in more detail in the last section of this chapter.

In the succeeding parts, the literature on GI marks, COO marks, and fake marks is discussed. In each of the parts, hypotheses are formulated.

Geographical Indication marks

The geographical region a product is manufactured in, or originates from, can influence the product's quality due to its geographical conditions, methods, or reputation of expertise (Verbeke et al., 2012). For several products, the geographical origin has become the product's trade name such as 'Cheddar cheese' and 'champagne'. In order to protect these trade names from unauthorised use of foreign manufacturers or misleading manufacturers, the protected designation of origin framework came into effect in 1992 under the European Law (Tosato, 2013). This law regulated the use of GI marks. These origin marks are placed on products which are certified for specific levels of regional originality. Officially, "a geographical indication is a distinctive sign used to identify a product as originating in the territory of a particular country,

region or locality where its quality, reputation or other characteristic is linked to its geographical origin.” (Geographical indications - Trade, 2015).

There are three types of possible European classifications for products:

- PDO, an abbreviation for Protected Designation of Origin;
- PGI, which stands for Protected Geographical Indication; and
- TSG, Traditional Speciality Guaranteed.

The types are visualised in the following marks:



Figure 3. From left to right: PDO, PGI and TSG mark (Geographical indications and traditional specialities, 2014)

These three European schemes “encourage diverse agricultural production, protect product names from misuse and imitation and help consumers by giving them information concerning the specific character of the products” (Geographical indications and traditional specialities, 2014). The schemes are designed to promote the agricultural products and, simultaneously, secure and protect the name of the product brand. The other purpose is to inform consumers about the nature of the product. The product’s perceived credibility is influenced by the fact that the product is certified by national organisations, which possess an accreditation for testing and certifying products.

The differences between the three marks depend on the level of originally used ingredients, processes, and methods (see Table 1).

The Geographical Indication scheme	
Protected Designation of Origin:	covers agricultural products and foodstuffs which are produced, processed and prepared in a given geographical area using recognised know-how.
Protected Geographical Indication:	covers agricultural products and foodstuffs closely linked to the geographical area. At least one of the stages of production, processing or preparation takes place in the area.
Traditional Speciality Guaranteed:	highlights traditional character, either in the composition or means of production.

Table 1. Differences between the GI marks (Geographical indications and traditional specialities, 2014).

PDO is the highest level of protection, which means all the stages of production, processing, and preparation occur in the specific geographical area. For PGI, however, only one of the stages is required to take place in the area. Finally, TSG is the lowest level, which does not require any link to a specific geographical area.

Before the GI marks were introduced, the French term 'terroir' was used to emphasise the association between the regional origin and the product's quality. Terroir reflected the context of production in terms of climate, soil, culture, tradition and local knowledge, and the quality of the product (Parrott, Wilson, & Murdoch, 2002), which is an essential link when applying for a GI mark.

The benefit and uniqueness of this GI marks is the objective certification by the government. There is no commercial influence of manufacturers and retailers and no branding for the marks; the GI marks are regulated and issued by an unbiased party. The mark's distinctive character lies in the combination of an objective level of quality together with a reference to a specific geographical region. In addition, special authorities in the market place will control for misleading products (DOOR, 2015). In order obtain the specifications and classifications of a GI mark, the manufacturer must apply for the indication, bearing effort and costs. This is the GI scheme's major drawback, as it requires a great deal of effort, time, and expenses to have the product certified.

In the Netherlands, only 15 products are registered as or applied for the geographical indications (DOOR, 2015). In total 1,460 products are registered in the DOOR database (Database of Origin and Registration), including non-European products. Therefore, the number of Dutch registered products is relatively low. Yet, as is stated in Verbeke et al. (2012), the Netherlands is part of the northern European countries, dividing Europe into northern and Mediterranean countries. In the Mediterranean part of Europe, for example in Spain and Italy, consumers are more used to the concept of terroir and the GI marks. In fact, the majority of the registered products are from these countries (Becker, 2009). The northern countries, however, are not very familiar with the GI system. Furthermore, compared to other northern countries, the Netherlands has an average number of certified products (see Table 2).

Registered products in:	
Belgium	19
Finland	10
Sweden	7
Denmark	9
Poland	37

Table 2. Number of registered products in DOOR. (DOOR, 2015).

Moreover, compared to the United Kingdom and Germany, which have 72 and 97 registered product respectively, the Netherlands has a low number of registered products.

This low number of registrations in the Netherlands may affect the findings of this thesis, as the awareness of the GI marks in general may be low. To estimate the knowledge of the GI marks, the GI marks' awareness among the respondents is measured. If the knowledge on GI marks turns out to be considerably low, this will be a limitation of the study. On the other hand, for the Netherlands, this is the reality and the actual established awareness level of the GI marks. The implications for marketers on the effectiveness will not be biased, as, for the Netherlands, the outcomes are representative for the sample. However, if the awareness is considerably lower compared to other countries, the results will be difficult to generalise to other countries.

A considerable amount of money and effort is devoted to the introduction and maintenance of this scheme; and for manufacturers it requires money and effort in order to certify their product with a GI mark. An interesting question is, whether the introduction of GI marks is effective. From a marketer's perspective, will adding a GI mark to their product increase the preference to buy this product? The existing literature on the GI marks' effectiveness is studied next.

Effectiveness of GI marks

A significant number of studies have focused on the effectiveness of GI marks. The GI mark has two effects: the effect of the region-of-origin cue and the effect of the certification mark itself (Teuber, 2011). As is discussed by Van Ittersum et al. (2007), consumers view the GI marks in a quality warranty dimension and an economic support dimension. The quality warranty represents the effect of the mark, which guarantees the prospected buyer a higher quality than average compared to a product without the GI mark. The economic support dimension influences the consumer's beliefs to what degree the mark can support the specific region in terms of local economy (Van der Lans, Van Ittersum, De Cicco, & Loseby, 2001).

Perceived quality

The products' origin becomes a substitute for information on the food safety and risk of consuming the product (Kim, 2008). Moreover, it provides information on the quality level of the product (Van der Lans et al., 2001; Van Ittersum et al., 2007), which increases the perceived quality for the regional product (Veale, 2008). This increased perceived quality is confirmed for wine (Orth, McGarry, & Dodd, 2005), as well as for beer (Lentz, Holzmüller, & Schirrmann, 2006), and for cheese (Bernabéu, Díaz, & Olemda, 2010), as summarised by Marcoz et al. (2014). The fact that a higher perceived quality was found for cheese indicates that cheese is a good product to test in this thesis.

The quality warranty dimension is established to be the most important determinant for the higher willingness to buy and willingness to pay for the regional products because of the higher perceived quality (Teuber, 2011; Veale, 2008). As was found by Verbeke et al. (2012), consumers are much more motivated to receive information of the product quality through GI marks, compared to having real interest in supporting the local food economy. Keeping the high-quality standards of a GI-marked product is critical for developing a positive attitude towards the product (Van Ittersum et al., 2007). Hence, GI marks are considered as mainly quality communicators on packaging and, thus, a substitute for label information.

Positive effect of GI marks

There are a couple of studies which have observed positive effects of the GI marks. The study of Van Ittersum et al. (2007) concludes that consumers who buy regional products have a favourable image of the GI marks, which differentiates from a neutral view of the products based on higher scores of both the quality warranty and economic support dimension. The higher perceived quality due to the quality warranty dimension and the strengthened attitude towards the regional product because of the economic support dimension creates a favourable image. This favourable image increases the perceived quality and the attitude towards the GI-marked products. Furthermore, the total effect of the two dimensions is substantially increasing the willingness to buy and willingness to pay for the regional products. Therefore, when providing regional products with a GI mark, the GI mark is found to be effective, as it increases the willingness to buy and pay compared to a non-marked product.

The study of Menapace et al. (2011) also found significantly higher willingness to pay for GI-marked products, proving the effectiveness of GI marks in general. In addition, they have established differences in the willingness to pay for PDO-marked and PGI-marked products, with higher results in the willingness to pay for PDO-marked products. Although the PDO mark turned out to be less recognised, the willingness to pay was higher for the PDO mark compared to the

PGI mark. Vecchio and Annunziata (2011) have revealed that more than half of their respondents were willing to pay a price premium of over 20% for GI-marked regional product and that 27% of the respondents were willing to pay up to 10% more for the product. Even though Menapace et al. (2011) discovered differences between the different types of GI marks, this thesis does not aim to verify these differences for the Dutch market. This is because the awareness of the GI marks is expected to be lower than average, and, therefore, this will most probably not provide significant findings.

Verbeke et al. (2012) conclude that various studies have identified positive valuations of GI marks by consumers regarding the perceived quality of the products. Hence, the willingness to buy and pay for the product due to its geographical region and the traditional character enhances (e.g. Caporal & Monteleone, 2001; Espejel, Fandos, & Flavian, 2008; Hersleth, Lengard, Verbeke, Guerrero, & Naes, 2011; Van der Lans et al., 2001). They have established that consumers believe that GI marks communicate high quality. The GI marks' positive influence on perceived quality is improved by the strong associated belief that the GI mark signals a distinct product character. This is in line with Steiner (2004) who states the created unique identity of the regional products adds value to the regional image and, thus, to the product. Van Ittersum et al. (2007) have identified the positive valuations due to the protection offered by the mark, ensuring product quality. They suggest the certification mark increases the consumer welfare by providing transparency in the market of regional products, which allows consumers to make better decisions. Following this reasoning, it is expected to observe a higher preference to buy for products displaying the GI mark, compared to products without the mark.

In a study conducted in Italy, Marozz et al. (2014) have found the European GI marks to be one of the most reliable quality indicators. In their study on Fontina, they concluded that the region of origin is of high importance for the local consumers. The GI marks are expected to be valued and infer higher preferences to buy compared to non-marked pieces of cheese.

Deselnicu, Costanigro, Souza-Monteiro and McFadden (2011) established that European-based products induce a lower additional willingness to pay compared to products based in North America and Australia. On a product category level, despite the country differences, the premium on cheese turned out to be one of the highest. Deselnicu et al. (2011) have found an explaining factor, which determines differences in terms of price premia, namely the level of processing. Highly processed products, such as cheese and wine, demand multiple stages of production before the end product is produced. These processes are complex, and as GI certification monitors these steps thoroughly, a GI mark on highly processed products signals

certified quality. Thus, this results in a higher willingness to pay. Again, this is expected to be reflected in the higher preference to buy for a GI-marked piece of cheese.

Negative effect of GI marks

According to other reports, consumers do not always value GI marks, or when they do, it depends on the market segments (e.g. Bonnet & Simioni, 2001; Loureiro & Umberger, 2003; Tregear & Giraud, 2011).

The results of Ilbery and Kneafsey (2000) suggest that for most PDO certified products, the mark is not regarded by the producer as a marketing indicator to enhance the consumers' decision-making process, but as a means of increasing the entry barriers for potential new competitors. The study of Carpenter and Larceneux (2008) discovered the following effect: for products, which are purchased on a non-regular basis, for example foie gras, an unexplained PGI mark worked counterproductive. The unknown mark was perceived as counterfeit because consumers did not recognise the mark. From the consumer's point of view, the present PGI mark may be obscuring the real low quality of the product. Without explaining the mark, the GI mark could potentially even decrease the perceived quality of the product. Nonetheless, as cheese is a frequently bought product for the majority of the consumers, this probably does not affect the findings in this study.

Mediating factors

In several papers, the effect of mediating factors on the effectiveness of GI marks is studied. Krystallis and Ness (2005) have established that factors, such as age, education, and income, affect the consumer's preferences. Furthermore, they found the GI marks to be more important especially for younger individuals and consumers who have higher incomes and educational backgrounds. These mediating factors are tested in this thesis to verify whether differences across age and gender can be observed.

The effect of awareness and knowledge of the GI marks' meaning is found to be of utmost importance. As such, the effectiveness of the information that the product is authentic and that the name is protected depends on the consumer's appreciation of the GI marks (Van Ittersum et al., 2007). Likewise, Van der Lans et al. (2001) pointed out that the mark's success does not only depends on the awareness, but also on the favourable image of the region to which the GI mark refers.

A survey conducted by Teuber (2011) concluded that only a very small share of the respondents in Germany was familiar with the GI marks. Furthermore, Verbeke et al. (2012) found the awareness of GI marks to be higher among men and people over fifty. Awareness was also

higher among the southern European countries, such as France, Italy and Spain, compared to the northern European countries such as Belgium, Norway, and Poland. In addition, respondents claimed to be most aware of the PDO mark, followed by the PGI mark, and the lowest awareness of TSG (68%, 36% and 25% respectively).

In a research by Carpenter and Larceneux (2008) the differences between an unexplained GI mark and an explained GI mark were tested for the perceived quality and purchasing intent. When the PGI mark was explained as an EU guarantee of the regional origin, this significantly increased the perceived quality and the purchase intention. Therefore, they found evidence for the positive effect of GI marks on purchase intentions. However, awareness appears to be a problem, as consumers without knowledge of the GI marks were willing to pay a premium up to 10% for marked products, while one third of the respondents with knowledge and awareness of the PDO mark were willing to pay a price premium up to 40% for the regional products (Vecchio & Annunziata, 2011). Thus, increasing awareness and knowledge of the GI marks increases the willingness to pay a price premium. The results of Vecchio and Annunziata (2011) also indicate that when people have excellent knowledge of the various kinds of GI marks, these marks are the main motivation for them to purchase the regional product.

Taking the previous research into account, including the effect of the mediating factors, the findings in literature focussed on the GI marks' value suggest that in providing a piece cheese with a GI mark should result in a higher preference to buy. As a result, the first hypothesis is formulated:

H1a. Adding a GI mark to product packaging increases the preference to buy for a product.

Hypothesis 1b includes the moderating effect of time pressure, which is explained and presented at the end of this chapter.

Country-of-origin effects

The next field of research relevant for the current study is the research on COO marks on product packaging, because these marks are an alternative for the GI marks. The GI marks are relatively new, however COO marks are used for a long time and are a widely studied phenomenon. In this section, the research on the effects of COO marks are discussed.

Country-of-origin effects in general

In 1987, Tan and Farley (1987) stated that the research on Country-of-origin effects was the most extensively researched phenomenon of consumer behaviour. As defined by Zhang (1996),

COO cues represent information where the product is made, mostly by adding “Made in ...” and the name of the country on the product.

Furthermore, Maronick (1995) identified the three streams of research on COO effects. Some researchers propose that the COO effects are cues, which simplify the processing of information. Others claim that COO cues are an indication of the country’s stereotypes, and, thus, their products. Finally, others state that the relative importance of the cues are affected by the use of single or multiple cues.

Evaluation of the product is based on both intrinsic and the extrinsic cues (Olson & Peter, 1987). COO cues are one of the most important extrinsic cues (Klein, Ettenson, & Morris, 1998). When consumers have no proper information or experience with the product they want to buy, they may infer meaning from the intrinsic and extrinsic cues to evaluate the product (Maheswaran, 1994). When the familiarity with the product is low, and, therefore, the level of knowledge and experience, consumers rely more on COO cues. In contrast, when the level of product knowledge is high, other cues are stronger in the decision-making process, reducing the importance of the COO cue (Schaefer, 1997). Furthermore, when this effect is the dominant effect, in case of cheese products, the importance of the COO cue should be low as the product knowledge of cheese is expected to be high in the Netherlands.

Moreover, Lusk et al. (2006) studied COO cues extensively. According to them, quality can only be determined when it is actually consumed; to fill the gap of missing information concerning the quality, the COO cues are used as the quality’s predictors (Huber & McCann, 1982; Maronick, 1995). Consumers deduce meaning from the product’s country and use its reputation as an indicator of the product’s quality. Inferring meaning from attributes, such as the COO cue, in order to assess the product’s quality is called the Halo effect (Nisbett & Wilson, 1977). The associations with the country are consumer-specific, and can be positive, negative, or indifferent. Additionally, the term “country equity” is used to describe the image of the country (Lusk et al., 2006). They propose two purposes of the COO cues for consumers. First, the product’s country of origin and the quality relate due to better tasting products or the safer products manufactured in this particular country. Second, there is no real relation between the country and the product quality, yet consumers feel connected to their home country and, thus, they prefer these products. Both these purposes are relevant in this thesis, as both can be the main reason for consumers to buy a COO-marked piece of cheese.

Thus, the COO marks shape perceptions in addition to the other information provided on the packaging (Cai, Cude, & Swagler, 2004). Consequently, country-of-origin marks may even

override the retailer's product information (Lusk et al., 2006). Therefore, placing a COO mark can be more convincing than text on the label. They state that three mechanisms explain the effects of COO marks. First, the cognitive mechanism in which the COO is a cue that consumers relate to product quality. Second, the affective mechanism where consumers relate the COO cue to symbolic and emotional values. Third, the normative mechanism concerns social and personal norms, which can be related to buying regional products, or not buying products from countries which are disliked (Verlegh & Steenkamp, 1999). In all three mechanisms, a positive association with the country infers positive COO effects.

Effect of Country-of-origin cues

Strong evidence exists for COO cues to affect consumer's purchase intentions and perceived quality (e.g. Baughn & Yaprak, 1993). The influence of COO cues on product evaluations is studied intensively, resulting in evidence for COO cues to affect consumer's evaluations on products (Bilkey & Nes, 1982). In addition, COO effects on products in general, on product classes, on specific types of products and on specific brands have been summarised (e.g. Gaedeke, 1973; Krishnakumar, 1974; Hampton, 1977; Yaprak, 1978).

COO marks are only deemed successful when in the consumers' minds the country is associated with the specific attributes he or she is looking for (Deselnicu et al., 2011). For example, when the durability of a particular product cannot be determined before consumption, consumers will seek inferences to assess the durability. If the country of origin is not at all associated with products of good durability, COO cues will not affect the perception of the durability; thus, it does not aid the consumer in the decision-making process. Nonetheless, when there are established associations for the majority of consumers, emphasising the country of origin in order to link these associations to the product can be successful and improve the consumer's perception (Deselnicu et al., 2011). For instance, Italy has high associations with leather products while the United States has established quality associations for clothing (Wall, Lifeld, & Heslop, 1989).

Culture dependent

Country-of-origin effects are not objective, since strong patriotism and ethnocentrism can affect the country-of-origin associations, and, in turn, result in biased perceptions of product quality (Lusk et al., 2006). When a consumer from the United States values products from its home country and has a strong feeling of patriotism, products marked with "Made in U.S.A." can override other available information on the quality and bias the perception of quality. On the other hand, COO marks can create quality. McClure et al. (2004) revealed when consumers were told they were drinking Coca Cola, this resulted in much higher neural activity than drinking

Pepsi. The same would be true for COO marks; when consumers value the extrinsic cues (brand or mark), this can actually create quality in the consumers' minds.

Furthermore, culture plays an important role influencing the magnitude of the COO effects (Klein et al., 1998). For example, Gürhan-Canli and Maheswaran (2000) found that Japanese prefer products made in their home country without trying to assess the product's quality. Most of the American consumers, however, are less focused on COO marks and evaluate products rather on its superiority than on its country (Hsieh, 2004). Nevertheless, the overall behavioural trend for consumer is to be more favourable about their native-country products (Bilkey & Nes, 1982). This finding affects the effectiveness of the tested COO marks, because the COO marks on the cheese refers to the home country of the Dutch respondents. Due to this bias, it is anticipated to find significant COO effects on the preference of buying COO-marked cheese.

Negative COO effects

In addition to positive COO effects on product quality evaluations, bad experiences with a product may lead to the generalising association of the country delivering low quality products without taking into account the manufacturer or designer (Insch & McBride, 2004).

Maronick (1995) argues that claiming "Made in U.S.A." should be done carefully, since consumers who have unfavourable quality associations with the United States, a product of marginal quality can reinforce this view. At the same time, for consumers with strong positive associations, the mark will not necessarily increase perceived quality and using the mark could be useless. Appelbaum and Halliburton (1993) claim that COO marks should be used during the product's introduction such as positioning the product in the early stages by providing additional information of the country. In the growth and maturity stages, the COO mark becomes more abstract than informational. When the frequency of purchasing the product increases, the judgments about the product's quality are established, relying on COO marks to a lesser extent (Heslop, Liefeld, & Wall, 1987). The same is true when consumers are exposed to other cues as well, then the importance and reliance on the COO cue is decreased (Han & Terpstra, 1988; Johansson, Douglas, & Nonaka, 1985). This is because consumers are confronted with various cues, for example in complex advertisement, which diminishes the relevance to a general level.

Nonetheless, the abovementioned results are not suggesting that the COO mark has a detrimental effect on the purchase preference. Yet, most of the results state that the effectiveness of the COO marks diminishes over time or in specific situations. The overall effect of COO marks is found to be positive, as they influence the product's perceived quality in a beneficial way. The most important factor, which determines the valence of the COO effect, is

the general association with the country. A case in point is that Asian countries are known for their low labour rates and their cheap products, especially clothing (Gereffi & Memedovic, 2003). For European consumers, these associations will not have a positive influence on the quality evaluation and preference to buy. However, when positive associations between its country and the product's quality are established, the COO effect is positive. For example, the discussed literature has shown price premia for Italian products. In this thesis, it is not expected the Dutch respondents will have unfavourable attitudes towards home country products such as cheese.

Therefore, it is interesting to examine to what extent the COO mark outperforms the GI mark. Or is the opposite true? In the succeeding section, the literature on comparing GI marks to COO marks is discussed.

Country-of-origin marks versus GI marks

In the field of comparing the GI mark to other marks, little is known about the differences in effectiveness between origin marks, which make this relevant to analyse. There are only a few studies focusing on a comparison in the effectiveness of marks on the same product. Furthermore, the study of Menapace et al. (2011) is the only research concentrating on comparing the effectiveness of COO marks and GI marks concurrently on the same product, finding unique results.

Menapace et al. (2011) conclude that both marks provide information which consumers use in their decision-making process. This allows the consumer to match them to the right product. The GI mark refers often to a smaller geographical region the product is made in, while COO marks refer to much broader country levels. This results in specific regional references and differentiates GI marks from COO marks. Their research was conducted in Canada and concerned the olive oil market. Their main results indicated a higher willingness to buy GI-marked products compared to products without this mark. Moreover, consumers are willing to pay a higher premium for PDO marks than for PGI marks. This supplies evidence for Hypothesis 1a. According to Menapace et al, adding informational content to the marks resulted in an even higher willingness to pay for the product. The most surprising finding, however, was that the premium for an Italian olive oil with COO mark induced twice the value of the premium consumers were willing to pay for the GI mark. Therefore, for both types of marks consumers are willing to pay a price premium, yet the COO mark's effect resulted in twice the premium compared to the GI marks. Even after cluster analysis based on shopping segments, the relative

preference for the Italian olive oil was consistently higher than the premium for the GI marks. This could be explained by the fact that the GI marks are based on a European scheme, and the European product was tested in a non-European country. The fact a COO mark (an Italian flag) is more effective in terms of inducing a price premium could be due to the awareness and recognition of the (European) GI marks. The Italian flag may have stronger associations with (quality) values than the GI is able to evoke. As they conclude, marketing managers should ask themselves whether starting the process of certifying the product on the European standards is worth this additional effort, time, and cost when the potential benefit of the GI mark may even lower the willingness to pay for the product.

The study of Marozz et al. (2014) has a slightly different focus, as they do not specifically compare the marks with the willingness to pay, but compare the perceived value of Italian Fontina cheese based on its origin and the PDO mark. As such, they concentrate on the potential differences due to the distance to the region of origin. Their findings correspond with the earlier findings of Menapace et al. (2011), which entails that the PDO certification is less valued than the region of origin. Consequently, the valuation for the PDO certification and the region of origin depends on the distance of the consumer's house to the region. When the distance increases, the PDO certification becomes more valued, which means that the PDO mark is more valued by foreign tourist than by local consumers. Based on their conjoint analysis, the region of origin is only slightly more important than the PDO mark; 42.7% compared to 35%. Nevertheless, the overall conclusion is that the region-of-origin indication is valued more than GI marks.

As previously mentioned, the design of this thesis is slightly different from Menapace et al. (2011), as the GI-marked product is tested in its home country, the Netherlands. The limitation of their research is the testing of a European product, marked by a European certification scheme, in a non-European country. This thesis, however, tests a European product, marked by the European scheme, in its home country. For this reason, this research could have dissimilar results. Nevertheless, the awareness of the GI system should be low, as indicated by the small number of registered products. Moreover, cheese is a traditional Dutch product known by almost every inhabitant. Representing the country by a COO mark, may induce the positive associations the inhabitants have with their native country and the locally made cheese, which could eventually result in the same outcomes as Menapace et al. (2011). The preference to buy cheese with a Dutch COO mark may be higher than the preference to buy cheese which is not visually related to the home country but includes the GI mark. This could be explained by the fact that this GI mark is most likely unfamiliar to the majority of the consumers. Hence, it is anticipated to observe the preference to buy for a product with a COO mark to be

outperforming the preference to buy for a product with a GI mark. Therefore, hypothesis 2a is formulated as follows:

H2a. The preference to buy a product with a COO mark will be higher than the preference to buy for a product with a GI mark.

As discussed earlier, a possible manner to indicate the country of origin is the “Made in ...” claim, yet this can also be achieved by making a graphical sign. Vecchio and Annunziata (2011) have found that an Italian flag inferred a good reference to the region of origin. The question is whether combining the GI mark with a COO mark will be stronger in communicating the region of origin to consumers, compared to the GI marks on its own. Another possibility is that when a packaging is crowded with various marks, this could result in the consumer’s distrust. However, multiple marks have a higher probability of being recognised than one mark. It may also be that a combination of the GI mark and a COO mark unites the ‘best of the two’, namely the quality inference of the GI mark and the strong link to the COO mark’s region of origin. As such, the following hypothesis is proposed:

H3a. Adding a COO mark to a GI mark on product packaging will increase the preference to buy a product, compared to a product with only a GI mark.

The next part discusses using fake marks and its influence on evaluating product packaging.

The effectiveness of a fake mark

When examining the research on the effectiveness of GI and COO marks, Vecchio and Annunziata (2011) presented the following finding: a large share of consumers were misled during the decision-making process due to the presence of other marks or signs on the packaging. Although almost all the respondents were regular buyers of the products, and stated to be familiar with the European certification scheme, they had difficulties with identifying the right marks, information, and the underlying quality standard. The Italian flag was one the signs which misled the majority of the consumers. More than one third of the respondents, who stated to have limited knowledge on regional food, preferred the product with a fake logo. The logo was designed by the authors, did not have any value, and was not previously presented to the respondents. As a result, these respondents found the fake logo more trustworthy than the actual GI mark. This relates to the fact that consumers base their inferences on the cues, which offer them the highest level of confidence (Grunert, 2005). Apparently, an Italian flag evokes a

stronger emotion or confidence level towards the product's origin than the GI mark provides in terms of informational context. Furthermore, almost 34% of the respondents stated they actually knew this brand well or even very well, even though the brand does not exist. In other words, the GI mark did not manage to communicate its value and information, whereas a false mark was able to do so.

As such, the question is whether the information about the food quality and origin can be transferred to the potential buyer, and this influences the effectiveness of the mark (Verbeke, 2005). When information is not processed properly, whatever the reason may be, the aimed effect will not be accomplished. This concerns the field of research on information processing. Prior research on information processing (e.g. Alden, Hoyer, & Crownley, 1993; Huber & McCann, 1982) established that people need to lack experience with the product or miss certain information, to make country-of-origin cues the most useful. This would mean in the case of cheese, the COO marks are not overly important because cheese is a known product in the Netherlands. However, Johansson and Nebenzahl (1986) have stated the opposite: when consumers are familiar with a particular brand in a product category, they are more prepared to weigh COO cues in their decision-making process. Thus, customers use these cues as a shortcut in processing the information. Therefore, this research found evidence in favour of the effectiveness of fake marks, which could make them attractive to use.

To elaborate on the information processing literature, Park and Young (1986) and Park, Young, Bagozzi, and Tybout (1983) distinguish the following types of involvement: the affective dimension and the cognitive dimension. Cognitive involvement alludes to rationale, high involvement, extensive search for information, active processing, and weighing and evaluating products before choosing, which does not appear to be in line with the shopping behaviour of the majority of shoppers for food (Trigui & Giraud, 2013). Affective involvement, on the other hand, corresponds with the food purchasing behaviour, as it relates to hedonic shopping behaviour and impulse purchasing. As such, the consumer is familiar with most of the products and retrieves information and experiences from past purchases. This dimension is probably a more important driver compared to the cognitive motives. This is because the affective dimension focuses on emotions, which is more consistent with the positive emotions that may be invoked by the region of origin factor of the GI mark (Trigui & Giraud, 2013). However, the awareness of the GI mark's value is a key factor in delivering the affection the region of origin should evoke in the buyer. Furthermore, it could be true that a counterfeit mark leads to more affection and a better connection to the emotional associations a consumer has with the region than the GI mark is able to induce.

The Elaboration Likelihood Model by Petty and Cacioppo (1986) divides the information processing into the motivation and the ability to process information. Both factors can be affected by personal and situational factors. In addition, information will be processed via the central route in case both the determinants are found positive; thus, the consumer is motivated and simultaneously able to process information. When the consumer lacks one of the two determinants, the information will be processed via the peripheral route. For example in the case of a time constraint, motivation and ability to process information will decrease, processing information via the peripheral route. However, only via the central route, attitudes and preferences for the long run can be altered. Via the peripheral route, only temporary changes are made. Regarding an origin mark, only long-term positive attitudes can be generated by high motivation and high ability to process information via the central route, and, thus, change attitudes in the end. For frequent purchased food items, there is low involvement. This results in the majority of the food decisions into peripheral processing. A visual mark should be the favourable option compared to a textual claim, which is easier to process via the peripheral route (MacKenzie, Lutz, & Belch, 1986). For this thesis, Petty and Cacioppo (1986) claim that the visual most appealing and informative marks should be the most effective. When the mark is visually attractive and at the same time is able to communicate the required information, it should be the most effective mark. In fact, a fake mark can be designed exactly the manner in which it connects best to the specific product, as the mark has to deal with its general appearance, which is true for all products. Consequently, this suggests that the fake mark should better be able to evoke emotions and affection when consumers are examining the product packaging.

Returning to the time constraint discussed by Petty and Cacioppo (1986), in shopping situations, consumers can experience that there is no time pressure for them. Despite the food shopping, decisions are characterised with low involvement, as consumers are able to compare the products within their own time frame. The GI mark can be recognised by consumers, who are familiar with the mark on other products. Moreover, the text in the GI mark can be read and processed. Consumers should not be able to do accomplish this in the case of a fake mark, because this mark cannot be recognised and it has no (qualitative) value added to the regional product. Theoretically, due to its inherent value, the preference for a GI mark should be higher compared to a fake mark when consumers do not feel any time pressure and are able to process the GI mark. Hence, hypothesis 4a is formulated as follows:

H4a. The preference to buy for a GI-marked product will be higher than the preference to buy for a product with a fake mark when there is no time pressure.

Furthermore, the GI marks have text in them, and are like a coloured stamp than a real indication referring to the product's geographical origin, as is inevitable for a general certification mark. The text in the GI mark poses a possible problem because the information processing via the peripheral route is not as persuasive as the fake mark presented by Vecchio and Annunziata (2011). As discussed before, when people are time constraint, they may not be able to process the information centrally and the peripheral route will be used. Via the peripheral route, the GI mark may be less effective compared to a fake mark, since the counterfeit one can illustrate the region of origin more specifically than the GI mark can achieve and can be more persuasive because of stronger linking the product to the region.

Since many people experience time pressure while shopping (Jabs & Devine, 2006), adding this element to the research offers valuable insights into potential differences of the origin marks' effectiveness during grocery shopping without time pressure, and the more realistic shopping situation in which the consumer experiences time pressure while deciding on which product to buy. In the succeeding section, the theory on time pressure and its relation to decision making is discussed. Thereafter, the last four hypotheses are presented.

Decision making under time pressure

The last fields of research interesting for this thesis are information processing and the moderating role of time pressure in decision making. Each of these subjects are discussed in the following sections.

Time pressure

Time pressure is experienced during many decisions (Pieters & Warlop, 1999). The term 'time pressure' refers to time famine, time scarcity or time crunch, which is in line with the feeling of not being able to do everything you desire to do in a particular time frame (Godbey, Lifset, & Robinson, 1998). In this thesis, time constraint refers to the situation of experienced time pressure. Time pressure has two possibilities, as either the amount of data is overloading or the time is restricted (Benbasat & Dexter, 1986).

In 1998, Zuzanek et al. (1998) identified increasing feelings of time pressure in industrialised societies worldwide. Dickens and Fontana (2002) distinguish between the agriculture countries and industrialised societies; in the former, time is a surplus in most cases, and in the latter it is a luxury good, since it is scarce for most of the inhabitants. This is especially due to the increased likelihood of both parents working outside the home instead of one parent at home taking care of the household (Fullerton Jr, 1999). The increasing number of employed parents adds time

pressure in the daily life, as they have to deal with their jobs, children, paying bills, social life, and household (Jabs & Devine, 2006). They also summarised an array of studies in which it is agreed that nowadays people feel more time pressure in daily life compared to the past, and this is unrelated to the actual working hours. They conclude that the multiple roles modern people desire to fulfil simultaneously and the willingness to make the most of it, all add to this feeling of time pressure.

Experienced time pressure results in time constraint behaviour, which includes speeding up the daily activities, using a shorter period of time, performing multiple activities concurrently, and dismissing the longer activities and replacing them for shorter alternatives (Godbey et al., 1998). The purchase decision for food and eating behaviour are subject to this increased trend of time pressure (Connorset al., 2001; Jabs & Devine, 2006), which makes this thesis exploring the influence of time pressure on food product choices. Moreover, speeding up daily activities also means speeding up the shopping trip for groceries. This inherently signifies that the time a consumer takes to decide is limited or hurried. Thus, the evaluation and comparison is performed while experiencing time pressure, which effects are explained by the theory on information processing.

Information processing

The cognitive process of evaluating and comparing products and their packaging is formulated in the theory concerning information processing. The Elaboration Likelihood Model proposed by Petty and Cacioppo (1986) is previously discussed alongside the theory behind the fake mark, yet it is especially relevant for assessing time pressure. Information can only be processed via the central route in case both motivation and ability to process enable the consumer to achieve this. Time pressure, however, is one of the situational (or external) factors influencing the ability to process information. As such, time pressure may work as a constraint on the ability to centrally process information. When a person is not able to centrally process the information, it will be processed via the peripheral route. Peripheral processing relies more on affective reactions instead of cognitive reactions; thus, more on the person 'who says so' instead of 'what he or she says', on emotional responding than rational responding, and on focusing on cues than on actual relevant thinking, as explained by Professor Pruppers in his class on information processing on the first of October, 2013. Therefore, when time pressure influences the ability to process centrally, the likelihood of processing via the peripheral route increases, and consumers become more cue depending in the time constraint situation, and, thus, rely on emotional deciders.

Within the information processing theory, a similar distinction in affective and cognitive processing is made by Park and Young (1986) and Park et al. (1983). Cognitive processing is

related to rationality and utilitarian motives, resulting in extensively evaluating products and alternatives due to high involvement. Affective processing is greatly focused on emotional involvement, feelings of pleasure, and experiential motives. Packaging itself can be divided into the same two categories, which are informational elements and visual elements (Silayoi & Speece, 2004). The cognitive central processing is connected to the informational elements, whereas the peripheral affective processing is related to visual elements, which include the packaging' graphics, the size, and shape (Silayoi & Speece, 2004). In case of time pressure, this graphical and visual element of the packaging is the best way to process information. Hence, visual marks, which establish the best link to the information it is trying to communicate, are expected to be the most effective, as they are processed emotionally.

For fast moving consumer goods, and especially food, extensive evaluations are exceptions (Silayoi & Speece, 2004; Trigui & Giraud, 2013). It is much more likely that food decisions are processed in the affective way, via the peripheral route, due to low involvement. Moreover, affective cues are extremely important because more than 70% of shoppers wait with their purchase decision until they are in the store (POPAL, 1996). Furthermore, Urbany, Dickson, and Kalapurakal (1996) found that 85% of the consumers do not pick alternatives to evaluate when deciding on what to buy. In addition, 90% of the consumers only examine the visual front of packaging without picking it from the shelves. Therefore, the products' visual front packaging are extremely important in the in-store purchase decision, especially under time pressure because then the product is evaluated on an emotional and visual basis. For this reason, origin marks can influence the purchase decision in assisting the communication of the origin and quality, trying to convince the potential buyer it is the best choice.

[Time pressure and its influence on decision making](#)

Over the years, there has been done much research on the combination of decision making and packaging, and in some studies, time pressure has been incorporated. During experiments, hypotheses on packaging effectiveness are tested. However, in real-life, consumers have less time to thoroughly identify the text, read it, and form an opinion on the content (Hoogland, De Boer, & Boersema, 2007). Moreover, perfect information and no time constraint is highly unrealistic in the modern world. This is especially true when deciding on what product to buy when the person is in a hurry and stands in front of the store shelves (Pieters & Warlop, 1999). So, focusing attention towards the product is essential for influencing in-store decision making; generally, packaging which looks attractive is generates more attention (Selame & Koukos, 2002; Silayoi & Speece, 2004).

The visual impact of the shelf influences the decision process because of an overload of information under limited time frames (Clement, 2007). The typical consumer is not likely to examine this information overload, and due to their time constraint, they are unwilling to spend much time making purchase decisions (Reutskaja, Nagel, Camerer, & Rangel, 2011); thus, the customer will examine the visual impact of the shelf. Feyz and Salahshour (2008) have indicated that exterior signs, such as packaging, are used in time constraint shopping behaviour to evaluate the product and its quality. When products are purchased on an impulsive basis, the packaging was found crucial in the decision process, and familiarity was especially an imperative factor (Wells et al., 2007). When the available time increases and the feeling of time pressure decreases, the actual impact of packaging also decreases (Stravinskienė et al., 2008). Conversely, increasing the time pressure will make the packaging, and so the origin marks, more important. The marks can enhance the packaging' visual impact and make it stand out from the shelf, which positively influences the conversion from consideration to decision.

A prior study on the influence of packaging on decision making focused on needed time and indicated that graphical representation of information resulted in less time required compared to information in tabular form (Benbasat & Dexter, 1986). Tabular-presented information took respondents 44% more time to process. This is evidence in favour of using graphical representations, such as marks, in order to increase the probability of processing information the manufacturer desires to communicate.

Nonetheless, research has demonstrated that people do not require much time to make a decision; Milosavljevic, Huth, Navalpakkam, Koch, and Rangel (2009) have claimed that people are able to choose wisely in a short period of time. The respondents chose the better binary alternative in over 70% of the time within a time frame of less than 400 milliseconds. Even when shopping, consumers do not have time to evaluate extensively, and they are quite good at evaluating under time pressure. Applying this finding to the thesis suggests that even in the time pressure situation respondents should have enough time to make informed decisions.

Furthermore, Silayoi and Speece (2004) have performed a relevant study on the effects of time pressure by conducting face-to-face interviews. One of their interesting findings was that some people stated to read the labels increasingly more; however, this was only for high involvement products such as skin care products. For low involvement products, this was not the case. The respondents indicated that every assistance in processing information during the purchase decision process, a clear indication of the ingredients for example, could increase their satisfaction due to a lower perceived time pressure. In fact, the Institute of Grocery Distribution

reported that people indicate they do not read food labels due to limited available time (Silayoi & Speece, 2004; Soltani & Majidi, 2014). Consumers, therefore, want to process information much faster by simplifying and standardising the information coded in colours and tags. Thus, marks on packaging are a manner of guiding the consumer in their decision-making process and providing assistance in processing the information.

In addition to the results on positive influences of time pressure on graphical visuals, Soltani and Majidi (2014) have found contradictory evidence in their study on Sohan. They discovered evidence that increasing time pressure resulted in a lowered impact of the packaging elements on in-store decision making. However, they do propose that showing information visually is best processed under time pressure. This is quite confusing, yet more information on the methodology is not known except that they conducted a questionnaire among Sohan users. For this reason, this thesis expands the findings in the field of research on the influence of time pressure on decision making.

Hypotheses in the situation of time pressure

In this section, for each previously formulated hypothesis a second 'b'-hypothesis considering the discussed effects of time pressure is presented.

The first hypothesis deals with the effect of adding a GI mark to a product. When deciding under time pressure, the visuals affect information processing via the peripheral route, which should lead to even higher preferences to buy for a visually marked product; visuals and graphically presented information is more easily processed and communicates a higher product quality when assessed under time pressure. In short, better quality signals should inherently lead to a higher preference to buy. In this study, the awareness of the GI marks is expected to be low as only a few Dutch products are certified. However, within a time limit, the respondents do not have the opportunity to extensively examine what origin mark is placed on the product and, thus, it is expected to function as a general quality indication. Because the other product does not contain any of the origin marks, a clear visual distinction is made. As this is vital under time pressure, the effect of the GI mark on the product will be higher compared to no time limit, as the consumer has no time to rationally evaluate the value of the GI mark. As a result, Hypothesis 1b is formulated as follows:

H1b. When experiencing time pressure, the preference to buy a product with a GI mark will be higher compared to the preference to buy a GI-marked product without time pressure.

Hypothesis 2a postulates that the preference to buy a COO-marked product will be higher than the preference to buy for a GI-marked product. Under time pressure, however, the products will

be evaluated visually. As both products contain a visual mark relating to an origin, one may assume the stronger effect of the COO mark to vanish under time pressure. Moreover, the GI mark has additional value, namely the official controlled quality level. On the other hand, the GI mark is less easy to interpret as it contains text and the knowledge of the mark will be low. As a consequence, the COO mark is most probably easier to interpret and process because of the lack of text; despite the fact it has no actual quality value, the three colours are more likely to be interpreted easiest. Therefore, in this thesis the COO mark is expected to infer a higher purchase preference due to the combination of visual appearance and time pressure:

H2b. Under time pressure, the COO-marked product will be preferred to the GI-marked product.

The effect of adding a COO mark next to the GI mark is in Hypothesis H3a hypothesised to positively influencing the preference to buy the product, as now two marks indicate the origin and quality of the product. Thus, adding a COO mark next to a GI mark affects the visual appearance even in a more prominent way compared to only one mark, so in a time constraint situation the second mark should positively influence the preference to buy even more. As the packaging is under time pressure only visually evaluated, adding this COO mark will peripherally have a stronger influence because of the lack of rational processing. This results in Hypothesis 3b:

H3b. Under time pressure, adding a COO mark to a GI mark on product packaging will increase the preference to buy for a product more than without a time constraint.

When designing a counterfeit mark, the intention is to strengthen the product's image and position. In a situation when there is no time constraint, consumers can rationally evaluate the packaging. As proposed in H4a, this will not lead to a higher preference to buy because the mark can be assessed as fake, or at least as "meaningless". Designing a fake mark ensures that it is focused on a specific product by emphasising the link between the product and the country, whereas the GI mark is far more general and does not contain any specific association between the product and the country. Clearly, this is the purpose of a "general" mark, but it has an evident drawback as it lacks the visual association between the mark and the product. When experiencing time pressure, the effectiveness of a special designed fake mark due to its visual appealing association with the product's origin may even be higher compared to the general GI mark, which has no link to the product. Furthermore, due to a time limit, the emotional processing of visual information may be more effective when a product-specific mark is designed even if it has no quality value at all. Therefore, H4b proposes the false mark to be more successful:

H4b. Under time pressure, the preference to buy for the product with the fake mark will be higher than for the product with the GI mark.

In the following section, all eight hypotheses are summarised and the managerial implications are discussed.

Hypotheses

The effectiveness of a GI mark

Hypothesis 1a: Adding a GI mark to product packaging increases the preference to buy for a product.

Hypothesis 1b: When experiencing time pressure, the preference to buy a product with a GI mark will be higher compared to the preference to buy a GI-marked product without time pressure.

If support for H1a and H1b can be found, this would be in favour of applying for a GI mark, which is especially relevant for manufacturing companies. As such, marketers can increase the purchase preference for their product compared to non-marked products by applying for and adding a GI mark to the product. The GI mark's effectiveness is then valuable in both normal and rushed shopping situations.

The effectiveness of a COO mark

Hypothesis 2a: The preference to buy a product with a COO mark will be higher than the preference to buy for a product with a GI mark.

Hypothesis 2b: Under time pressure, the COO-marked product will be preferred to the GI-marked product.

If there cannot be found evidence for H2a, this means that the GI marks are at least as effective as a COO mark. Still, this does not mean that marketers should choose the GI mark over a simple COO mark, as the GI mark is more costly to invest in and it does not necessarily increase the purchase preference. Additionally, when there is evidence found for H2b, the GI mark is in terms of buying preference the worst option in both situations.

The effectiveness of an additional COO mark

Hypothesis 3a: Adding a COO mark to a GI mark on product packaging will increase the preference to buy a product, compared to a product with only a GI mark.

Hypothesis 3b: Under time pressure, adding a COO mark to a GI mark on product packaging will increase the preference to buy for a product more than without a time constraint.

Finding evidence for H3a means that the additional value of adding a COO mark to the product with already a GI mark on it is significant, which results in a higher preference to buy. If the same evidence is found under time pressure, this signifies that the visual influence of adding a free of charge COO mark enhances the buying preference in all shopping situations. As long as no negative effects are found, marketers could decide on adding the COO mark to the GI mark in order to benefit from the effect in the non-time constraint situation.

The effectiveness of a fake mark

Hypothesis 4a: The preference to buy for a GI-marked product will be higher than the preference to buy for a product with a fake mark when there is no time pressure.

Hypothesis 4b: Under time pressure, the preference to buy for the product with the fake mark will be higher than for the product with the GI mark.

Taking the awareness and valuation of GI marks into account, the appreciation for this mark should be higher than for the fake mark. When evidence is found for H4b, this would suggest that marketers can make better use of their own designed fake marks compared to applying for the expensive and less effective GI mark.

Theoretical framework

Following the hypotheses, the theoretical framework is established as follows:

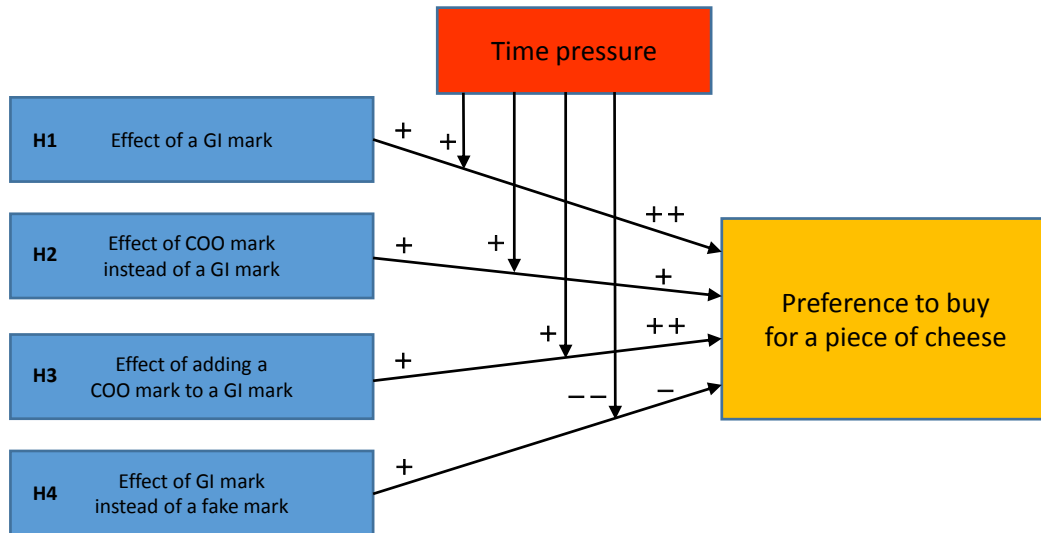


Figure 4. Theoretical framework graphically presented.

Chapter 3 – Methodology

In order to answer the research questions and test the hypotheses, a descriptive research is conducted in the form of an online survey. This online choice experiment is carried out in the Netherlands, in June 2015.

Design of the experiment

The product

As pointed out earlier, the product used in this research to test the hypotheses is a packaged piece of cheese. As is discussed by Teuber (2011), the product under study should have a long history to suit the setting well. This product is chosen because it is a Dutch product and, thus, suitable for a research that studies the Dutch market. Cheese is a traditional and authentic Dutch product, known by the majority of the inhabitants, and it is a fast moving consumer good available in all supermarkets. This means that the Dutch customers are highly familiar with cheese.

The variables

The dependent variable is the preference to buy for the product. This variable is chosen to simulate the chosen option in a real-life shopping situation where the preferred product is the product that is purchased.

The following independent variables influence the preference to buy:

- No mark
- GI mark
- COO mark
- Fake mark
- Price

The moderating variable is time pressure by using this setting as a moderating factor in determining the preference to buy.

Moreover, the influence of socio-demographics is tested and the level of awareness and knowledge on GI marks are measured.

Target respondents

The target respondents are men and women above the age of 18, as they should have enough 'shopping experience' in grocery stores. This does not mean that the respondents have to be shoppers on a regular basis. In addition, only Dutch respondents are questioned. Respondents who answer that they never buy and eat cheese are excluded from the sample, since the probability of these respondents completing the survey in the wrong manner is too high. The survey is distributed via e-mail and is sent to my friends and acquaintances who in turn shared it with their friends and relatives. People were asked to participate in the experiment that took around four minutes. However, the sample is not perfectly representative for the Dutch population, yet the best distribution among the population is attempted to be achieved.

Conjoint analysis

The optimal packaging

Marketers must make decisions on features or attributes and decide which to incorporate in the packaging. In the end, marketers are seeking the best and optimal packaging. The statistical technique used for this thesis is conjoint analysis. This statistical technique is chosen because the objective is to find the best manner of product packaging. This may consist of either no mark, one of the marks, or various marks together with linked quality levels. Conjoint analysis is the best means to examine how people value the attributes of a product or its packaging. Moreover, conjoint analysis is used to identify the significant effects and weights of the attributes and levels. By performing a conjoint analysis, the optimal product can be examined based on the highest valued levels of the attributes. Furthermore, analysing the evaluations provides the answers to the research questions. This technique is also used in the study of Marcoz et al. (2014), who tested the relative importance of the PDO certification, the influence of the region of origin itself, and the influence of the manufacturer on the evaluation of Fontina cheese.

A conjoint experiment is a choice based experiment, resulting in a survey in which respondents are asked to choose between proposed products. Analysing the chosen products over the alternatives provides insights into the weightings and evaluations of the varying features the chosen and not chosen products. In this thesis, the valuation of the marks, which are the features, are analysed.

Providing respondents with two products to choose from, means that they have to make trade-offs between the features and ask themselves the following questions: do I prefer this mark to the other? Do I prefer two (inferior) marks to one more valuable mark? Am I willing to spend an

additional amount of money only because there is an additional mark added on this product? By performing multiple trade-offs, the underlying preference can be discovered.

This is done because obtaining the valuations of the different features of the packaging offers the required information to answer the research questions and the problem statement.

Experimental design

The experimental design for the conjoint analysis is generated on the basis of four attributes, including the different related levels (see Table 3).

Attribute	Level 1	Level 2	Level 3	Level 4
Attribute 1: GI mark	No mark	PDO mark		
Attribute 2: COO mark	No mark	Dutch flag		
Attribute 3: Fake mark	No mark	Cow mark		
Attribute 4: Price	€ 4.40	€ 4.20	€ 4.00	€ 3.80

Table 3. Product attributes with corresponding levels.

For the first attribute, the GI mark, only one out of three available marks will be used to test the GI marks' effectiveness in general. The PDO mark is preferred to the other two (PGI and TSG mark) from the scheme, as, according to Menapace et al. (2011), this mark infers the highest price premium. This should lead to the largest effect, which is the most desirable in finding good results in the Netherlands. Moreover, Verbeke et al. (2012) found that the PDO mark was the most recognised mark. Because the awareness will most probably be low in the Netherlands, the best option is to use the PDO mark.

The COO mark is tested in the form of a Dutch flag. This flag symbolises the relationship towards the Netherlands as a COO cue. The benefit is that this mark does not require text, and is thus easier processed information.

The fake mark is a picture of a cow's head, referring to the Dutch grasslands and the typical Dutch animal which produces the milk for the cheese. Yet, the national colours are not incorporated in this mark. This cue does not infer any meaning in terms of quality, as it is simply a cow on the packaging. However, the link between the 'Dutch' cow and the product may result in an effective association.

For the products' price, four levels are selected. The base level is € 4.-, which is the average price for a piece of cheese. The other levels are based on deviations of 5% to 10%. The small differences are chosen because high deviations may lead to strong focus on the price, which is not the purpose of this experiment.

Clearly, the purpose of the experiment is not explained to the respondents. This means the respondent is not told on which basis he or she should choose among the cheeses. He or she is also not explained which factors are in the experiment design and which are not. For example, the picture of the cheese, the holes in the cheese, and the cheese' description on the label are held constant over the experiment, without varying between the choices. This also means that the variety of marks (the attributes) and the price levels are unknown in advance. This is consistent with a real-life experience, as nobody in the supermarket is told which possible marks are present on their packages of cheese, which price levels there are, which is the highest and lowest price level, and which factors could vary when making a decision.

Furthermore, this means that PDO mark cannot be studied by the respondent before the experiment starts. During the experiment, the marks are not explained as well. The study of Carpenter and Larceneux (2008) indicated better results in effectiveness for GI marks when these were explained on the label. However, this thesis tries to simulate a real-life shopping experience and, therefore, the respondent has to deal with the visuals on the packaging, without additional information which is not present on packaging in reality.

Fractional factorial design

A fractional factorial design is generated, since testing every possible combinations should take too long for the respondents. The total possible combinations = $2*2*2*4 = 32$, which would make the experiment too extensive (see Table 3). The program JMP (Version 12, SAS) is used to generate the fractional factorial designs. Respondents are shown eight sets of two pieces of cheese and are asked to choose the cheese they prefer to buy. This means that JMP generates eight choice sets, including two options per choice set. Two versions of surveys are created, including choice sets, which are different across the surveys. For the detailed overview of the fractional design, see Appendix Table 19.

As a result, version A and B are two different versions of the experiment, which cancel out any problems or unknown side effects. The two versions of the data enable asking for more choice sets, which minimises the order-effects and increases the feasibility of the findings. After gathering the data, the two versions will be combined.

Multiple surveys

Within the survey, the respondent is randomly assigned to the 'non-time constraint' experiment, or the respondent is randomly assigned to the actual 'time constraint' situated experiment.

Within each of the two situations, the respondent is randomly assigned to one of the two versions of the survey. Both versions are tested in the non-time constraint and two time pressure settings. This results in four different completed surveys.

Visualisation of choices

To obtain the best results, the pieces of cheese should be similar to real pieces of cheese. Two pieces of cheese are used which are almost visually identical in terms of shape, colour, and appearance. Using exactly the same image for the two choices would make the experiment look obvious and unprofessional. By using two almost identical pieces of cheese, the visual appearance of the cheese and the choice between the two is as realistic as possible.

One of the key features of a realistic appearance is the label on the cheese. Existing labels are used in order to acquire the most realistic effect (see Figure 5). For the type of cheese "Jonge Kaas 30+" is chosen, which is explicitly stated on the label. The expiration date is 04-07-15, held constant over all choices. The price of the cheese depends on the experimental design, thus, it changes per piece. The price per kilo, which is inherently linked to the price of the piece itself, varies along with the price tag. The changing price per kilo is an additional distraction. Since not changing the price per kilo would make the price tag itself unrealistic, as respondents will realise the pieces of cheese are equally expensive and simply vary in weight, which results in a different price tag. By altering the prices per kilo makes the respondent aware that the weight of the piece is unimportant for the cheese has a different price per kilo compared to the other piece of cheese.

The placement of the marks on the packaging is constant. As varying the places of the marks would render the judgments on packaging even harder during the time pressure setting, which could influence the results.



Figure 5. Example of the visualization of the two pieces of cheese used in the experiment.

Mediating factors

The socio-demographics are tested to examine any differences in effectiveness due to variances in age or gender.

The questions on the eating and shopping behaviour for cheese are proposed to exclude participants from the results when they lack experience with cheese.

Moreover, the awareness and knowledge of GI marks in general, and the meaning of the PDO mark specifically, is measured. It is expected that the results of this questions will indicate a low level of awareness and knowledge of the European system.

The online survey

An online survey is used for this experiment, consisting of three parts.

As previously indicated, every respondent is randomly selected to either answer the survey in a time constraint or in a non-time constraint setting. Within the selected situation, the respondent is randomly assigned to one of the two versions of the survey.

Part A

First, an introduction of the experiment is shown in which the respondent are thanked for his or her participation and is informed that the experiment concerns purchase decisions in supermarkets. Moreover, 'cheese' is proposed as the product to test this behaviour.

Subsequently, the setting and circumstances are sketched; the respondent is a consumer on a weekly shopping trip in a grocery store and 'a piece of cheese' is on the shopping list.

The respondents are explained that they have to make eight decisions, choosing between two pieces of cheese. The upcoming question will be the same for every product: "Which of the following products do you prefer to buy?" Next, the answer possibilities are explained.

For the non-time constraint situation, the respondents are told to take as much time as they require, and to simply make a considered choice before moving on to the next choice.

For the time constraint situation, the respondents are informed that they are in a hurry and have a time limit. They only have five seconds to see the choices, before they have to make a decision. According to Clement (2007), a decision is made within twelve seconds; however, in the study of Milosavljevic et al. (2009) people were able to make the better choice within less than half of a second. Having to decide within five seconds makes the respondents to experience time pressure, yet they should be able to make a good choice. This timeframe corresponds to a real-life shopping trip, as people feel the time pressure and want to decide quickly but do take some seconds to evaluate their choices. The situation of time pressure is simulated by showing the respondents the two pieces of cheese only for five seconds, whereupon the online survey automatically forwards the respondent to the next page. This page contains the question which of the just seen pieces of cheese the respondent would prefer to buy. Initially, the time frame to see the pieces of cheese was four seconds, yet after testing the time constraint setting on a sample, it became clear that five seconds was a better time frame.

Finally, the respondents assigned to the time pressure setting are provided with a sample question in order to practice the manner of questioning, improving the quality of the eight 'real' choices.

Part B

In this part, the respondents are provided with the above-explained choices.

For both situations, the design is the following: the respondent will see two identical products, only differing in its packaging and price, provided with the question and three answer options:

Which of the following products do you prefer to buy?

Answer A: "I would buy cheese A"

Answer B: "I would buy cheese B"

Answer C: "I would choose none of the two pieces of cheese"

Including option C, the opt-out alternative, is in line with Menapace et al. (2011), which discusses the benefits of this included option compared to forcing consumer to choose one of them. The respondents are told to choose the cheese they prefer to buy, and only when they find none of the two cheeses attractive, they should choose option C.

For the non-time constraint situation, the two pieces of cheese is presented with the question stated below the image. Respondents can take any time they want and when having decided on their most preferred choice, they can click "Next" to move onto the next page.



Figure 6. Screenshot of the questions in the non-time constraint experiment.

As explained earlier, for the time constraint situation, the image of the two pieces of cheese, which the respondent should choose from, is only shown for five seconds. A timer is visible and

counts from 5 to 0. When reaching the 0, the page automatically forwards to the next page. On this page, the image of the two pieces of cheese has disappeared and the question is displayed including the multiple options to answer.



Figure 7a & b. Screenshot (a) of the time constraint questions, where the timer counts down from 5 to 0 and forwards the respondent to the next window (b) in order to make their decision.

Moreover, the respondents are required to make a choice for every question before they can move onto the next page.

Part C

After making their eight choices, respondents are asked for their demographics. The respondent has to fill in their gender and age. Moreover, questions on the frequency of buying cheese and eating cheese have to be answered. Furthermore, questions on the awareness and knowledge of the GI marks are asked. First, the respondent is provided with the scheme of three different GI marks and is asked whether he or she has seen the marks before the experiment, and if so, which of them. Then, the respondent is asked if they know what the marks mean, and if so, they are asked to explain the meaning of the marks in an open field. Then, the respondent is forwarded to the last page on which only the PDO mark used in the experiment is shown in a large format in order to study the mark. Next, a multiple-choice question on the meaning of the PDO mark has to be answered. The question is: "This mark means ...", and six possible answers are provided from which the respondent has to choose one. The possible answers are:

- A. .. environmentally friendly ingredients are used, which are organically grown
- B. .. the product is authentic and from the country of origin, tested against objective standards and with a minimum quality level
- C. .. trading with the suppliers has been done fair, and they are paid the real value for their ingredients
- D. .. the product includes an international patent
- E. .. protected ingredients are used in the production process
- F. .. I have really no idea

For an example of the survey, see the Appendix.

Analysis

Initially, the program JMP is used for the experimental design and basic analyses. Furthermore, the statistical program IBM SPSS 19.0 will be used as well, which enables to analyse the effects of the variables and the differences between the normal situation and the time pressure situation. Moreover, each hypothesis is analysed by using SPSS in order to test whether there can be found support for the statements.

Chapter 4 – Results

In this chapter, the obtained data of the experiment is analysed and the results are presented. Finally, the hypotheses are evaluated.

The experiment

Henceforth, the non-time constraint situation is referred to as the 'control condition' and the situation with a time constraint called the 'time pressure condition'.

Conducting the survey

The survey, as described in the previous chapter, is conducted in the first week of June, 2015. The survey was distributed among the described target group.

After the finishing the experiment, a great deal positive feedback was given:

"I really enjoyed your survey; what a funny experiment!"

"Now I am really curious what your thesis actually is about ... ;-)"

"I would like to eat some cheese now, your experiment has made me hungry!"

"Fun experiment, I really liked the images."

"Exciting to do! Much better than those long boring lists of questions."

"The time pressure was high! Am I wrong for choosing the cow?!"

After starting the experiment, within the first 24 hours the initial target of 160 respondents was already accomplished. In total, over 400 respondents have participated in the experiment. This number of respondents allows for solid conclusions and results.

Cleaning the data

After closing the experiment and importing the data, it became clear that various respondents have not finished the experiment. After removing the incomplete responses, the dataset consists of 375 respondents. In addition, five respondents, who were not above the 18, were excluded from the sample, as is discussed in the chapter on methodology. Moreover, eight respondents who answered to never eat cheese as well as never to buy cheese. These respondents were excluded from the dataset, as is discussed in the chapter on methodology as well.

A shortcoming of the experiment was that some of the respondents took the introduction too literally. The condition of a real shopping trip was sketched, and the respondent was told to choose between the pieces of cheese as if it was displayed in the supermarket. However, some of the respondents have interpreted this literally when looking at the type of cheese on the label: It said “Jonge kaas 30+”, and just because these respondents disliked this type of cheese they decided to buy none of the pieces, as explained in the respondents’ feedback. The type of cheese is constant during the experiment and was not part of the attributes in the design.

In total, only fourteen respondents have chosen eight times in a row the option C “none of the above”. Nevertheless, the results cannot be traced back to specific respondent’s IDs because the survey was conducted anonymously. This means that it is unclear whether the name on the label is the only reason for them to select option C. Because of this uncertainty, the respondents cannot be excluded from the sample and should be taken into account. This is not expected to bias the results, as the number is only small compared to the total dataset and, thus, the impact on the results should be limited.

Missing data is no problem in the dataset. As pointed out earlier, the experiment was built with a forced choice, which means that the respondents had to answer all the questions before they could move on.

In sum, cleaning the data based on the methodology results in a valid dataset of 362 respondents on which the following results are based.

Preparing the dataset

The experiment’s dataset consists only of the eight choices the respondents have made, their demographics, and their answers to the awareness and knowledge of the GI marks.

Yet, four different surveys are conducted, based on different choice sets and the different condition the respondent is placed in. The choices each respondent has made are converted to a response indicator, which indicates the final choices on a binary scale; the response indicator is set to 0 if the option is not chosen and set to 1 if the option is chosen. The response indicator is dependent on the choices the respondent has been shown. The response indicator is, therefore, matched with the actual fractional factorial design used during the experiments. This entails that a dataset of sixteen rows per respondent is created, consisting of the sixteen different pieces of cheese the respondent has evaluated during the eight trade-offs. The response indicator is linked to the fractional factorial design including the levels of the attributes, which the

respondent is exposed to, and indicates the chosen piece of cheese on the binary scale. As a result, there is a dataset for the control condition and a dataset for the time pressure condition. Then, the respondent's anonymous ID is matched to the demographics. Subsequently, the datasets for both conditions can be analysed.

Description of the dataset

Sample size

The target population consists of Dutch people, who are at least 18 years old and eat and purchase cheese on a regular basis. A sample of this population is questioned in order to infer meaning for the population as a whole. The sample can be described as a convenience sample, because not everyone from the total population has had the same chance of being questioned, due to sending the survey out to family, friends, acquaintances and their contacts. The sample is not random, however, it is diverse.

The number of respondents per type of experiment can be found in the table below.

Respondents per type of experiment	
	Number of respondents
Control condition	
Version A	88
Version B	83
Total	171
Time pressure condition	
Version A	92
Version B	99
Total	191
Grand total	362

Table 4. Number of respondents per experiment.

The rule of thumb for examining the sample size is simple: the bigger, the better. Nevertheless, a minimum number of respondents should be questioned in order to have a database which contains enough data. According to Green (1991), the minimum number of respondents can be computed by

$$N = 104 + k \quad \text{(Equation 1)}$$

with k representing the number of predictor variables.

With eleven predictor variables, the minimum number of respondents for this experiment should be $N = 115$ for each condition. For both tested conditions, the required minimum is easily met with 170 and 191 respondents.

Gender

The ratio of men versus women in the control condition is 48.0% versus 52.0%, respectively. For the time pressure condition, the ratio is 50.8% men versus 49.2% women. No significant differences were established between the two conditions; the mean difference of 0.028 was not significantly different from zero ($p=0.592$), which indicates that the percentages do not differ significantly from each other. Thus, the results are not biased by varying proportions of genders in the samples.

Age

Analysing the age distributions between the two conditions, no significant differences are found; the mean difference for the two conditions is equal to 0.310 years, not being significantly different from zero ($p=0.851$). In other words, the age distribution is equal in the two conditions.

Given that the age distributions do not significantly differ, the data is combined. Overall, the youngest respondent was 18 years old and the oldest respondent 84 years old. Moreover, the average age is approximately 35. The median age is 26, which indicates that half of the respondents fall in the range of 18 to 26 years old.

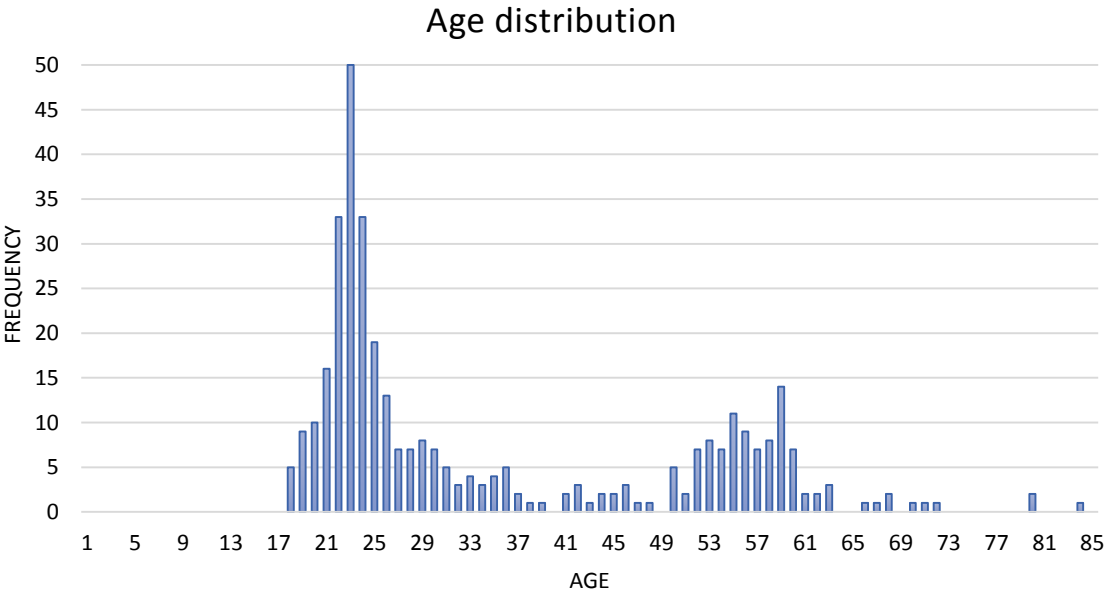


Figure 8. Distribution of the respondents' age.

The age distribution is the same for the two separate datasets. The distribution of the respondents' age is not equal to the expected population's age distribution. Nonetheless, the majority of the possible ages is represented in the sample.

Behaviour, knowledge, and awareness

Respondent's buying and eating behaviour

No significant differences are found ($p=0.602$) between the two conditions for the question concerning the consumer's buying frequency. This means that the buying behaviour is consistent in the two samples.

Composing one figure for the two conditions offers insights into the buying behaviour of the datasets (which is allowed, because the two samples have no differences); the majority of the respondents tend to buy cheese on a weekly basis, as can be observed in Figure 9.

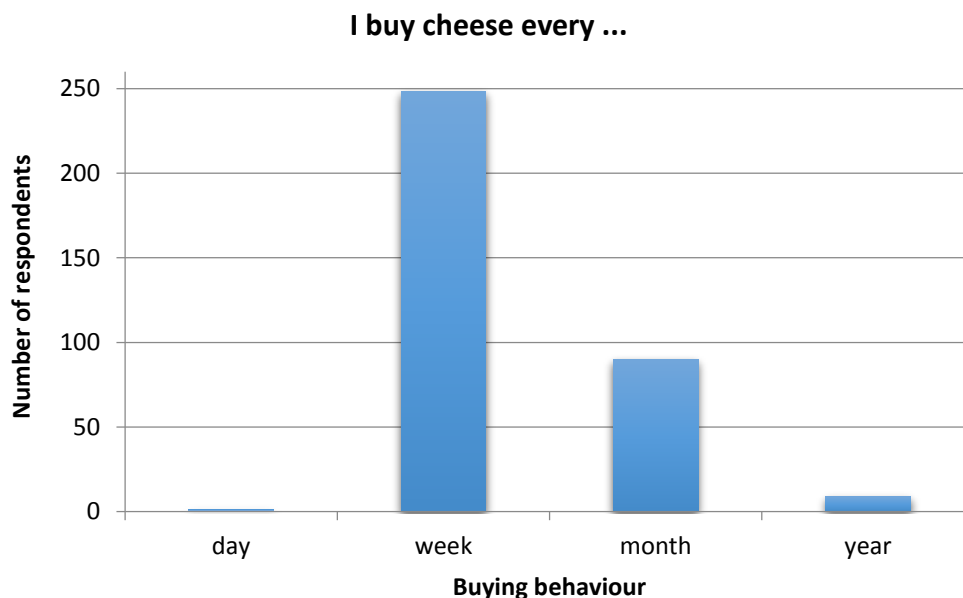


Figure 9. Buying behaviour of cheese.

In the total experiment, only one person purchases cheese on a daily basis while nine respondents buy cheese on a yearly basis. This appears realistic, as cheese is purchased on a weekly basis for the majority.

When examining the cheese eating behaviour, no significant differences were found between the two conditions ($p=0.757$). This means that the eating behaviour is also consistent among the datasets.

Because no variances were found among the samples, combining the samples provides an overview of the eating behaviour of the total dataset, which indicate that consumption is highest on the daily basis, which is closely followed by eating cheese on a weekly basis (see Figure 10).

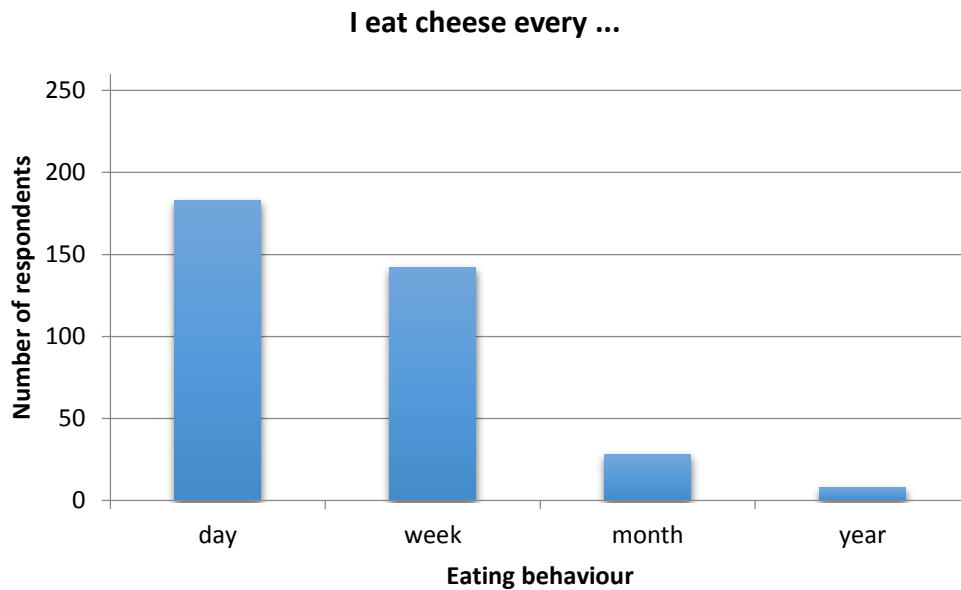


Figure 10. Eating behaviour of cheese.

From these statistics, it can be concluded that cheese is a familiar product for the Dutch inhabitants and, thus, the choice for using this product is a good one. Furthermore, because eating and buying cheese happens on a daily or weekly basis, Dutch people have ample experience with cheese.

Awareness of GI marks

The awareness of GI marks is captured in the question: “Have you ever seen one of these marks before the experiment?” accompanied by the scheme of the three GI marks. For this question, only 21 respondents answered to have seen the marks before. This means only 6% of the respondents could recall or recognise the marks. Therefore, the awareness of the GI marks can be considered low. This may have important implications for the results on the effectiveness of the GI marks, yet this is in accordance with the earlier mentioned expectations for the experiment.

Knowledge of GI marks

The second question, still accompanied by the image of the three GI marks, focused on the respondents’ knowledge of the GI marks. Out of the 362 respondents, 54 of them answered to

know what the GI marks indicate. In an open text field, the meaning of the GI marks should be explained, which was done properly by almost all of these respondents.

Overall, only 21 respondents could really recall the marks from earlier experiences. However, 54 respondents know or could properly determine the meaning of the GI scheme. As such, the majority of respondents, who could write down the proper meaning of the GI scheme earlier, said to not have seen the marks before. This is quite contradicting, as they able to correctly write down the meaning of a mark without actually having seen it before. This means that the respondents may have been able to guess the right meaning due to the text in the mark, in combination with the visual appearance. A little more than half of the respondents, who had actually seen the marks before, also knew the meaning of the GI scheme. These percentages are quite low, yet this was anticipated.

Knowledge of the PDO mark

The final question of the experiment focused solely on the PDO mark, which is used on the packaging during the experiment. In the survey, the multiple-choice question asked for the meaning of the PDO mark. The respondent could choose among five possible answers, or the sixth option “I have no idea”, as can be observed in Figure 11.

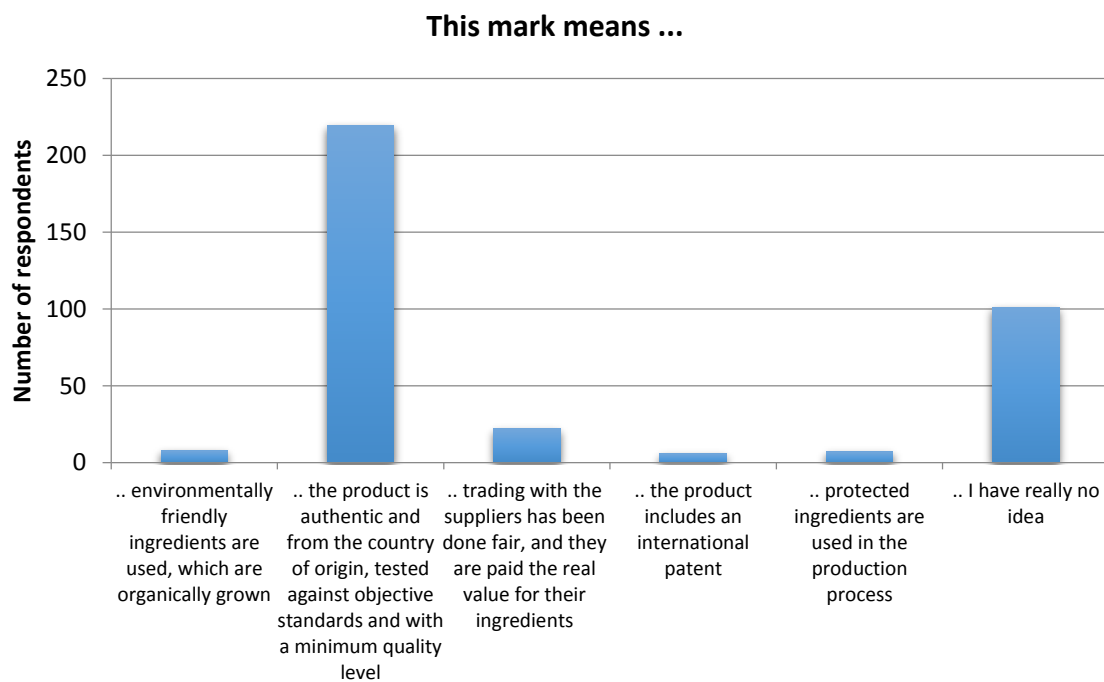


Figure 11. Results of the question on the knowledge of the PDO mark.

Almost 28% of the respondents stated to have no idea what this PDO mark means. This is a quite low percentage compared to the much higher percentage for the complete GI scheme. About 12% of the respondents have chosen the wrong answer, which were about environmentally friendly ingredients, fair trade, patents, or protected ingredients. Nevertheless, over 60% of the respondents ticked the right multiple-choice answer. Apparently, the majority of the people are able to identify the correct meaning of the PDO mark, or at least when they are provided with multiple possible explanations. When people are required to consider the PDO mark and its meaning, the majority of the people are able to understand the mark's meaning.

It is interesting to determine whether differences can be observed between the group of respondents who indicated the right meaning of the PDO mark, and the respondents who were not able to do so. It is possible that the PDO mark is valued more by the 60% of respondents who ticked the right answer, compared to the group, which was not able to indicate the right meaning. This analysis is given at the end of this chapter.

Out of the respondents, who claimed to know what the complete GI scheme entailed in the previous question, almost 90% indicated the correct meaning of the PDO mark in this question as well. Moreover, no differences are established in the knowledge of the PDO mark or the GI scheme among men and women.

In the succeeding sections, the choices between each set of pieces of cheese re analysed. Yet first the statistical technique is explained.

Statistical technique

In order to analyse the data, the correct statistical analysis technique needs to be identified.

Logistic regression

Normal multiple linear regression is used for predicting the value of the variable Y, using the values of multiple predictor X variables. One of the assumptions for having an accurate model for linear regression is that the relationship between the X variables and the Y variable should be linear (Field, 2009). However, the Y variable in this thesis is the purchase preference, which is the binomial choice of 0 or 1; not preferring to buy the cheese or preferring to buy this piece of cheese, respectively. Therefore, given the binomial dependent Y variable, this assumption for linear regression is violated and the normal multiple linear regression technique cannot be used.

The purpose of the analysis is to predict the probability of variable Y occurring, given the different levels of the attributes specified in the design. This means in practical terms that a

prediction is made to indicate which of the two cheeses will be preferred. This is the Y variable, the response indicator. This chosen piece of cheese is then “preferred over the other piece”, which is in line with the question of the experiment. This is also simulated in the experiment, the cheese that would have been chosen in the supermarket. In the analysis, you try to predict the preference to buy a specific piece of cheese based on the characteristics of the packaging; thus, by the price level and presence or absence of different marks.

Solving the problem of a binomial Y variable can be accomplished by a logistic regression; the logistic regression expresses the categorical relationship between the Y variable and the independent variables in a linear way. In the logistic regression, the preference to buy is the dependent variable, the to-be-predicted value. This is measured by the binomial choice of the respondent. The attributes with the corresponding levels are the independent variables, namely the predictors. Possible interactions among the marks and the price levels are interesting to examine, because the influence of the number of marks may have a significant influence on the purchase preference. Moreover, not only the number, but also the simultaneous presence of a combination of two marks may induce a different preference to buy. This is the reason for adding interaction terms in the logistic regression as predictor variables as well.

Each of the predictor variables in the logistic regression has its own effect on the preference to buy, which is measured by the coefficient for the specific variable. When running a logistic regression, the values for the coefficients of the predictor variables are estimated; these are called the “Beta values”. The values of the coefficients are based on the best fitting of the model, resulting in the best approximation of the observed values using the maximum-likelihood estimation. The Beta values are also called standardised regression coefficients, which refers to the fact that the coefficients are measured in standard deviations. This means that the coefficients of the variables can be compared to one another and, thus, conclusions concerning the relative strength of the predictor variables can be drawn.

Assumptions

The logistic regression includes two different assumptions before results can be interpreted.

The assumption of independence of error terms is tested by the Durbin-Watson test; the statistic on the entire database is 2.670 which is fairly acceptable, indicating the cases of the data are not related.

The second assumption, which is in fact not really an assumption yet more of a common problem when using logistic regression, is multicollinearity. The predictor variables should not be

too highly correlated, and this can be tested by the Tolerance and VIF scores. Multicollinearity is not a problem in the dataset of this thesis; the Tolerance scores should not be below 0.1, and the lowest Tolerance score is 0.836 for the predictor Price. This same can be found in the VIF scores, which should not exceed 10; this is true for all variables, and Price has the highest score of 1.196.

Main variables and interaction terms

The variables have to be included in the Binary Logistic Regression. The dependent variable is the preference to buy, which is measured by the response indicator. This indicator is the converted variable based on the choices the respondents have made. The predictor variables are the attributes as specified in the experimental design.

However, only including the four variables is not a realistic approach in this case, as possible interactions could be ignored. It could be possible that a mark’s influence changes when another mark is added to the packaging; the presence of multiple marks simultaneously may give different results. This effect is captured by including the interaction terms between the origin marks. Therefore, all possible interaction terms between two marks are added, and the interaction term of the three marks simultaneously present is added. Moreover, the mark’s effectiveness may change depending on the price level. For this reason, the interaction terms of the single origin marks with the price level are also included in the model. The interaction terms of the price level with several marks simultaneously present are not included in the model, because adding these interaction terms will result in findings that are difficult to interpret. Furthermore, adding these interaction terms would result in high chances of overfitting the data.

The included predictor variables are:

Predictor variables	
GI mark	Variable for presence GI mark
COO mark	Variable for presence COO mark
Fake mark	Variable for presence fake mark
Price	Variable for level of price
COO mark * GI mark	Interaction term
Fake mark * GI mark	Interaction term
COO mark * Fake mark	Interaction term
COO mark * Fake mark * GI mark	Interaction term
Price * GI mark	Interaction term
Price * COO mark	Interaction term
Price * Fake mark	Interaction term

Table 5. Predictor variables added in the analysis.

For the variables for the GI mark, the COO mark, and the fake mark, the baseline “no mark” is chosen, as this demonstrates the increase in buying preference when switching the categorical variables from “0”, which means the absence of the mark, to “1”, which denotes the presence of the particular mark.

Method

Before performing the Binary Logistic Regression analysis, the type of method has to be selected. Two different methods are applicable for this analysis, which are the Enter method and the Stepwise method. For the Stepwise method, six different types of method are available, including the forward and backward methods.

However, Field (2009) suggests to never make use of the Stepwise method, and when you do, you should only use it in case of model building. Only when the study is exploratory and no past research is known on which hypotheses can be based, the Stepwise method may be the better option in order to build a model. He says that various people have noted that the Stepwise method is not a good option when trying to test theories. In fact, the Stepwise method has higher chances of fitting the data in an incorrect way such as over-fitting or under-fitting.

In contrast, the Enter method is a good method to use when testing hypotheses based on past research. This is exactly what this thesis does. Field (2009) mentions that some of the researchers even claim that this Enter method is the only appropriate technique for testing the theories in Binary Logistic Regression. All variables and interactions should be included in the model.

The model

In normal multiple linear regression, the X variables try to predict the outcome value of the scaled Y variable. The constant is the intercept for the Y variable and the Beta values are the estimates of the coefficients of the predictors in the model:

$$Y = b_0 + b_1 \cdot X_1 + b_2 \cdot X_2 + b_3 \cdot X_3 + \dots + b_n \cdot X_n + \varepsilon \quad (\text{Equation 2})$$

However, having a categorical Y variable, the multiple regression formula has to be transformed into a logistic regression model. In this model, the various X predictor variables try to predict the probability that the Y variable occurs by using the e as base for the natural logarithm:

$$P(Y) = \frac{1}{1 + e^{-(b_0 + b_1 \cdot X_1 + b_2 \cdot X_2 + b_3 \cdot X_3 + \dots + b_n \cdot X_n)}} \quad (\text{Equation 3})$$

The multiple linear regression formula can be found between brackets in this formula. By taking the natural logarithm, the probability that the Y variable occurs can be predicted based on the predictor variables between the brackets. This transformation results in an expression of the non-linear relationship in a linear way (Field, 2009). In other words, the formula expresses the multiple regression in logarithmic terms.

The Y variable is now specified in terms of probability; the value that results from the equation above is now between 0 and 1 (Field, 2009). This indicates that the probability the particular piece of cheese is preferred.

Additionally, each predictor variable has its own effect, the so-called Beta coefficient. These values can be included in the formula representing the logistic regression model, resulting in the formula for the predictive model. This logistic regression model is used to analyse the data obtained in the experiment.

Analysis of the 'control condition' data

Because two conditions are tested in this experiment, first the analysis on the 'control condition' without any time constraint is presented.

Binary Logistic Regression

When including the variables in the Binary Logistic Regression and using the Enter method, the analysis can be performed.

The analysis indicates the percentage of 54.1% successful predictions without any predictor variables in the model. In other words, only when the model's constant included, 54.1% of the predicted values for the dependent variable is correct. This can be regarded as the base model. The model including variables should offer a higher percentage of accurate predictions, as the prediction will then depend on the significant predictor variables.

In the next step, the predictor variables are added to the model. The residual chi-square statistic is 361.478 (p-value = 0.000), which means that the Beta values for the predictor variables are significantly different from zero. For this reason, adding these variables will significantly improve the model. This means the model including predictor variables will be more accurate in its predictions compared to the base model.

In addition, the Omnibus Test for the model is also significant ($p < 0.05$), which again means that the model is a significantly better predictor than the base model.

Subsequently, the table for all the included predictor variables is created (see Table 6).

Variables	Beta coefficients	Standard error	Wald statistic	Significance
Constant	5.572	2.165	6.626	0.010
GI mark	6.842	2.452	7.788	0.005
COO mark	2.602	2.129	1.494	0.222
Fake mark	8.704	2.098	17.220	0.000
Price	-1.592	0.553	8.302	0.004
COO mark * GI mark	-0.567	0.339	2.789	0.095
Fake mark * GI mark	-0.374	0.358	1.091	0.296
COO mark * Fake mark	-1.206	0.258	21.793	0.000
COO mark * Fake mark * GI mark	1.985	0.443	20.110	0.000
GI mark * Price	-1.627	0.581	7.843	0.005
COO mark * Price	-0.347	0.536	0.419	0.517
Fake mark * Price	-1.900	0.526	13.043	0.000

Table 6. Results of run logistic regression in the control condition.

The Beta values are the coefficients of the predictor variables with the corresponding Wald statistic, which indicates the significance of this coefficient. If the coefficient is significant, the predictor variable has a significant contribution to the outcome variable.

For this analysis, the confidence level of 95% is used that corresponds with a p-value of 0.05. From the Wald statistics and the corresponding p-values, it can be argued that four of the added predictor variables are found to be not significantly affecting the predicted variable, namely the preference to buy the piece of cheese.

Because insignificant variables are in the model, the Beta coefficients of the significant variables cannot be interpreted correctly. The insignificant variables will have to be removed and the model has to be run again. However, the interaction between the COO mark and the GI mark turns out to be close to the 95% confidence interval. For this reason, the interaction term will not directly be removed and will be kept in the model. Removing the other insignificant variables for the COO mark, the interaction between the fake mark and the GI mark, and the interaction between the COO mark and price from the model and running the logistic regression again, results in the following model:

Variables	Beta coefficients	Standard error	Wald statistic	Significance
Constant	3.908	1.611	5.882	0.015
GI mark	10.535	2.212	22.691	0.000
Fake mark	10.669	2.008	28.244	0.000
Price	-0.970	0.402	5.834	0.016
COO mark * GI mark	0.352	0.186	3.564	0.059
COO mark * Fake mark	-0.145	0.163	0.787	0.375
COO mark * Fake mark * GI mark	1.477	0.250	34.949	0.000
GI mark * Price	-2.679	0.536	24.963	0.000
Fake mark * Price	-2.573	0.493	27.241	0.000

Table 7. Results of run regression without three insignificant variables.

Because of the removal of three variables, two of which included the COO mark, now the interaction between the COO mark and the fake mark is no longer significant either. Because there are no hypotheses formulated on the interaction between the COO mark and the fake mark, this interaction variable is also removed from the model. Again, the interaction between the COO mark and the GI mark is very close to the 95% confidence level, so this variable will not be removed. Now, the binary logistic regression is run again. The following table presents the results:

Variables	Beta coefficients	Standard error	Wald statistic	Significance
Constant	4.029	1.606	6.292	0.012
GI mark	10.628	2.212	23.091	0.000
Fake mark	10.732	2.010	28.509	0.000
Price	-1.002	0.400	6.262	0.012
COO mark * GI mark	0.319	0.183	3.051	0.081
COO mark * Fake mark * GI mark	1.398	0.234	35.833	0.000
GI mark * Price	-2.691	0.537	25.156	0.000
Fake mark * Price	-2.601	0.493	27.857	0.000

Table 8. Final results for Binary Logistic Regression on control condition data.

This model allows for interpretation of all coefficients, having significant variables; the interaction term of the COO mark and the GI mark still found to be significant at the 10% confidence level, which will be kept in the model because of its marginal effect.

The Nagelkerke R^2 indicates that the proportion of variance in the dependent variable is explained by the model including the predictor variables, which is equal to 14.7%.

The predictive power of the model is more accurate than the base model. Compared to the base model, the explained variance has increased by 10.9% from 54.1% to a percentage of 65.0%.

Now, almost two out of three outcomes are predicted correctly by the model including predictor variables.

The model

Before relevant conclusions regarding the effects of the marks can be drawn, the model must first be composed. Filling in the Beta coefficients in the model (for base model, see Equation 3) results in the following equation:

$$P(\text{choosing the packaged piece of cheese in control condition}) = \frac{1}{1 + e^{-(4.029 + 10.628 \cdot GI \text{ mark} + 10.732 \cdot Fake \text{ mark} - 1.002 \cdot Price + 0.319 \cdot COO \text{ mark} * GI \text{ mark} + 1.398 \cdot COO \text{ mark} * Fake \text{ mark} * GI \text{ mark} - 2.691 \cdot GI \text{ mark} * Price - 2.601 \cdot Fake \text{ mark} * Price)}}$$

The main variable COO mark is excluded from the analysis because it was found insignificant. The main effects of the GI mark, the fake mark, and the price are found to significantly influence the probability of choosing a piece of cheese and are therefore included in the model.

All significant interaction terms are also in the model. A significant interaction term in the model means that the effect of the predictor variable X_i on the categorical Y variable differs per value of another predictor variable, say X_j . A positive interaction term indicates that when variable X_j increases, the effect of variable X_i on the outcome variable also increases. For a negative interaction term, the opposite is true; when variable X_j increases, the effect of variable X_i on the outcome variable will decrease.

Interpretation of the general effects

In this section, the Beta coefficient per variable will be discussed. In the next section, the actual changes in preference due to changing the marks on the product packaging will be discussed.

The interpretation of the main effects per mark is not straightforward because of the natural logarithm in the formula and the binary dependent variable. However, the coefficients show the valence and the magnitude of the mark's effect on the preference to buy:

P(choosing the packaged piece of cheese in control condition)

$$= \frac{1}{1 + e^{- (4.029 + 10.628 \cdot GI\ mark + 10.732 \cdot Fake\ mark - 1.002 \cdot Price + 0.319 \cdot COO\ mark * GI\ mark + 1.398 \cdot COO\ mark * Fake\ mark * GI\ mark - 2.691 \cdot GI\ mark * Price - 2.601 \cdot Fake\ mark * Price)}}$$

For the GI mark, the coefficient 10.628 indicates a significant positive effect on the purchase preference. The first conclusion is that the GI mark is effective, as it influences the consumer shopping behaviour. Thus, despite low awareness and knowledge of the European scheme, the mark is proven to affect the product's evaluation. Second, the relationship between the buying preference and the PDO mark is positive. This means that adding a GI mark to the product packaging results in a more preferred product, compared to a non-marked product.

Surprisingly, the main variable for the COO mark cannot be found in the formula; the variable resulted to be insignificant. This means that a Dutch flag placed on a piece of cheese does not affect the preference to buy the product; it does not have a positive effect nor does it harm the product's evaluation. The earlier found positive effects of COO mark do not apply to this experiment, since cheese showing a Dutch flag was preferred equally to a non-marked product.

In addition, the fake mark is found to have the largest effect on the purchase preference, as the Beta coefficient 10.732 indicates a positive effect, and it is the largest coefficient found in the model. First of all, the effect is found to be significant, indicating that a fake mark is able to effectively influence the preference for a product. Second, the relationship is positive because without any specific meaning or objective measure, a visual mark is able to increase the purchase preference. Third, the coefficient is somewhat greater than the GI mark's coefficient, which means that the fake mark is preferred to the GI mark. The interaction of the fake mark with price is negative, however, the same negative relationship with price is found for the GI mark, which is an even stronger negative relationship. In short, without any objective value, a fake and designed mark is able evoke a higher preference compared to the European alternative.

Looking at the next variable, price has a negative relationship with the preference to buy. This indicates that the same piece of cheese will be less preferred when it is priced at a higher price level. This is in line with the expectations, as people generally prefer cheaper products. Moreover, this means that the total preference is decreased due to the price. Thus, the effectiveness of the origin marks in terms of product preference will also be decreased by increasing the price. Therefore, a cheaper non-marked product may be preferred to an overpriced fake-marked product.

The combination of the COO mark and the GI mark is found to be significant, contrary to the insignificant COO mark on its own. The coefficient for this interaction is small, but positive. Combining the COO mark with the PDO mark is increasing the preference for the product. However, this effect is marginal significant, so the implications of this result should not be emphasized too much.

Even more surprising to find is the significant positive coefficient for the interaction of the three marks simultaneously present. When all marks are present on the same packaging, this positively influences the preference for the product.

The two significant interactions with price, namely the interaction of the GI mark with price and the interaction of the fake mark with price, are both negative. Increasing the price level negatively affects the preference to buy the GI-marked and fake-marked product. This is consistent with earlier found negative coefficient for price itself. When the price level increases, the origin marks become less effective in shaping the purchase preference, and, consequently, the price level has become more important.

Now, the coefficients of the variables are discussed, giving insight in the general effect per variable. However, what this conclusion requires is an easy-to-interpret measurement to observe to what extent the preference of a product changes due to the origin marks. The previously discussed coefficients are somewhat more difficult to interpret in actual terms of preference because of the natural logarithmic conversion. In addition to the general effects found in the coefficients, it is interesting to examine how exactly the preference for a product is changed by a different product layout due to an added mark. To provide insights into these changes and in the influence of the interactions among marks, the probabilities, odds, and odds ratios are used in the succeeding section.

Probabilities, odds, and odds ratios

The first calculation concerns the probability that a particular piece of cheese is chosen. This can be calculated by filling in the model as proposed in the previous section. This will result in a certain percentage equal to the probability that it will be chosen and, therefore, this is the preference to buy this product.

The probability for not choosing this particular piece of cheese can be computed by following this formula:

$$P(\text{not chosen}) = 1 - P(\text{chosen}) \quad (\text{Equation 4})$$

Having the two numbers, these two probabilities can be used to determine the odds, which are computed as follows:

$$Odds = \frac{P(chosen)}{P(not\ chosen)} \quad (\text{Equation 5})$$

When the odds are greater than 1, this means that the piece of cheese is more likely to be chosen.

First, the probability and odds for the base product without any marks and only revealing a price level is needed in order to compare a marked product to the base product. For comparison, the price level will be constant at the base price of € 3.80. This indicates that all products, which will be compared to each other, will have the same price of € 3.80. Evidently, computing the numbers based on another price level will offer different results.

First of all, the probability of choosing the base products needs to be calculated. This can be achieved by filling in the above-presented model. When only a price level of € 3.80 is visible on the packaging and on marks, the following formula is used:

$$\begin{aligned} &P(\text{choosing base product in control condition}) \\ &= \frac{1}{1 + e^{-(4.029 - 1.002 \cdot \text{Price})}} = \frac{1}{1 + e^{-(4.029 - 1.002 \cdot \text{€ } 3.80)}} \\ &= 0.555 \end{aligned}$$

All other variables are set to 0, since no marks are present. Only the constant is in the formula, and the coefficient of the price and the price level of € 3.80. The outcome of 0.555 implies that the probability of preferring the base product to another piece of cheese is 0.555, or 55.5%.

Next, the odds for choosing this base product can be computed as follows:

$$P(not\ chosen) = 1 - 0.555 = 0.445$$

$$Odds = \frac{P(chosen)}{P(not\ chosen)} = \frac{0.555}{0.445} = 1.248$$

The odds can be used to calculate the odds ratio, which is explained later on.

The same calculation can be made for a piece of cheese displaying a GI mark, which is the PDO mark in this experiment. However, the calculation for the probability for choosing this GI-marked product is now based on the model also including the variable for GI mark and the interaction term of the GI mark with the price level of € 3.80. This results in the following calculation:

$P(\text{choosing a GI marked product in control condition})$

$$= \frac{1}{1 + e^{- (4.029 + 10.628 \cdot GI \text{ mark} - 1.002 \cdot Price - 2.691 \cdot GI \text{ mark} * Price)}}$$

$$= \frac{1}{1 + e^{- (4.029 + 10.628 \cdot 1 - 1.002 \cdot \text{€ } 3.80 - 2.691 \cdot 1 * \text{€ } 3.80)}} = 0.651$$

Currently, the coefficient of the GI mark is in the formula, representing the presence of the GI mark. Again, the coefficient for the price and the price level of € 3.80 can be found. Finally, the coefficient and the interaction term of the GI mark with the price are included. Calculating the probability for buying this product results in 0.651, or 65.1%, which is higher compared to the base product.

Additionally, the odds for choosing this GI-marked product can be computed:

$$P(\text{not chosen}) = 1 - 0.651 = 0.349$$

$$\text{Odds} = \frac{P(\text{chosen})}{P(\text{not chosen})} = \frac{0.651}{0.349} = 1.866$$

Now, the most interesting is to observe to what extent this GI-marked product has a higher probability of being chosen compared to the base product. In other words, has the GI-marked product a higher preference to buy due to its present mark? And if the GI-marked product is shown concurrently with the base product, will the GI-marked product be preferred to the base product?

This insight can be gained by computing the odds ratio. The odds ratio is calculated by dividing the odds of the newly assembled product by the base product:

$$\text{Odds ratio} = \frac{\text{Odds new product}}{\text{Odds base product}} \quad (\text{Equation 6})$$

The odds ratio tells the change in the probability of Y occurring, when the X variable changes one unit. If the odds ratio for variable X_k is greater than 1, the probability of Y occurring will increase. Essentially, the odds ratio measures the change in odds due to a change in the packaging of the cheese, a change in the categorical predictor variable. In effect, having an odds ratio greater than 1 means that when a predictor variable is increased - in this experiment from no mark marks to the particular mark - the probability of buying the marked product will increase. Conversely, if the odds ratio is below 1 the odds of Y occurring decreases (Field, 2009).

The odds ratio for the GI-marked product can be computed as follows:

$$\text{Odds ratio} = \frac{\text{Odds new product}}{\text{Odds base product}} = \frac{1.866}{1.248} = 1.495$$

The value of 1.495 implies that the odds for choosing a piece of cheese will be almost 1.5 times higher when the packaging is provided with a PDO mark. Therefore, in the control condition, it is effective to place the PDO mark on a piece of cheese of € 3.80.

For the COO mark and for the fake mark, the same odds ratio can be calculated:

Present marks	Probability (chosen)	Probability (not chosen)	Odds	Odds ratio compared to base product
Base product	0.555	0.445	1.248	
GI mark	0.651	0.349	1.866	1.495
COO mark	0.555	0.445	1.248	1.000
Fake mark	0.745	0.255	2.914	2.335

Table 9. Computed probabilities, odds, and odds ratio for the main variables at price level = € 3.80.

As can be observed in Table 9, the odds ratio for the COO mark is equal to 1. This can be explained by the fact that this variable is found to be insignificant. The COO has no effect on the purchase preference. When computing the probability for the COO-marked product to be selected by the respondents, the model requires the same components as the base product. The probability the COO-marked product is chosen is equal to the probability that the base product without marks is chosen. Likewise, the identical probabilities result in identical odds, which entails that there is no preference difference established by adding a Dutch flag to the packaging. Thus, the products are equally preferred.

The probability that the piece of cheese displaying a fake mark is selected is considerably higher compared to the GI mark and the COO mark. The odds ratio of 2.335 indicates that the likelihood a fake-marked product will be chosen is 2.3 times higher compared to a non-marked product. This effect can be explained by the coefficient for the fake mark, which is discussed earlier.

Presence of multiple marks

As mentioned before, interaction terms may play an important role. Especially when it comes to the question whether a combination of marks infers a different buying preference for the product.

Due to the experimental design, several combinations of marks are presented to the respondents. Therefore, the effects of the combination of the marks can now be analysed.

For computing the probability a product with multiple marks is chosen, the model must be used again. All variables and interaction terms for the present marks are recorded in the formula, resulting in the probability for this combination. Subsequently, the corresponding odds can be calculated. Finally, the odds ratio of the product with various marks and the base product can be calculated. As the steps are identical to the ones shown in the previous section, only the results are presented in the following table:

Present marks	Probability (chosen)	Probability (not chosen)	Odds	Odds ratio compared to base product
GI mark & COO mark	0.720	0.280	2.567	2.057
GI mark & Fake mark	0.813	0.187	4.357	3.492
COO mark & Fake mark	0.745	0.255	2.914	2.335
All 3 marks: GI, COO & Fake	0.960	0.040	24.259	19.441

Table 10. Probabilities, odds, and odds ratios for multiple marks in the control condition at price level = € 3.80.

The effectiveness of the combination of the GI mark and COO mark has an interesting implication; the change in preference due to placing both the marks simultaneously on the packaging is higher compared to the change when only one of the marks is presented. This combination turns out to be effective and, thus, results in a higher purchase preference than just one mark.

For the combination of the GI mark and the fake mark, the same finding is revealed; the combination of the two marks is more effective than one of the marks presented on its own.

However, the combination of a fake mark and a COO mark results in exactly the same odds ratio as for the fake mark on its own. This is because the COO mark has no significant other interactions which change the preference. Concerning the fake mark, the findings suggest that adding a COO mark to the packaging of the GI-marked product will have no positive or negative effect. However, when using a COO mark, the preference for the COO-marked product can be increased by adding the fake mark.

In sum, every combination of two marks is equally preferred or outperforms a single mark's preference. The conclusion is that adding an additional mark to an already present mark will do no harm and may even lead to an increased preference for the product.

What is the most interesting to find, is that the combination of all three marks on the packaging results by far in the highest preference to buy: the odds ratio of 19.441 suggests that providing the packaging of a piece of cheese with all the possible marks will have the highest preference to buy, and so the highest probability of being chosen. Obviously, the number of marks plays an

important role for consumers. Increasing the number of marks results in higher preferred products.

The influence of increasing the price

When comparing the probabilities, conclusions about the marks' effectiveness can be drawn. However, the previous analysis is based only on the price level € 3.80, and the effectiveness is dependent on the chosen price level. Consequently, varying the price level will yield other results. This is due to the interaction terms with the price, which change the magnitude of the mark's effect. The main question now is: What happens to the marks' effectiveness when the price is increased?

The interactions with price can be found in the following model:

$$P(\text{choosing the packaged piece of cheese in control condition}) = \frac{1}{1 + e^{-(4.029 + 10.628 \cdot GI \text{ mark} + 10.732 \cdot Fake \text{ mark} - 1.002 \cdot Price + 0.319 \cdot COO \text{ mark} * GI \text{ mark} + 1.398 \cdot COO \text{ mark} * Fake \text{ mark} * GI \text{ mark} - 2.691 \cdot GI \text{ mark} * Price - 2.601 \cdot Fake \text{ mark} * Price)}}$$

Nonetheless, only having the coefficients for the different variables makes it hard to draw the right conclusions. To provide an overview of the effect of price level on the mark's effectiveness, it is noteworthy to examine the "trends" that can be discovered when comparing the odds ratios of a mark on different price levels.

Present marks	Odds ratio, per price level			
	€ 3.80	€ 4.00	€ 4.20	€ 4.40
Base product				
GI mark	1.495	0.873	0.510	0.297
COO mark	1.000	1.000	1.000	1.000
Fake mark	2.335	1.388	0.825	0.490
GI mark & COO mark	2.057	1.201	0.701	0.409
GI mark & Fake mark	3.492	1.212	0.420	0.146
COO mark & Fake mark	2.335	1.388	0.825	0.490
All 3 marks: GI, COO & Fake	19.441	6.746	2.341	0.812

Table 11. Total overview of odds ratios for the main variables and interaction effects in the control condition, based on various price levels.

As is demonstrated in Table 11, price negatively influences the effectiveness of every mark and every combination. A negative relationship between the purchase preference and the price is established for every variable. Thus, the coefficient for the main variable price is negative as well

as the coefficients of the two interactions with the price. Basically, this means that the origin mark's effectiveness decreases when the price level is increased. Also, for all combinations of marks this is true. When a piece of cheese is priced higher, the marks start playing a less important role. Price has a relatively strong effect, as the most combinations become less preferred than a non-marked product for the two highest price levels. The trends which can be observed indicate that price is an important factor influencing the marks' effectiveness. For the lower price levels, the marks are able to evoke a positive preference for the product. However, increasing the price to the two higher price levels results in the marks having a detrimental effect; the marked products are less preferred than products containing no mark. The conclusion is that when the price becomes too high, marks are no useful tool anymore, not being able to increase the purchase preference.

Looking at the single marks, the fake mark is the origin mark which results in the highest preference, outperforming the GI mark and the COO mark. This effect is decreased when price increases. When deciding on one origin mark, the fake mark turns out to be the most effective in positively affecting the purchase preference.

When looking at the combination of two marks, the GI mark's effectiveness can be enhanced by adding a COO mark to the packaging. However, combining the fake mark with the COO mark has no effect: the effectiveness stays the same, whether or not the COO mark is added to the fake-marked packaging. For the lower price levels, the combination of the fake mark and the GI mark turns out to be the most effective combination, having the highest preference to buy.

Finally, the combination of all three marks simultaneously present turns out to be the most effective. This combination infers the highest preference to buy for a piece of cheese. However, the price decreases the combination's effectiveness. When deciding on putting marks on a packaged piece of cheese, the best advice is to provide it with all three marks, having the highest purchase preference.

It is interesting to see that the COO mark on its own has no positive effect, however nor does it have a negative effect for the higher price levels. But, when the COO mark is combined with one or multiple other marks, the combination is effective. So, despite the fact that on its own the COO mark has no value, in combination with other marks the COO mark is able to evoke a higher purchase preference. When, for some reason, a higher priced product has to contain a mark, the COO mark is the better option: for the highest price levels, it does not decrease the purchase preference.

Analysing the residuals

An important part of the analysis is the assessment of the residuals. Analysing the residuals provides insights into the model's quality. As such, the data points that fit the model poorly and data points which may influence the model can be examined.

The results suggest that the model is good, as none of the standardised residuals is greater than 2, which means that there are no outliers. Moreover, the Cook's Distance is less than 1 for all of the residuals. Furthermore, the leverage values are all below the expected leverage calculated based on the number of predictors and sample size. Finally, none of the DFBeta values is greater than 1.

The most preferred product

Lastly, it is interesting to examine what would be the most preferred product in the 'control condition'. As discussed in the previous section, this depends on the price level. Increasing the price decreases the effectiveness of every mark and combination of marks.

If, for some reason, only one mark is allowed to be placed on the piece of cheese, the fake mark is the most effective mark. The image of the cow prompts the highest preference to buy the product. When a marketer is allowed to put more than one mark on the product packaging, the highest preference to buy is established by adding all three marks simultaneously. However, all effects are subject to the influence of the price, decreasing the marks' effectiveness. For the highest price level, a non-marked product is preferred over a product containing all three marks.

Analysis of the 'time pressure' data

For analysing the dataset in the time pressure condition, the same steps and procedures are used as described for the control condition. Hence, in this section the steps' description is omitted and only the results for the time pressure data are presented.

The same variables and interaction terms are included in the Binary Logistic Regression, as described above. Again, the Enter method is used and the regression is run.

The analysis indicates the percentage of 52.3% successful predictions without any predictor variables in the model. In other words, the model only including the constant correctly predicts 52.3% of the values for the dependent variable.

The residual chi-square statistic is 375.067 with a p-value of 0.000, which means that the Beta values for the predictor variables are significantly different from zero, and, thus, adding these variables will significantly improve the model. The Omnibus Test for the model is also significant (p=0.000), which indicates that the model is a significant better predictor than the base model that only includes a constant.

Subsequently, the table for all the included predictor variables is created (see Table 12).

Variables	Beta coefficients	Standard error	Wald statistic	Significance
Constant	5.351	2.005	7.122	0.008
GI mark	8.256	2.360	12.234	0.000
COO mark	2.175	1.990	1.195	0.274
Fake mark	6.504	1.979	10.804	0.001
Price	-1.530	0.511	8.968	0.003
COO mark * GI mark	-0.556	0.316	3.089	0.079
Fake mark * GI mark	-0.248	0.332	0.559	0.454
COO mark * Fake mark	-0.866	0.242	12.760	0.000
COO mark * Fake mark * GI mark	1.367	0.417	10.750	0.001
GI mark * Price	-1.976	0.559	12.513	0.000
COO mark * Price	-0.218	0.500	0.191	0.662
Fake mark * Price	-1.383	0.496	7.772	0.005

Table 12. Results of run logistic regression in the time pressure condition.

Compared to the control condition, the same four variables are found to be insignificant. However, the p-value of the interaction between the COO mark and the GI mark is found to be close to 0.05 again, which indicates a marginal significant effect; thus, the variable will not be removed immediately. Again, the other three variables will be removed from the model in order generate a model which only contains significant variables. Removing the insignificant variables for the COO mark, the interaction between the fake mark and the GI mark, and the interaction between the COO mark and price from the model and running the logistic regression again, results in the following model:

Variables	Beta coefficients	Standard error	Wald statistic	Significance
Constant	3.500	1.528	5.246	0.022
GI mark	12.491	2.119	34.734	0.000
Fake mark	8.353	1.890	19.527	0.000
Price	-0.853	0.381	5.018	0.025
COO mark * GI mark	0.386	0.178	4.696	0.030
COO mark * Fake mark	0.262	0.151	3.017	0.082
COO mark * Fake mark * GI mark	0.952	0.236	16.318	0.000
GI mark * Price	-3.150	0.514	37.591	0.000
Fake mark * Price	-2.031	0.464	19.131	0.000

Table 13. Final results of the Binary Logistic Regression for the time pressure condition data.

All variables in the model turn out to be significant, having found a marginal significant effect for the interaction term of the COO mark and the fake mark. Because the p-value is close to 0.05, the variable will be kept in the model.

The Nagelkerke R^2 captures the proportion of variance in the dependent variable explained by the model including the predictor variables, which is equal to 13.0%, and comparable to the control condition model.

The predictive power of the model is more accurate than the base model. Compared to the base model, the explained variance has increased by 9.8%, from 52.3% to a percentage of 62.1%.

The model

For the time pressure condition, a new model is created. Entering the Beta coefficients in the model (for base model, see Equation 3) results in the following equation:

$$\begin{aligned}
 &P(\text{choosing packaged piece of cheese in time pressure condition}) \\
 &= \frac{1}{1 + e^{-(3.500 + 12.491 \cdot \text{GI mark} + 8.353 \cdot \text{Fake mark} - 0.853 \cdot \text{Price} + 0.386 \cdot \text{COO mark} \cdot \text{GI mark} + 0.262 \cdot \text{COO mark} \cdot \text{Fake mark} + 0.952 \cdot \text{COO mark} \cdot \text{Fake mark} \cdot \text{GI mark} - 3.150 \cdot \text{GI mark} \cdot \text{Price} - 2.031 \cdot \text{Fake mark} \cdot \text{Price})}}
 \end{aligned}$$

The main variable COO mark is excluded from the analysis because it was found insignificant. The main effects of the GI mark, the fake mark, and the price are found to significantly influence the probability of choosing a piece of cheese and are therefore included in the model.

Interpretation of the general effects

The Beta coefficients in the model can now per variable be analysed:

$$P(\text{choosing packaged piece of cheese in time pressure condition}) = \frac{1}{1 + e^{-(3.500 + 12.491 \cdot \text{GI mark} + 8.353 \cdot \text{Fake mark} - 0.853 \cdot \text{Price} + 0.386 \cdot \text{COO mark} * \text{GI mark} + 0.262 \cdot \text{COO mark} * \text{Fake mark} + 0.952 \cdot \text{COO mark} * \text{Fake mark} * \text{GI mark} - 3.150 \cdot \text{GI mark} * \text{Price} - 2.031 \cdot \text{Fake mark} * \text{Price})}}$$

The coefficient for the GI mark is equal to 12.491, indicating a positive effect of the PDO mark's presence on the purchase preference. Similar to the control condition, the effect considerably differs from zero, increasing the purchase preference when the product is provided with a GI mark. The mark is proven to establish additional value and not only in the condition when people have all the time they need, but also in the condition when people are placed under time pressure.

Again, no significant influence of the COO mark is discovered. When consumers are placed under time pressure, the Dutch flag does not alter the preference for the piece of cheese. This is quite surprising, as the Dutch flag is a mark, which is easy to interpret and is expected to communicate the origin effectively.

Furthermore, the effect of the fake mark is also positive and significant in the time pressure condition. Even though the fake mark's coefficient is smaller than the GI mark in this condition, the odds ratio for the fake mark will be higher. This can be explained by the fact that the coefficient for the fake mark's interaction with price is now lower than the one for the GI mark's interaction with price.

The coefficient for price is almost equal to the coefficient in the control condition and reveals a significant negative relationship, explained by the fact that higher priced products are less favoured. The same negative effect is established for the interactions of the GI mark and the fake mark with price. This is in line with the control condition.

The positive coefficients for the combinations of the COO mark with the GI mark or the fake mark indicate that adding a COO mark to one of the other marks increases the purchase preference.

The coefficients for the price interactions with the marks are negative again, indicating in a decreased effectiveness of the marks when the price is increased.

In addition, in the time pressure condition, the combination of the three marks is found to be of significance influence as well. The presence of the three marks on the product positively increases the preference to buy this piece of cheese.

To measure the actual impact of the marks on the preference to buy a piece of cheese, the odds ratios are computed in the succeeding section.

Probabilities, odds, and odds ratios

Because the steps for calculating the probabilities, odds, and odds ratio are identical to the previous section, only the results are presented in the Table 14.

Present marks	Probability (chosen)	Probability (not chosen)	Odds	Odds ratio
Base product	0.564	0.436	1.295	
GI mark	0.686	0.314	2.181	1.684
COO mark	0.564	0.436	1.295	1.000
Fake mark	0.710	0.290	2.444	1.887

Table 14. Computed probabilities, odds, and odds ratio for the main variables at price level = € 3.80.

The odds ratio for the fake-marked piece of cheese is the highest, which is consistent with the findings in the control condition. Despite the fact that the fake mark's coefficient was found to be smaller than the GI's, the fake mark still outperforms the GI mark due to the interaction with price. The GI mark positively affects the preference to buy, whereas the COO mark is unable to generate any change in the preference to buy for the product.

All outcomes for the odds ratios are in line with the outcomes in the control condition.

Presence of multiple marks

The same steps are followed to calculate the metrics of the combination of multiple marks:

Present marks	Probability (chosen)	Probability (not chosen)	Odds	Odds ratio
GI mark & COO mark	0.762	0.238	3.208	2.477
GI mark & Fake mark	0.805	0.195	4.116	3.178
COO mark & Fake mark	0.761	0.239	3.177	2.453
All 3 marks: GI, COO & Fake	0.953	0.047	20.385	15.740

Table 15. Computed probabilities, odds, and odds ratio for the interaction terms at price level = € 3.80.

The interpretation of these odd ratios is also in line with the interpretations for the control condition. All combinations of multiple marks are preferred to single-marked products. The combination of the GI and COO mark results in a higher purchase preference compared to a

single presented GI or COO mark. The same is true for the combination of the GI mark and the fake mark and combining the COO mark and the fake mark.

Moreover, simultaneously adding all three marks to the packaging infers the highest purchase preference for a € 3.80 priced piece of cheese in the time pressure condition.

The influence of increasing the price

Also for the time pressure condition, it is interesting to know how increasing the price affects the marks' effectiveness. Varying the price level will yield other results, due to the negative coefficients for price and the interaction terms:

P(choosing packaged piece of cheese in time pressure condition)

$$= \frac{1}{1 + e^{-(3.500 + 12.491 \cdot GI \text{ mark} + 8.353 \cdot Fake \text{ mark} - 0.853 \cdot Price + 0.386 \cdot COO \text{ mark} * GI \text{ mark} + 0.262 \cdot COO \text{ mark} * Fake \text{ mark} + 0.952 \cdot COO \text{ mark} * Fake \text{ mark} * GI \text{ mark} - 3.150 \cdot GI \text{ mark} * Price - 2.031 \cdot Fake \text{ mark} * Price)}}$$

The relative impact of the marks and their combinations is constant across the price levels. Nevertheless, varying the price level yields other results in absolute terms. The price changes the magnitude of the mark's effect.

To discover the "trends" due to the changing price, the following table is composed:

Present marks	Odds ratio, per price level			
	€ 3.80	€ 4.00	€ 4.20	€ 4.40
Base product				
GI mark	1.684	0.897	0.478	0.254
COO mark	1.000	1.000	1.000	1.000
Fake mark	1.887	1.257	0.838	0.558
GI mark & COO mark	2.477	1.319	0.703	0.374
GI mark & Fake mark	3.178	1.127	0.400	0.142
COO mark & Fake mark	2.453	1.634	1.088	0.725
All 3 marks: GI, COO & Fake	15.740	5.585	1.981	0.703

Table 16. Total overview of odds ratios for the main variables and interaction effects in the time pressure condition, based on various price levels.

It can be concluded that price negatively influences the effectiveness of every mark and of every combination. A negative relationship between the preference to buy and the price is observed for every variable, as the coefficient for the main variable price is negative, as well as the coefficients of the two interactions with the price. The same is found in the control condition.

This can be explained by the fact that the majority of the people prefer to pay less for their products and the time pressure condition is no exception. Moreover, the negative effect of price results in decreasing effectiveness of the marks in a consistent way compared to the control condition, as the odds ratios stay in the same relative relationship to each other for every price level. Hence, there are no contradicting findings between the two conditions.

For the GI mark, the same results are found compared to the control condition. The COO mark is again found to be insignificant, not being able to influence positively or negatively the purchase preference.

Also in this condition, the fake mark is the most effective when having a single mark on the product's packaging. The fake mark is able to infer the highest purchase preference for a single-marked piece of cheese. The effectiveness is decreased when the price increases.

For all combinations of two marks, the results suggest that these products are preferred to the single-marked products. A combination of marks induces a higher purchase preference than a solely presented mark is capable of. However, when multiple marks are allowed, the combination of all three marks simultaneously results in the highest purchase preference.

Yet, the influence of the price increases when the price level increases. At some point, the negative effect of the higher price is stronger than the positive effect of the different marks. As such, marketers should keep this implication in mind, as the influence of price is an important factor. Also in the time pressure condition, for higher price levels the marks' effectiveness diminishes.

[Analysing the residuals](#)

The conclusions of analysing the residuals of the time pressure condition model are that no outliers are detected, because none of the standardised residuals is greater than 2. Moreover, Cook's Distance is less than 1 for all the residuals. When investigating the leverage values, none of them is above the expected leverage. Finally, also none of the DFBeta values is greater than 1. Hence, this means that the model fits well.

[The most preferred product](#)

When examining Table 16, the most preferred product is the product that has all three marks simultaneously. Compared to the control condition, there are no differences. Only for the

highest price level, leaving the GI mark out or having a non-marked product is preferred over the combination of all three.

Summary of the effects

For both conditions, the product showing all three marks is preferred to all other options. In general, when one mark is present, the fake mark has the strongest positive effect on the purchase preference and is closely followed by the GI mark. The COO mark does not establish any change in the purchase preference and is equal to the base product without marks.

The magnitude of the effects the origin marks are able to establish also depends on the price level. The overall trend of the price is negative; when increasing the price, every mark or combination becomes less preferred.

Combining Table 11 and Table 16 provides an overview of all the trends due to the changing price:

Present marks	Control condition				Time pressure condition			
	Odds ratio, per price level				Odds ratio, per price level			
	€3.80	€4.00	€4.20	€4.40	€3.80	€4.00	€4.20	€4.40
Base product								
GI mark	1.495	0.873	0.510	0.297	1.684	0.897	0.478	0.254
COO mark	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Fake mark	2.335	1.388	0.825	0.490	1.887	1.257	0.838	0.558
GI & COO mark	2.057	1.201	0.701	0.409	2.477	1.319	0.703	0.374
GI & Fake mark	3.492	1.212	0.420	0.146	3.178	1.127	0.400	0.142
COO & Fake mark	2.335	1.388	0.825	0.490	2.453	1.634	1.088	0.725
All three marks: GI, COO & Fake	19.441	6.746	2.341	0.812	15.740	5.585	1.981	0.703

Table 17. Summary of the effects in normal and time pressure condition.

Differences between conditions

After having composed the models for the two conditions and having examined the effect sizes and interaction effects of the marks within the model, the differences between the effectiveness of the marks within each model are discovered.

Nevertheless, this thesis also concerns the proposed differences in the marks' effectiveness between the condition without a time constraint, and the condition under time pressure. As

such, it is interesting to observe whether a mark may have a different effect due to the consumer's condition.

As can be seen in the previous sections, at some point the numbers are slightly different. The next analysis essentially tests whether a mark has a significantly different effect in the control condition compared to the time pressure condition.

The technique to test the differences across the two models is to combine the two datasets into one dataset. In this dataset, one dummy variable is added for the time pressure condition. This means that all data, which is conducted in the time pressure condition, will contain the dummy for time pressure equal to 1, and the time pressure dummy for the control condition data is equal to 0.

The reason for adding the dummy variable and composing all interaction terms with the dummy variable is to separate the data of the two samples for all variables. Then, the statistics for the coefficients of all variables times the dummy variable provides insight into the potential differences between the two samples. If, for example, for the variable "*Fake mark * Dummy Time Pressure*" the coefficient is found to be significantly different from zero, this would mean that the effect of the fake mark significantly differs between the control condition and the time pressure condition.

The next step is to run a binary logistic regression in the same way as described in the previous sections. However, the dummy variable for time pressure and all interaction terms of the dummy variable for time pressure with the main variables and with the possible interaction between the main variables are now added to the model. In short, the number of variables in the logistic regression has doubled, because for all of the predictor variables, the equivalent predictor variable times the dummy for time pressure is added to the model. Next, the logistic regression including thirty variables is run.

The outcomes of this logistic regression can be found in the Appendix, Table 20.

Analysing the coefficients for all variables with the time pressure dummy yields a surprising result, as none of the coefficients are significant. The interaction terms with the time pressure dummy measures the differences between the control condition and the time pressure condition for the particular effect. This indicates that the effect of all main variables and interaction terms are compared for the conditions and that no significant difference is observed for any of the predictors in the models. This is surprising since when people are shopping under

time pressure or taking all the time they need, they will value the different marks exactly in the same way in both conditions.

It is surprising that no differences are discovered, as variances should be found according to previous studies. Nonetheless, when examining the data, this deficiency of alterations is less surprising, since the conclusions for both conditions were in line with each other. Thus, no contradicting results were found and no differences were seen.

Consequently, not finding differences has direct implications for all b-hypotheses that are formulated in the theoretical part of this thesis.

Differences in effectiveness due to knowledge

Since no differences in the mark's evaluation between the two conditions were found, it is interesting to investigate whether there are differences in the evaluation of the marks based on the knowledge of the GI marks. The question on the knowledge of the PDO mark resulted in an interesting finding; when people are aided by multiple-choice answers, over 60% of the respondents chose the right answer. The question is whether the group of respondents who gave the right answer to the meaning of the PDO mark also value the marks in a different way compared to the group of respondents who provided the incorrect answer or indicated that they did not know the meaning of the mark.

The dataset for each condition is divided into two groups. The first group consists of the 60% respondents who selected the right meaning of the PDO mark. The second group consists of the other 40% who answered the question incorrectly or stated that they did not know. Moreover, a new dummy variable is created to indicate each group. Thereafter, the same procedure and steps are followed as for testing the differences between the conditions in the previous section; for every variable, an interaction term with this dummy is generated and added to the model. The dummy tests whether any differences between the groups are present.

For the control condition, testing the data results in the finding that none of the interaction terms with the dummy is significantly different from zero. This indicates that no significant differences are observed between the group of people who provided the correct meaning of the PDO mark, and the group that did not. Furthermore, performing the same test on the data of the time pressure condition does not result in any differences either, as the groups were found to be identical in evaluating the marks.

Testing the hypotheses

The results of the analyses are presented in the previous sections. In this section, the hypotheses are evaluated based on the discovered results.

In total, eight hypotheses are formulated; four of them based on the control condition, the a-hypotheses, and the other four based on the time pressure condition, the b-hypotheses.

The effectiveness of a GI mark

The first hypothesis was formulated for the control condition.

Hypothesis 1a: Adding a GI mark to product packaging increases the preference to buy for a product.

Support is found for this hypothesis, albeit only for the lowest price level. Price negatively affects the influence of the GI mark, which should be taken into account when deciding to apply for the mark. The GI-marked product is preferred to the non-marked product for the lowest price level, indicating a positive influence of the mark's presence. In essence, the GI mark is able to positively affect the purchase preference. However, increasing the price results in a less preferred product. Hence, in this thesis, support is discovered for the earlier found evidence that the GI mark works effectively on the product's packaging. However, this positive influence turns into a detrimental effect when the price level increases.

The b-hypothesis focused on the time pressure condition:

Hypothesis 1b: When experiencing time pressure, the preference to buy a product with a GI mark will be higher compared to the preference to buy a GI-marked product without time pressure.

During the time pressure condition, the same results are found for the effectiveness of the GI mark. Thus, the proposed increased effectiveness is not supported by the data. Regardless of the condition, the GI mark presented on its own affects the preference to buy in the same manner.

The effectiveness of a COO mark

For the control condition, the following hypothesis is formulated:

Hypothesis 2a: The preference to buy a product with a COO mark will be higher than the preference to buy for a product with a GI mark.

Surprisingly, the COO mark does not affect the preference to buy for a piece of cheese. A product displaying the Dutch flag is equally preferred compared to a non-marked product. Nevertheless, providing a product with the GI mark does increase the preference for buying the product; but, only at the lowest price level. When the price increases, the GI mark's effectiveness diminishes, resulting in the fact that the COO-marked product is actually preferred to the GI-marked product. It is quite contradicting to say that the COO mark outperforms the GI mark, because the COO mark has no effect at all. In none of the situations, the COO mark is able to perform better compared to a non-marked product. The GI mark however, is able to enhance the purchase preference for the lowest price level, compared to a non-marked product. In essence, there is no evidence found for the COO mark to be preferred to the GI mark. Hence, no support is found for this hypothesis.

The b-hypothesis states the expected preferences to be equal in the time pressure condition:

Hypothesis 2b: Under time pressure, the COO-marked product will be preferred to the GI-marked product.

No actual support is found for this hypothesis. When the price is increased, the effectiveness of the GI mark decreases. But, for the lowest price level, the GI mark is proven to positively affect the purchase preference. The COO mark however, does not affect the preference to buy at all. Thus, no support is found for the COO-marked product to be preferred to the GI-marked product. Only due to the influence of price, the effectiveness of the GI mark diminishes.

The effectiveness of an additional COO mark

The third hypothesis focuses on the presence of several marks, namely adding a COO mark to a GI-marked piece of cheese:

Hypothesis 3a: Adding a COO mark to a GI mark on product packaging will increase the preference to buy a product, compared to a product with only a GI mark.

The hypothesis states that adding a second mark - the COO mark - to a GI-marked product, will result in an even higher preference to buy the product compared to a GI-marked cheese.

The conclusion drawn previously is that all combinations of more than one mark outperform the effectiveness of the single marks. So, support is found for this hypothesis; adding a COO mark to a GI-marked product will increase the purchase preference for the product.

For the time pressure condition, the next hypothesis is formulated:

Hypothesis 3b: Under time pressure, adding a COO mark to a GI mark on product packaging will increase the preference to buy for a product more than without a time constraint.

In the final part of the analysis, the differences in coefficients across the models are analysed. The conclusion from this analysis is that none of the coefficients in the two models significantly differ from each other. Still, in the time pressure condition, the combination of the GI mark and the COO mark is as effective as in the control condition. Thus, no support is found for the statement that in the time pressure condition increases the effectiveness, yet the effectiveness is proven to hold under the new condition.

Diverging somewhat from this hypothesis is the combination of other marks. No hypotheses have been formulated about the combination of, for example, a fake mark and a GI mark. Yet, Table 17 reveals that adding a fake mark next to a GI mark will also increase the purchase preference for the product. The same goes for combining the COO mark with the fake mark, which also leads in the time pressure condition to a product which is preferred to the single-marked products.

The most surprising finding in this thesis is the fact that the highest purchase preference is measured for the product displaying all three marks. For both conditions this product is the most preferred. The only explanation for this unexpected effect is the influence of the number of presented marks. Apparently, the number of marks has the greatest influence on the preference to buy, because the preference to buy for this combination is the highest among all combinations; the packaging full of marks is preferred to all other options, in both conditions. Only for the highest price level, this conclusion does not hold. Thus, for consumers, a packaging full of marks does not result in a perceived “overkill” of marks; the three marks combined are preferred the most.

The effectiveness of a fake mark

In the last hypotheses, the effectiveness of a fake on the product’s packaging is assessed:

Hypothesis 4a: The preference to buy for a GI-marked product will be higher than the preference to buy for a product with a fake mark when there is no time pressure.

However, the opposite is true. A fake mark in the form of a cow’s image is of greater value for the consumer than the GI mark. Thus, the preference to buy a fake-marked product is significantly higher than the GI mark’s preference. Therefore, evidence is found for this

hypothesis in the opposite direction. Evidently, people do not identify the cow's head as a mark without any value and evaluated the GI mark on its properties.

Hypothesis 4b: Under time pressure, the preference to buy for the product with the fake mark will be higher than for the product with the GI mark.

Support is found for this hypothesis. In addition, no differences are found between the two conditions, indicating that the stronger effect of the fake mark is also applicable in the time pressure condition. For every price level, the fake mark has a stronger influence on the purchase preference compared to the GI mark.

Summary of support for hypotheses

To summarise the above conclusions on the hypotheses:

Hypotheses	Support / No support
The effectiveness of a GI mark	
Control condition: Adding a GI mark on product packaging increases the preference to buy	Support
Time pressure condition: Adding a GI mark will be more effective compared to the control condition	No support
The effectiveness of a COO mark	
Control condition: The preference to buy a COO-marked cheese will be higher compared to a GI-marked cheese	No support
Time pressure condition: The COO-marked piece of cheese will be preferred to the GI-marked piece of cheese	No support
The effectiveness of an additional COO mark	
Control condition: Adding a COO mark together with a GI mark increase the preference to buy compared to solely GI-marked piece of cheese	Support
Time pressure condition: The preference to buy will be higher for the combination compared to the control condition	No support
The effectiveness of a fake mark	
Control condition: The GI-marked piece of cheese will be preferred over the fake-marked piece	No support
Time pressure: The preference to buy for the fake mark will be higher than for the GI mark	Support

Table 18. Summary of supported hypotheses and those which are not supported.

Chapter 5 – General discussion

It is not problematic that support is not found for all hypotheses; the data simply suggests other conclusions than initially predicted. Furthermore, contradicting results shed new light on existing research and offers possibilities for future research. The results found in the previous chapters apply to cheese, the marks tested, and to the geographical region the Netherlands.

The research questions are answered and used as the basis for the general discussion.

The research questions

As previously discussed, the first research question is formulated as follows:

“Does adding an origin mark (a GI mark, a COO mark, or a fake mark) versus no origin mark to the packaging increase the preference to buy for a product?”

The answer to this research question depends on the type of mark. In general, it can be argued that adding a visual mark to product packaging does have an influence on the preference to buy the product. Therefore, product packaging is essential and visual marks and colours are able to increase the preference for a product. As concluded before, products that “stand out”, which means, in this case, including marks and colours on the packaging, are more attractive (Silayoi & Speece, 2004).

The insight this thesis provides is that the origin marks’ effectiveness largely depends on the price. Despite the decreasing trend in effectiveness caused by the price, the findings for the lowest price level indicate that indeed origin marks are able to evoke an increased purchase preference. However, the increased price level has shown to destroy this effect. Thus, the upcoming conclusions cannot be generalised for all price levels, but it is most important that the origin marks are actually able to make a difference.

The GI mark

The GI mark, which is developed for communicating objective quality and origin, increases the preference to buy for the piece of cheese in the Netherlands. Moreover, no differences are established between the non-time constraint condition and the time pressure condition. However, it is important to keep in mind that only the PDO mark is used to test the effectiveness of the GI mark. Furthermore, the positive effects of the GI marks found by Van Ittersum et al. (2007), Menapace et al. (2011), Verbeke et al. (2012), and Marcoz et al. (2014) were evident in the data of this thesis. The influence of price has to be taken into account; when the price increases, GI-marked products are less preferred compared to a non-marked product.

Generally, the GI mark's awareness can be considered low, since only 6% of the respondents had seen the marks before, which is the reality in the Netherlands. Despite the low awareness of the GI scheme, the PDO mark is able to evoke a higher preference for the lowest price level. As this thesis finds support for the GI mark's effectiveness in a northern country, generalisation towards other northern countries becomes possible. A lower level of awareness in a northern country does not imply that the GI mark is not effective. Prior research (e.g. Van Ittersum et al., 2007; Van der Lans et al., 2001) stated that the awareness of the GI scheme is crucial for its success; this thesis proves that despite a low level of awareness and knowledge of the GI scheme, the marks are still successful on Dutch cheese.

The questions concerning the knowledge of the GI marks and the PDO mark in particular suggest that when people are asked to consider the meaning of the marks, the majority of the people are able to distinguish the correct meaning. However, possible explanations were provided in this multiple-choice question. This may indicate that when people are in some way assisted to consider the PDO mark properly, people can understand the mark's purpose. It could be doubtful whether people actually have understood the mark's meaning during the experiment and have associated the mark with the corresponding quality standards, objective audit, and region of origin, since only a small number of people said that they recognised it. However, it is clear that people value the mark, whether knowing the precise meaning or not. This means for a marketer that the GI mark is a valuable tool to use in order to increase the purchase preference of the cheese.

Concerning the established awareness of the GI scheme and the differences between the three types of marks as a whole, there is still a long way to go in the Netherlands for the European committee. People value the mark, yet the questions indicate that people do not recognise the marks, and are unable to explain what the mark's meaning without the assistance of a multiple-choice answers. In addition, the marks include standards, certifications, and objectivity, which could be valuable for consumers, manufacturers, and marketers. These standards and values are currently unknown by the Dutch consumers. Clearly, the small number of registered products is one of the main reasons for the low level of knowledge of the marks. When this number grows, the awareness and the knowledge increases, yet this it is an important task for the committee to make the Dutch population more familiar with the GI scheme.

Other studies have shown a higher willingness to pay for GI-marked products. This higher willingness to pay could be an opportunity to invest in the branding and creation of awareness of the GI scheme; this costs money, yet if consumers are willing to spend additional money on the

product because they are aware of what the GI mark stands for, the price sensitivity decreases and it may be worth the expense. The focus of this thesis was not on the willingness to pay for a product, but on the purchase preference. For this reason, the willingness to pay is not measured as a dependent variable, and thus, no exact conclusions on a price premium can be drawn. However, some conclusions are evident; the odds of a GI-marked product of € 4.00 are lower compared to the odds of a non-marked piece of cheese at price level € 3.80. Thus, the preference for a cheaper non-marked product is higher compared to a 20 cents more expensive product which contains a GI mark. However, the preference for the € 4.00 fake-marked product is higher than the € 3.80 non-marked product; consumers prefer the higher priced fake-marked product more than the base product at a lower price level. Moreover, for the € 4.20 price level, a product containing all three marks has higher odds compared to a non-marked product priced at € 3.80; thus, consumers still prefer a 40 cents more expensive product full of marks compared to a cheaper non-marked product.

The COO mark

Even though the literature indicates otherwise, adding a COO mark to the packaging of cheese will not affect the purchase preference in the Netherlands. Cheese displaying a Dutch flag was preferred equally to a non-marked product.

The results for the COO mark are not in line with the discussed theories and earlier research on the effectiveness of the marks. The findings of Menapace et al. (2011) and Marcoz et al. (2014) indicate that the COO mark outperforms the GI mark. However, this thesis proves the opposite for the lowest price level. Despite the fact that the GI mark's effectiveness diminishes due to an increased price, the GI is able to affect the purchase preference, and the COO mark is not.

One explanation for the ineffectiveness of the Dutch flag is that people expect the cheese to be Dutch. In fact, they expect every cheese in the supermarket to be produced in the Netherlands, which means that finding a Dutch COO mark on the cheese makes no difference to them. The COO mark does not communicate any value or information, as this is already done by the product itself. This may explain the equally preferred non-marked product. It could even be the case that consumers expect the COO mark to work the other way around; if the cheese is not Dutch, the consumer is expected to find this information on the packaging.

The main conclusion is that the Dutch flag is not able to evoke additional associations with the Netherlands, the quality of the product or specific attributes, which the piece of cheese itself cannot induce. The Dutch flag is not needed to improve people's belief about the product, its safety, or the connection with their home country. The fact that the mark tells the consumer the

cheese originates in the Netherlands, has no influence on the purchase preference. In fact, this information is already communicated by the product itself and even if it is communicated by the COO mark, it has no influence on the purchase preference.

The fake mark

In the Netherlands, adding a fake mark to the packaging of a piece of cheese will result in the highest preferred single-marked product. The fake mark is found to be the best mark to use in order to increase the purchase preference for the packaged pieces of cheese. Again, this is only true for the lower price levels, as price decreases this effect strongly.

It is important to note that a simple COO mark does not affect the purchase preference, but when a fake mark associated with the region of origin in which the product is made, it outperforms the GI mark. The effectiveness of the fake mark is in agreement with the findings of Vecchio and Annunziata (2011). People do value the fake cow's image more than the official GI mark. In effect, the cow fits the goal of referring to the origin in a visual way better than the GI mark is able to accomplish. Additionally, the information processing of the fake mark is more effective than it is for the GI mark. This is not the case for the COO mark, which is unexpected because the link towards the region of origin is visually more clear for the COO mark than for the GI mark. Despite the fact that for higher price levels the effect decreases, still the fake mark will be preferred to the GI mark, when comparing the two marks.

The study of Vecchio and Annunziata (2011) have concluded that the fake mark is more reliable and trustworthy than the GI mark. The results of this thesis are consistent with these findings. When seeing the PDO mark and the image of the cow, the consumer prefers the meaningless cow's head to the qualitative GI mark. Thus, the ability to visually associate the product with the origin, by presenting a cow, has a higher influence on the preference for the product than a general product mark. The conclusion for the GI mark's designers is that for the Netherlands, it is still more beneficial for the marketers to develop their own mark, which visually referring to the origin, because it is more effective than the European alternative.

Next, the second research question is as follows:

“What is the effect of time pressure on the evaluation of a GI mark compared to a COO mark?”

The evaluation of the COO mark is the same in both conditions; the purchase preference inferred is equal to the preference for a non-marked product. However, the GI mark is evaluated

to increase the purchase preference for the cheese in both the control and the time pressure condition, albeit only for the lowest price level.

Furthermore, no differences are found between the control condition and the time pressure condition data. For this research question, this indicates that time pressure has no effect on the marks' evaluations. Thus, not for the COO mark, which remains ineffective, and not for the GI mark, which stays evenly effective.

The third research question focuses on the comparison with the fake mark:

[“What is the effect of time pressure on the evaluation of a GI mark compared to a fake mark?”](#)

A GI mark effectively increases the preference for a piece of cheese. Yet, the fake mark has an even stronger effect on the buying preference. Therefore, the fake mark is valued more than the GI mark.

Because there are no differences found between the two datasets for the control condition and the time pressure condition, it can be said that there is no effect of time pressure on the evaluation of the GI mark and the fake mark; the moderating variable does not influence the effects. The fake mark is consistently preferred to the GI mark, for all price levels and in both situations.

The last research question is the following:

[“Does the preference to buy increase by adding a COO mark to a GI mark?”](#)

Yes, adding a COO mark to a GI mark will result in a higher purchase preference for the product. The interaction between the GI mark and the COO mark is positive, indicating that the combination of the two marks is more preferred than the single marks. The preference for a GI-marked product containing also a COO mark is consistently higher than for the solely GI-marked product.

Adding a fake mark to the GI mark is also found to be effective. However, this only holds for the two lowest price levels. Nonetheless, when the fake mark and the COO mark are simultaneously added to the GI mark, the highest possible purchase preference is established. The presence of the three marks is in both conditions the most preferred combination.

Time pressure

The observation that there are no significant differences established between the control condition and the time pressure condition is quite unexpected, as the theory suggests potential differences, especially due to information processing. One of the reasons for this could be that the experiment had a defect, which does not seem to be the case in my opinion. In addition to the literal interpretation of the type of cheese on the label, no other feedback was received which could have influenced the results. After testing the experiment on a test sample, the appropriate time frame of 5 seconds was determined. Furthermore, the feedback was exactly as expected; some people responded that they had only looked at the price, some people only at the cow, and some only at the number of marks. The majority of the people stated when answering the questions on the knowledge of the GI marks that they then realised the experiment was particularly concerned this mark. In addition, no major improvements of the experiment were suggested by the participants, also not after explaining the research aim.

Another reason why there are no differences found between the condition could be because the marks are already perfectly adjusted to visual information processing under time pressure. When people are able to fully process the mark's information in the same way they could do without any time constraint, this could explain the fact no differences are found.

Furthermore, another possible explanation could be that people are indeed able to make the right judgments and decision within a very short period of time, as indicated by Milosavljevic et al. (2009). The five seconds the respondent was given may be enough to at least intuitively make the same decision as they would make when he is given all the time he needs. As such, the intuitive and quick decision someone makes during the time pressure condition turns out to be identical to the decision they make when rationally judging the same decision without any time constraint.

Having answered the research questions facilitates to answer the problem statement in the next section.

The problem statement

For this thesis, the problem statement focuses on the variety of available origin marks, which communicate a certain origin, including its quality. At the same time, the effectiveness per mark may differ due to the time pressure people experience during shopping trips. The main problem statement for this thesis is as follows:

Which type of origin mark on product packaging provides the highest preference to buy when the consumer is or is not placed under time pressure?

The highest purchase preference is caused by the fake mark, which is a designed image of a cow. This is true for both conditions of no time pressure and when people are placed under time pressure. The effectiveness of the marks quickly decreases when price is increased.

When assessing packaging, which has two marks rather than just a single mark, the combination of the GI mark and the fake mark is the most effective. Again, this effectiveness is subject to a strong price influence.

The ultimately preferred product, however, is the product exhibiting all three marks. The combination of the three marks is the highest preferred product in both conditions. Only for the highest price level, a non-marked product is preferred to this combination.

The implications

The results have several implications, as insights into the effectiveness of different marks on packaged pieces of cheese are gained. Several combinations of marks create a more preferred product than a non-marked product. The marks make the product visually attractive and enhance the communicated information; as a result, marked products are preferred to non-marked products.

The most obvious implication is that the price level has a major impact on the marks' effectiveness. The purchase preference for a product varies quickly when the price level is changed. Moreover, an origin mark can positively affect the purchase preference, however when the wrong price level is chosen, it may even lower the preference to buy this piece of cheese. The interaction with price is crucial to examine when deciding on the use of origin marks. Providing the product with all three marks is the best option; this infers the highest purchase preference for all price levels. However, when the price is highest, a non-marked product is actually preferred over the cheese containing all three marks. The price level determines the best choice of origin marking. Increasing or decreasing prices can have serious consequences in

terms of purchase preference. The fact price has a great influence on the effectiveness, indicates that when the price increases, the value of the marks diminish. Consumers do not care that much about the present marks when the piece of cheese is higher price; no additional value is established anymore by the marks. Origin marks can be valuable and affect the purchase preference, but only when the cheese is lower priced.

As previously indicated, the Dutch market has a low awareness of GI marks, which is average compared to the other countries in the northern region. The European committee responsible for the marks should come up with an action plan for the Netherlands (and probably all other northern European countries) with the goal of increasing GI marks' awareness and knowledge. The following trends are possible for the next years: more products will be certified and due to the mark's improved visibility and hopefully due to invested branding and awareness creation, the awareness and knowledge levels will improve. The scheme will become more successful when a higher percentage of people will be able to recognise the marks, and will eventually be able to identify the differences between the marks. Alternatively, the scheme will maintain the current awareness level. This will provide an increased preference for the products, yet without consumers properly understanding the scheme.

Furthermore, the findings are extremely valuable for marketers. In the Netherlands, the PDO mark on its own has a positive effect in terms of preference. However, replacing the GI mark on cheese by the fake mark will result in a higher purchase preference. For marks on their own, the fake mark outperforms the GI mark.

When the marketer has decided to use a COO mark, it is advisable to accompany the mark with a fake mark. However, the most optimal way of using the COO mark is in combination with both the other marks. In the end, this is the most optimal way of packaging for all the possible combinations.

The most important implication is that the marketers designing the packaging of Dutch products now know the optimal manner of presenting marks on their products. When the goal is to use a single mark, marketers should design their own mark associating the product with its origin. However, this may have some drawbacks. In the long term, the fake mark or manufacturer may lose its credibility. In addition, the effective fake mark is only found for this product category. Thus, it is possible that for other product categories, a fake mark will have a different effect. The GI mark is the second best option at this moment, yet the effectiveness of the mark is likely to change when the level of awareness and knowledge is improved. Nonetheless, when marketers desire to use two marks, the combination of the GI and the fake mark is the optimal choice.

Finally, when the number of marks is not an issue for the marketer, the most preferred packaging consists of the three marks in both the conditions. As described above, it still depends on the price of the cheese.

Furthermore, as these findings are only applicable to cheese in the Netherlands. It is hard to draw conclusions on which marks to place on German sausages, for example, or French wine. Testing in other geographical regions for these types of products will improve the generalisation of the findings.

Lastly, the results are interesting for researchers, as this thesis provides evidence that is not in line with some of the earlier discussed theories.

Overall, it could be effective to explain the GI scheme and marks better in the Dutch market. In the literature review is revealed that explained GI marks were much more effective than the unexplained ones. Explaining the mark's meaning on the packaging of the cheese or on its shelf in the supermarket, could have an additional positive effect the buying preference for these products.

The final implication concerns the deficiency of difference between the control condition and the time pressure condition. For this thesis, variances were expected but not found. Nevertheless, this is beneficial for the marketers, as their packaging will have the same impact on both people who are taking their time while shopping and on people who are in a hurry and want to purchase their groceries as fast as possible. If differences in effectiveness in the two conditions were found, this could have resulted in a far more complex condition when deciding how to design the product's packaging. Furthermore, contradictory effects in both conditions could have led to the conclusion that there is not one efficient manner of designing the packaging because a different mark is required for both conditions. Evidently, it is not possible to design a different packaging for the control condition and the time pressure condition. From this point of view, not detecting any differences is the most relevant outcome.

The limitations

This thesis also has its limitations. First of all, as mentioned before, the external validity is a limitation of this thesis. The low level of knowledge and awareness of GI marks in the Netherlands is representative for the Dutch inhabitants, as this is the real situation. However, the generalisation of the results to other countries may be difficult. Only when the level of the marks' awareness is comparable, the results could apply to other countries.

Additionally, the labelling was constant during the experiment. Nevertheless, because the least possible amount of information was provided before the experiment, some respondents may have interpreted the experiment incorrectly. When more information was provided, it would have been evident what the study's subject was, which would have biased the results.

Moreover, this experiment was an online survey, which means that the respondents could not examine the cheeses properly.

When being asked for participating in an experiment, people are aware that their knowledge is tested. Consciously, or unconsciously, people are searching for the test's purpose and are likely to behave differently than when they are shopping in a supermarket. When someone does not know he or she is participating in an experiment, the results would be even more valid.

Since the GI mark's effectiveness is currently only tested for the PDO mark, no conclusions can be drawn for the PGI and the TSG marks, which are also part of the GI scheme.

Furthermore, the effectiveness of the COO mark is only measured by using a Dutch flag. This type of COO cue is found to be ineffective on packaged cheese in the Netherlands. However, other representations of the country may be effective such as the name of the country or the country's outline visually presented.

The fact that a cow's head is chosen representing the fake mark does not imply that every fake mark will be as effective. A cow is used on more dairy products, which may familiarise the consumer with this image. For other product categories, different fake marks will most probably be appropriate.

Additionally, the fact that introducing time pressure did not yield different results could be because five seconds was still long enough to examine the pieces of cheese thoroughly. Unfortunately, the online survey tool has not recorded the used time for making each choice. Only the total time was recorded, which included reading the explanations, filling in the demographics, and answering the questions on awareness. Moreover, the used time was rounded off to minutes, resulting in data on the number of minutes used. This data does not allow any correct comparison between the used time frames. It was expected that the time would be recorded in seconds and per question, yet this turned out to be not the case. This does not allow for comparing the used time in the control condition to the time pressure condition. As a result, no conclusions can be drawn concerning differences in actual used time in the two conditions; in fact, it is possible that the average person did not feel time-constraint by having

five seconds observation time. When this comparison could have been made, more solid conclusions on the effect of the time pressure conditions would have been available.

This factor could have been excluded when several time frames were tested in the experiment. Then, when comparing the data between the time frames, potential differences between the time frames could have been examined. The main challenge then is the need for even more participants.

Ideas for further research

Nonetheless, these limitations offer ideas for future research. As the experiment was an online survey, more realistic results could be gathered when the same study is conducted in an actual supermarket, with products on the shelf. A real-life setting will offer more insights into the actual behaviour and reasoning of the customers. When people can be interviewed afterwards, more qualitative data can be collected.

Moreover, the experiment could be expanded. For example, by performing the experiment in other northern countries or by testing other products within the Dutch market. As such, various products could be tested at the same time.

The GI mark is found effective when using the PDO mark. Alternatively, the PGI mark and the TSG mark could be used to test whether people also value these other two marks.

Another possibility is explaining the GI scheme in advance. In this thesis, not explaining the GI mark was one of the testing methods. However, by explaining the GI mark the results may differ.

Furthermore, repeating the same study with different visualisation of marks would be interesting by, for example, using the proposed geographical outline of the Netherlands as a mark on the packaging instead of the Dutch flag, or using a mill or meadow for representing the fake mark. It is likely that a cow will not be an effective mark for bread, whereas a mill could be effective in this case.

In addition, it would be interesting to employ other measurement techniques, such as eye tracking, for the same experiment. Determining which mark has the longest focus point, and which other packaging elements are considered during the purchase decision could provide new insights into making use of the marks. This will be especially interesting if differences can be found between a control condition and the time pressure condition.

Finally, performing the same study in the southern countries would be interesting. The levels of awareness and knowledge of the GI marks are expected to be much higher in countries such as Italy. Moreover, it could be true that time pressure yields different results compared to a non-time constraint condition in these countries where the GI scheme is much more developed.

Chapter 6 – Conclusions

This thesis has provided surprising findings and new insights contributing to the existing academic literature.

First, price is found to have a strong and important negative influence on the origin marks' effectiveness. The negative effect of the price results in diminishing effectiveness of the (combination of) marks; for the higher price levels a non-marked is preferred to a marked product. However, the influence of the price is consistent, keeping all relative preferences constant.

Second, the PDO mark is found to have a positive effect on the preference to buy a packaged piece of cheese. Despite the low awareness in the Netherlands, the mark evokes a positive purchase preference for the GI-marked product. This result is in line with the earlier found effects.

In this thesis, the COO mark presented on its own has no influence on the purchase preference. Moreover, the GI mark does change in its effectiveness when a COO mark is placed next to it; the combination of the two marks is more preferred than the solely presented GI mark.

The fake mark is found to have the greatest influence when looking at solely presented marks and the mark outperforms the GI mark. The implication of this finding is quite surprising; rather than using the GI mark, which is meant to communicate quality, designing an own mark directly linked to the region of origin is more effective than the European alternative that ensures quality and objective standards.

An interesting finding for marketers is that the value of the GI mark can be enhanced by adding a fake mark or a COO mark; these combinations are preferred to the solely GI-marked product in the lower price levels.

Evidently, the number of marks is a factor determining the purchase preference, as every solely presented mark can be enhanced by combining it with another mark. Ultimately, the combination of the three marks presented simultaneously outperforms any other combination of marks.

Surprisingly, no differences in the marks' effectiveness or combination of the marks are found in comparing the non-time constraint condition to the condition with a time limit. This is quite surprising and not in line with the expectations based on the existing literature. The conclusion is that people appear to be able to intuitively choose the same product within five seconds as when they can take all the time they need.

In addition, contributions have been made to the existing literature. This study contributes to the field of research on GI marks' effectiveness by conducting the experiment in a new geographical market with a new product. Moreover, this thesis belongs to one of the first studies comparing the effectiveness of GI marks to COO marks. Furthermore, considering a fake mark in this comparison is a unique approach.

This study has tested the COO marks in a new context and ensures further generalisation of the COO effects on product packaging. In addition, this research provides further investigation for a new geographical area and using new products. The previously mentioned contradicting finding expands the findings in the field of COO cues.

Finally, the incorporation of the moderating factor time pressure in studying the effectiveness of these marks is unique and reveals that there are no differences for these marks and this product in the Dutch market.

Lastly, the answer to the problem statement is found:

[Which type of origin mark on product packaging provides the highest preference to buy when the consumer is or is not placed under time pressure?](#)

The optimal packaging for cheese in the Netherlands consists of all three marks simultaneously: the GI mark, the COO mark, and the fake mark. For every price level, the combination of displaying all marks results in the highest purchase preference compared to other possible (combination of) marks present.

When assessing packaging, which has one mark rather than multiple marks, the fake mark is the most effective mark; but, its effectiveness is subject to a strong price influence.

Moreover, for both the non-time constraint condition and the time pressure condition, the most preferred products are the same.

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Appendix

Example of the online survey

For the actual online survey, [open this link](#).

Text version of survey

Introduction for both experiments A and B

Beste deelnemer,

Bedankt voor het meewerken aan mijn onderzoek!

Mijn onderzoek focust zich op het Nederlandse **keuzegedrag in supermarkten**.

Waarmee kan dat beter getest worden dan met **kaas**?

Dit onderzoekje duurt minder dan 4 minuten.

Veel plezier !

- Page break -

Experiment A: Non-time constraint experiment:

Het kaas-experiment.

Stel je voor: je bent in een supermarkt voor je wekelijkse boodschappen. Er staat "een stuk kaas" op je boodschappenlijstje.

Je gaat straks **8 maal een keuze** maken **tussen twee verschillende soorten kaas**, en telkens is de vraag:

"Welke van de twee kazen zou jij het liefste kopen?"

Je krijgt dus iedere keer twee kazen te zien. Kies de kaas die je het liefste zou kopen.

Wanneer je beide kazen echt niet aantrekkelijk vindt, kun je kiezen voor de derde optie: "Ik zou geen van beide kazen kiezen".

Maak rustig je keuze en klik verder.

Klik 'Verder' om te starten.

- Page break -

Question 1 till Question 8:



1. Welke van de twee kazen zou jij het liefste kopen?
 - Ik koop het liefste kaas A
 - Ik koop het liefste kaas B
 - Ik zou geen van beide kazen kopen

Experiment B: Time pressure experiment:

Het kaas-experiment.

Stel je voor: je bent in een supermarkt voor je wekelijkse boodschappen.

Er staat "een stuk kaas" op je boodschappenlijstje. **Maar, je hebt haast.**

Je gaat straks **8 maal een keuze** maken **tussen twee verschillende soorten kaas**, en telkens is de vraag:

"Welke van de twee kazen zou jij het liefste kopen?"

Je krijgt dus iedere keer twee kazen te zien. Kies de kaas die je het liefste zou kopen.

Wanneer je beide kazen echt niet aantrekkelijk vindt, kun je kiezen voor de derde optie: "Ik zou geen van beide kazen kiezen".

Je staat onder tijdsdruk, net als wanneer je in de supermarkt haast hebt: Je krijgt **5 seconden** de tijd om de twee kaassoorten te bekijken en je keuze te maken.

Na deze 5 seconden word je automatisch doorgeleid naar de volgende pagina.

- Page break -

Oefenvraag.

Je krijgt eerst een oefenvraag, zodat je een beetje een idee krijgt wat de bedoeling is.

Klik 'Verder' voor de oefenvraag.

- Page break -

Kaas A



Kaas B



- Page break -

1. Welke van de twee kazen zou jij het liefste kopen?
 - Ik koop het liefste kaas A
 - Ik koop het liefste kaas B
 - Ik zou geen van beide kazen kopen

- Page break -

OK, dit was de oefenvraag.

Nu komen de echte 8 keuzes.

Let op, je hebt dus maar **5 seconden**, en dat is inderdaad erg kort!

Klik op 'Verder' om te starten.

- Page break -

05



- Page break -

1. Welke van de twee kazen zou jij het liefste kopen?
 - Ik koop het liefste kaas A
 - Ik koop het liefste kaas B
 - Ik zou geen van beide kazen kopen

Algemene gegevens

Geslacht

- Man
- Vrouw

Leeftijd (in jaren)

Ik **koop** kaas:

- Dagelijks
- Wekelijks
- Maandelijks
- Jaarlijks
- Nooit

Ik **eet** kaas:

- Dagelijks
- Wekelijks
- Maandelijks
- Jaarlijks
- Nooit

- Page break -



1



2



3

Heb je een van deze logo's wel eens eerder gezien voor je met dit onderzoek meedeed?

- Ja. Welk nummer(s)?:

- Nee

Weet je wat deze logo's betekenen?

- Ja, namelijk:

- Nee

- Page break -



Dit logo geeft aan ..

- dat er milieuvriendelijke ingrediënten gebruikt worden, die op een biologische wijze geteeld worden
- dat dit een authentiek product is uit het originele land van herkomst, getoetst aan objectieve standaarden met een minimaal kwaliteitsniveau
- dat er eerlijk gehandeld is met de toeleveranciers, en zij naar waarde voor hun ingrediënten betaald zijn
- dat dit product voorzien is van een internationaal patent
- dat er beschermde ingrediënten gebruikt worden in het productie proces
- Ik heb werkelijk geen idee

- [Page break](#) -

That's it!

Bedankt voor je medewerking, je maakt mijn afstuderen mogelijk :) !

Je kunt dit venster nu wegklikken.

Thanks, Chris

- [End of survey](#) -

Tables

Survey version	Choice set	GI mark	COO mark	Fake mark	Price level
A	1	no mark	Dutch flag	Cow mark	€ 4.40
	1	PDO mark	no mark	Cow mark	€ 4.00
	2	no mark	Dutch flag	no mark	€ 4.00
	2	PDO mark	no mark	no mark	€ 4.40
	3	no mark	Dutch flag	Cow mark	€ 3.80
	3	no mark	no mark	no mark	€ 3.80
	4	no mark	Dutch flag	Cow mark	€ 4.20
	4	no mark	Dutch flag	no mark	€ 3.80
	5	PDO mark	Dutch flag	no mark	€ 4.20
	5	PDO mark	Dutch flag	Cow mark	€ 4.20
	6	no mark	Dutch flag	no mark	€ 4.20
	6	PDO mark	Dutch flag	Cow mark	€ 4.40
	7	PDO mark	Dutch flag	no mark	€ 4.40
	7	PDO mark	no mark	Cow mark	€ 4.20
	8	PDO mark	Dutch flag	no mark	€ 3.80
	8	no mark	Dutch flag	no mark	€ 4.00
B	9	no mark	Dutch flag	Cow mark	€ 4.40
	9	no mark	Dutch flag	no mark	€ 4.00
	10	PDO mark	Dutch flag	Cow mark	€ 4.20
	10	PDO mark	no mark	no mark	€ 4.40
	11	PDO mark	Dutch flag	Cow mark	€ 4.20
	11	no mark	no mark	no mark	€ 4.20
	12	no mark	no mark	no mark	€ 3.80
	12	PDO mark	no mark	Cow mark	€ 4.00
	13	PDO mark	Dutch flag	Cow mark	€ 4.40
	13	no mark	no mark	Cow mark	€ 3.80
	14	PDO mark	no mark	no mark	€ 4.20
	14	no mark	no mark	Cow mark	€ 4.00
	15	no mark	no mark	Cow mark	€ 4.20
	15	no mark	Dutch flag	no mark	€ 4.20
	16	no mark	Dutch flag	no mark	€ 4.00
	16	no mark	no mark	Cow mark	€ 4.40

Table 19. Fractional factorial design generated by JMP.

Variables	Beta coefficient	Standard error	Wald statistic	Significance
Constant	5.572	2.165	6.626	0.010
GI mark	6.842	2.452	7.788	0.005
COO mark	2.602	2.129	1.494	0.222
Fake mark	8.704	2.098	17.220	0.000
Price	-1.592	0.553	8.302	0.004
COO mark * GI mark	-0.567	0.339	2.789	0.095
Fake mark * GI mark	-0.374	0.358	1.091	0.296
COO mark * Fake mark	-1.206	0.258	21.793	0.000
COO mark * Fake mark * GI mark	1.985	0.443	20.110	0.000
GI mark * Price	-1.627	0.581	7.843	0.005
COO mark * Price	-0.347	0.536	0.419	0.517
Fake mark * Price	-1.900	0.526	13.043	0.000
Time pressure (dummy)	-0.221	2.951	0.006	0.940
GI mark * Time pressure (dummy)	1.414	3.403	0.173	0.678
COO mark * Time pressure (dummy)	-0.427	2.914	0.021	0.883
Fake mark * Time pressure (dummy)	-2.201	2.884	0.582	0.445
Price * Time pressure (dummy)	0.062	0.752	0.007	0.934
COO mark * GI mark * Time pressure (dummy)	0.011	0.464	0.001	0.982
Fake mark * GI mark * Time pressure (dummy)	0.126	0.488	0.067	0.796
COO mark * Fake mark * Time pressure (dummy)	0.340	0.354	0.921	0.337
COO mark * Fake mark * GI mark * Time pressure (dummy)	-0.618	0.608	1.031	0.310
GI mark * Price * Time pressure (dummy)	-0.349	0.806	0.188	0.665
COO mark * Price * Time pressure (dummy)	0.128	0.733	0.031	0.861
Fake mark * Price * Time pressure (dummy)	0.517	0.723	0.511	0.475

Table 20. Analysis of differences between the two conditions.

