Manipulating attitudes towards genetically modified food with framing

"A comparative study about the effects of framing on individual attitudes towards genetically modified food in the Netherlands"

Master thesis

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Preface

After four years of studying in Nijmegen at Radboud University, my student days have finally come to an end. I look back on a period in which I have learned very much and at the same time had a very fun time. This thesis will complete my master Strategic Management. I would like to thank my supervisors Gerrit Willem Ziggers and Stephanie Koornneef for the time they put into reading and providing great feedback. This took my thesis to a higher level. I also want to thank my parents and Niek for always providing support, inspiration and feedback. Also, I want to thank my friends Imke Slaats, Melina van den Berk and Nicole Gordon for reading my thesis and doing a final check-up. Finally, I would like to thank everyone who completed my questionnaires and who shared it with others.

I hereby proudly present my thesis.

Krista Westervoort

Abstract

Although the benefits of genetically modified food are scientifically proven, most people of the Dutch population do not support its implementation and are sceptical towards the topic. Contributing factors for this sceptical attitude are a lack of knowledge and (ethical) beliefs. Framing can cause changes in the attitude of an individual. This is known as the framing effect. According to four pillars of legitimacy, four different types of framing are distinguished: normative, cognitive, regulative and pragmatic framing. The aim of this study was to investigate whether there is a difference between the framing effects of these types of framing. An experimental vignette study with four different questionnaires is conducted, each questionnaire representing a different framing type. Using a sample of 236 consumers between 18 and 30 years old, it was found that there are no significant differences between the four framing effects. However, a significant positive correlation was found between the familiarity of genetically modified foods and a positive attitude towards the topic, confirming previous literature. This means that the more familiar people already are with genetically modified food, the more positive their attitude is towards it.

Keywords: *Framing; Legitimacy; Attitude; Genetically Modified Food;*

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1. Introduction

1.1. Introduction to genetically modified food attitudes

A genetically modified organism (GMO) is defined as "An organism produced from genetic engineering techniques that allow the transfer of functional genes from one organism to another, including from one species to another" (Roederer, Nugent, & Wilson, 2000, p.8). These GMOs form the basis of genetically modified (GM) foods. GM foods are foods and food ingredients containing or consisting of GMOs, or produced from GMOs. Ever since the 1990s, GM food has been a topic of many public debates in Europe and in the Netherlands specifically (Bauer, Durant, & Gaskell, 1998; Gaskell and Bauer, 2001; Gutteling, Hanssen, Van Der Veer, & Seydel, 2006). For example, in 2001 there was the Dutch 'Eten en Genen' debate, in which the topics of food safety and consumer freedom were discussed in relation to GMOs and GM foods, as well as their risks, ethical aspects and consequences for agriculture (Hagendijk & Egmond, 2004). The impression of the response to the debate was that the Dutch public had a very skeptical attitude towards the use of GM foods: people fear risks, doubt the usefulness and inquire about the alternatives. Most countries in Europe have a negative public attitude towards the use of GM in agriculture, especially in the case of GM food crops production and consumption (Gaskell et al., 2010). Support for the implementation of GM food in Europe decreased from 59% in 1996 to 30% in 2010. Although the Netherlands belonged to the countries in Europe with the highest support for the implementation of GM food, along with Denmark, Ireland, Portugal, Spain and the United Kingdom, only 30% of the Dutch population was pro GM food.

There are several reasons to explain this sceptical attitude towards GM food in the Netherlands. Contributing factors are a lack of knowledge about the working principles of GM food, religious or ethical beliefs, and difficulties in defining the concept of GM food (Aerni, 2013; Comstock, 2010; Sturgis, Cooper, & Five-Schaw, 2005). This leads to irrational and emotional thoughts about the topic (Gaskell et al., 2004). The media in the Netherlands, which reflect the public debate, are also predominantly negative about GM food, leaning on emotional statements rather than understanding and knowledge about GM food (Jansma, Gosselt, Kuijpers, & De Jong, 2019). In general, audiences associate GM food with high risks and low benefits (Hossain & Onyango, 2004; Pidgeon et al., 2005; Phillips, Hallman, & William, 2013). The main associated risks with GM food are (long term) risks for personal health and human health in general, risks for the environment and risks for future generations (Augoustinos, Crabb & Shepherd, 2010). Another concern is, due to the rights and patents involved with GM food, that companies will prefer profit over safety and try to capture the market and monopolize their products (Lapan & Moschini, 2004). At the same time many Dutch citizens have a lack of knowledge when it comes to the benefits GM crops and food could provide (Hanssen et al., 2018; Lucht 2015). Non-governmental organizations have added to the reluctance against legitimizing GMOs by

performing anti-GM actions (Paarlberg, 2014). This has resulted in disagreement between Member States of the European Union and has negatively affected public research funding for GMOs (Fedoroff, 2015).

1.2. Problem statement

Scientific research indicates that there is a gap between public attitudes towards GM food and scientific proof. A recent report from the National Academy of Sciences (2016), reviewing a wide range of published research about GM food, found no convincing evidence for negative health or environmental effects of GM foods. Also, many scientific articles prove that GM food could have significant benefits. GM food crops typically have two common traits: insect resistance and herbicide tolerance. Insect resistance comes from the Bacillus thuringiensis genes which are inserted in GM food crops (Hellmich & Hellmich, 2012). This is a soil bacterium which produces toxins, causing insects to stop eating and perish after a few days. In this way, GM crops are able to produce their own pesticides, which are fatal to (harmful) insects. As a result, farmers can benefit from lesser yield loss, because they have less insect damage. At the same time, they do not have to use as much chemical pesticides to control insect damage (Hellmich & Hellmich, 2012). Also, as mentioned before, GM food crops are more resistant against herbicides. This makes farmers better able to control weeds (Carpenter & Gianessi, 1999). Furthermore, by genetically engineering crops, the nutritional qualities of crops could increase as well as the resistance to drought and diseases (Harmon, 2013; Sharma, Kaur, & Singh, 2017). With GM food crops, farmers could supply cheaper, healthier, more efficient food, which is touched less by potentially harmful pesticides (Wolfenbarger & Phifer, 2000). For this reason, GM food could be a solution for the food scarcity in third-world countries (Huang, Pray, & Rozelle, 2002) and it could be a solution to future food shortages which could occur due to climate change (Godfray et al., 2010). It is also important that GM food will be considered as a solution because pollution, excessive land use and resource depletion are all part of current environmental problems that are increasingly jeopardizing the earth's life-support systems (Rockström et al., 2009). However, identifying these or other benefits GM food could provide, is non-consequential if the public is unwilling to consider the scientific evidence or if they do not give weight to it.

1.3. Scope of thesis

This thesis focuses on how individual attitudes towards GM foods could be influenced in a positive way by framing. It is important to study how positive attitudes towards GM food could be increased, since the public has irrational and emotional sceptical thoughts about GM food (Gaskell et al., 2004), while science proves GM food has significant benefits and no proven risks (National Academy of Sciences, 2016). The acceptance of GM food of the public, influences the success of the appliance of GM foods in the society (Marques, Critchley, & Walshe, 2015). A positive attitude plays a positive role in whether an individual is going to consume a GM product (Boccia & Sarnacchiaro, 2015). Also, it plays an

important role in the development and marketing of GMOs and therefore the long-term application of GM food in society (Boccia & Sarnacchiaro, 2015). Additionally, the public attitude could influence government policies and regulation that affect the development, production and distribution of GM foods, which could in turn help the industry to grow even more (Dietrich & Schibeci, 2003; Marques & Walshe, 2015). This thesis focuses on framing, because framing is an effective way to influence individual attitudes towards GM food. Framing is the selective telling of stories and therefore a strategic way of packaging information (Gamson & Modigliani, 1994). Elite "framers" emphasize certain considerations that they want people to associate with, while downplaying or omitting other dimensions of the issue. Research shows that framing can play a crucial role in determining public approval of a particular policy (Chong & Druckman, 2007; Nelson, Clawson, & Oxley, 1997). This research studies Dutch consumers between 18 and 30 years old. This age category is chosen for numerous reasons: first, it is assumed that young people are still open to change their attitudes. Second, this research respondents were found online through Facebook, where it was easier to find people in this age category.

1.4. The four pillars of legitimacy

The framework chosen in this thesis to use for framing is 'the four pillars of legitimacy' (Ruef & Scott, 1998; Suchman, 1995). Jansma et al. (2019) conducted a media analysis to investigate whether 'the four pillars of legitimacy' could be used as a framework to analyse the legitimization processes of GM food in the public discourse. Their study showed that (media) articles could be linked to one of the four pillars and that the framework can be applied as a generic framework to study the legitimization processes of technological innovations, such as GM food, in a multi-dimensional way (Jansma et al., 2019). This indicates that framing is possible with the four pillars and that framing could contribute to the legitimization processes of GM food. The four pillars consist of the normative, cognitive, pragmatic and regulative pillar of legitimacy (Ruef & Scott, 1998; Suchman, 1995). Legitimacy is defined as "a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (Suchman, 1995, p. 574). In terms of GM food this means that the society sees GM food as desirable, proper, or appropriate within their socially constructed system of norms, values, beliefs, and definitions. So, when texts are normatively, cognitively, pragmatically or regulative framed, this will contribute to the normative, cognitive, pragmatic and regulative legitimacy respectively.

To study legitimacy, the attitude of a whole society should be measured. Since studying society as a whole was not possible for this thesis, it focuses on individual attitudes. Legitimacy is constructed of attitudes of individuals, and thus this thesis rests on the assumption that the framework of the four pillars of legitimacy is applicable for individual attitudes too. An acknowledged lack of this study is that the sum of all individual attitudes is not necessarily equal to legitimacy of a whole society. Further research

is needed to investigate to what extent these effects of framing on individual attitudes differ from the effects of framing on legitimacy.

1.5. Objective and research question

The aim of this thesis is to contribute to academic literature by comparing the effects of framing (according to the four pillars of legitimacy) on individual attitudes towards GM food in the Netherlands. Therefore, it is assumed that the four pillars of legitimacy, which is a framework made for the construct 'legitimacy,' is also applicable for the construct 'individual attitude.' This objective results in the following research question:

"Is there a difference between the effects of framing (according to the four pillars of legitimacy) on individual attitudes towards genetically modified food in the Netherlands?"

This thesis conducts an experiment with four different questionnaires, each measuring the effect of one of the four different types of framing on individual attitudes. The experiment was held in the period of May 2020 and had a total of 236 respondents, each filling in one of the four questionnaires. The research population consisted of Dutch consumers between 18 and 30 years old who were recruited through Facebook. Based on this experiment, conclusions are drawn about whether there is a difference in the effects on positive attitudes of individuals by framing (according to the four pillars of legitimacy) in the context of GM food in the Netherlands and how these effects relate to each other.

1.6. Theoretical and practical relevance of thesis

Many studies focus on the legitimacy of and the attitude towards GM food (e.g. Gauthier & Kappen, 2017; Lucht, 2015; Marques, Critchley, & Walshe, 2015; Miles, Ueland, & Frewer, 2005; Rzymski & Królczyk, 2016). However, there are no records of existing studies that used the four pillars of legitimacy (Ruef & Scott, 1998; Suchman, 1995) as types of framing to study their effects on individual attitudes towards GM food. Also, there are only a few studies which address attitudes towards GM food specifically in the Netherlands (e.g. Hanssen et al., 2018; Jansma et al., 2019). Jansma et al. (2019) used the four pillars for researching GM food but focussed on which pillars were mostly used as frames in the media and did not link its effect to attitudes towards GM food. The authors of the article came to conclusions about how much the media used each pillar (each way of framing) and if the pillars were mostly used in a negative or positive way in the Netherlands between the years 1996 and 2016. The authors emphasize that although those ways of framing in the media reflect the public discourse, this reflection cannot be assumed one-on-one to attitudes. Although there is broad agreement that frames could influence public attitudes on a certain issue (Chong & Druckman, 2007; Nelson, Clawson, & Oxley, 1997), there is less knowledge about the relative influence of different types of frames on a certain issue. Other articles study how knowledge influences attitudes towards GM food, which

correlates with cognitive framing (e.g. Maes, Bourgonjon, Gheysen & Valcke, 2018; McPhetres, Rutjens, Weinstein, & Brisson, 2019; Rose, Howell, Su, Xenos, Brossard, & Scheufele, 2019; Wuepper, Wree, & Ardali, 2019). However, this features only one type of framing, but it neglects the other ways of how an issue could be legitimized through framing. Therefore, this thesis contributes to this deficit of knowledge by comparing the four ways of framing (according to the four pillars of legitimacy) in terms of how they relate to each other in affecting individual attitudes towards GM food in the Netherlands (Raymond & Delshad, 2016). By examining these effects there will be more understanding about the legitimization processes of GM food. With this understanding, theoretical conclusions could be drawn about which tactics (frames) would work best for changing individual attitudes and therefore how to make a certain industry more legitimate. Practically, considering that public opinion has a significant impact on the development and marketing of GMOs, companies involved with GMOs could apply this knowledge to the development of appropriate commercialisation strategies for genetically modified products.

1.7. Outline of thesis

The outline of this thesis will be as follows. The second chapter will be about the theoretical background of attitudes and the four types of framing according to the four pillars of legitimacy. This results in four hypotheses shown in a conceptual model. The third chapter is devoted to the method of this thesis, which will be an experimental vignette study. Four questionnaires are constructed and each questionnaire will represent one pillar of legitimacy. The fourth chapter will show the results of the research on the effects of that framing according to the four pillars of legitimacy has on individual attitudes towards GM food in the Netherlands. Finally, the fifth chapter will consist of conclusions and will discuss the results and limitations.

2. Theoretical background

The effects of the four ways of framing (according to the pillars of legitimacy) on individual attitudes are going to be compared in order to answer the research question. Therefore, this chapter will provide theoretical background about these concepts and their relationships. These relationships result in a conceptual model which is going to be tested.

2.1. Attitude

The concept 'attitude' could be constructed in multiple ways (Ostrom, 1969). Eagly and Chaiken (1993) defined an attitude as "a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour" (Eagly & Chaiken, 1993, p. 1). Therefore, Eagly and Chaiken (1993) state that an attitude comes from an psychological tendency and is expressed with an evaluative response. Breckler (1984) calls this psychological tendency 'the antecedent stimulus'. This stimulus could be observable or non-observable and is best described as an exogenous or independent variable. In case of GM food, the psychological tendency or antecedent stimulus could come for example from an article in a newspaper about GM food. While reading such an article, the persons evaluative response could then be to disfavour or favour GM food. Breckler (1984) classified these evaluative responses and divided them into three different interrelated components: affection, cognition and behaviour. 'Affection' refers to the gut reaction of a person and its emotions and feelings towards the antecedent stimulus. For example, a person could feel uncomfortable about GM food after having read the article. 'Cognition' refers to the person's knowledge structures, beliefs, thoughts and perceptual responses. In case of the example about GM food, a person could learn from the article which then influences its beliefs about the topic. 'Behaviour' refers to verbal statements, behavioural intentions and overt actions. In case of the example about GM food, a person could express its feelings and beliefs in words or a change in behaviour. Therefore, the evaluative response could drive a person to act in a certain way (Albarracín, Sunderrajan, Lohmann, Chan, & Jiang, 2018), which could for example be the consuming of GM food or the contrary.

2.2. The four pillars of legitimacy

The four pillars of legitimacy are used as a theoretical framework. Legitimacy is defined as "a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (Suchman, 1995, p. 574). This socially constructed system of norms, values, beliefs, and definitions comes from the attitudes of individuals in a society, which is the reason why it is assumed in this thesis that the four pillars of legitimacy are also applicable on individual attitudes. The previous literature conceptualises organizational legitimacy from two different perspectives. According to the institutional perspective

(DiMaggio & Powell, 1983; Meyer & Rowan, 1977) legitimacy is something which is fixed and limits the decisions of organizations (Beelitz & Merkl-Davies, 2012; Suchman, 1995). For example, because the Dutch population does not accept GM food, policies and laws make it impossible for organizations to produce GM food. The second perspective corresponds with the agency perspective. This perspective views legitimacy as an operational resource which organizations could use to construct certain strategies to achieve their goals (Beelitz & Merkl-Davies, 2012; Dowling & Pfeffer, 1975; Suchman, 1995). For example, organizations could use different ways of framing to make GM food more acceptable in the eyes of the audience to change policies and laws to produce GM food.

Legitimacy is a multidimensional concept and is therefore in many studies categorized in multiple divisions. Suchman (1995) divided legitimacy in three categories: moral, cognitive and pragmatic legitimacy. All of them involve a general perception or assumption of legitimacy, but are based on somewhat different behavioural dynamics. Ruef and Scott (1998) extended this categorization by adding a regulative component. Also they combined cognitive and pragmatic legitimacy and renamed moral legitimacy to normative legitimacy. Scott (2013) used these three elements in his research and defined them as 'pillars'. In other scientific papers the categorization of Ruef and Scott's (1998) and Suchman (1995) were combined into 'the four pillars of legitimacy': normative legitimacy, cognitive legitimacy, pragmatic legitimacy and regulative legitimacy (e.g. Binz, Harris-Lovett, Kiparsky, Sedlak, & Truffer, 2016; Jansma et al., 2019). Normative legitimacy refers to why GM food would be right (for society), based on norms and values. Cognitive legitimacy refers to information and knowledge about GM food. Pragmatic legitimacy is about how GM food could be used and how people could benefit from it. Regulative legitimacy is about how GM food corresponds to existing legislation and laws. These four pillars are not hierarchical and could overlap and co-exist with each other (Suchman, 1995). When the pillars are not in accordance with each other, they could cause conflict and confusion (Scott, 2013). In case of GM food, the following narrative could prove to be true. Based on the knowledge a person has about genetically modified food (cognitive legitimacy) this person has a positive view on genetically modifying food, but since GM food does not fall within the societal norms (normative legitimacy), that person's attitude about GM food would be impacted negatively. The strength of the pillars' combined forces is at its greatest when the pillars' are aligned with each other (Scott, 2013). Therefore, it is important when trying to gain legitimacy that attention is paid to all four pillars of legitimacy.

2.3. Framing

Framing has become a comprehensive theoretical paradigm that can be assessed through various deductive and inductive approaches (D'Angelo, 2002; Entman, 1993). "To frame is to select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment

recommendation for the item described" (Entman, 1993, 52). Therefore, framing something in a certain way may change an individual's perspective to an issue and could alter the way how an individual defines the issue and how the individual is opinionated towards the issue. As stated before, an attitude is some degree of favour or disfavour, which comes from an psychological tendency or antecedent stimulus (Breckler, 1984; Eagly & Chaiken, 1993). Using this logic, it can be stated that framing could be the aforementioned stimulus to affect the attitude of an individual. This effect of framing on the attitude of an individual is known in scientific literature as a 'framing effect'. In the psychological process of the framing effect, attitudes are conceptualized as the 'weighted sums' of various 'considerations' applied to the issue (Chong & Druckman, 2007). Exposing an individual to a framed text about a certain issue can impact certain considerations that a person has about that certain issue in a positive way and might impact other considerations that the person has on that certain issue in a negative way. (Nelson, Clawson, & Oxley, 1997). For example, when an individual is exposed to a pragmatically framed text to describe the advantages of GM food, it may increase the psychological weight that is given to that specific advantages, but it does not change the psychological weight given to how much risk that person perceives regarding to GM food.

Two categories of framing emerge in the framing literature, which are issue-specific framing and generic framing. Issue-specific framing is concrete and most of the time solely applicable in relation to a certain topic, while generic framing is abstract and identified in relation to a wide range of topics (Brugman, Burgers, & Steen, 2017). An advantage of issue-specific framing is that it allows for detail and great specificity (De Vreese, Peter, & Semetko, 2001). An advantage of generic framing is that it offers a systematic platform to be used for the identification across topics and for patterns over time. Therefore, generalising and comparing results is relatively easy with generic framing, contrary to issue-specific framing (Borah, 2011; Brugman, Burgers, & Steen 2017). Jansma et al. (2019) showed that the four pillars of legitimacy can be applied as a generic framework to assess how technological innovations, and GM food specifically, could gain legitimacy in the public discourse. The four pillars of legitimacy then consist of four ways of framing: normative framing, cognitive framing, pragmatic framing and regulative framing. These four types of framing are aimed to increase normative, cognitive, pragmatic and regulative legitimacy respectively. And assumed in this thesis is that they could be used as ways of framing to influence the attitude of individuals towards GM food in a positive way as well.

2.3.1. Normative framing

Suchman (1995) defined normative legitimacy as judgements, which are formed over time by norms and values of the society. This consists of whether an activity is "the right thing to do" or not. The highest form of normative legitimacy would be when these judgements are perceived as facts by the actors. The normative pillar emphasizes the logics of well-being and justice (Suchman, 1995).

Normative legitimacy, and as an assumption in this thesis an increase in positive attitude of an individual towards GM food, would therefore be gained by framing a text about why GM food would be the right thing to do. In the context of GM food, counter-arguments in the discussion are often based on high moralizing and emotional rhetoric, focusing on the justice of society rather than individual benefits (Hielscher et al., 2016). Morality concerns about GM food are often that GM is seen as unnatural and that humans try to behave like god, twisting the laws of nature (Frewer & Shepherd, 1995; Knight, 2009). This way of thinking could reflect in their affection, cognition and behavior (Breckler, 1984) towards GM food and therefore to the negative attitude of an individual. Regarding morality, there are intrinsic and extrinsic dimensions. Intrinsic moral concerns are those which are rooted in the idea that GM is for example unnatural or natural and these moral concerns relate to the application of the technology (Dietrich & Schibeci, 2003). Extrinsic moral concerns are the consequences of this technology and the perceived risk balanced against the purported outcomes (Frewer & Shepherd, 1995). Dietrich and Schibeci (2003) see a correlation between fear and perceived risk and a negative attitude towards GM food. Therefore, it can be assumed that convincing people why GM food would be right for society through normative framing, will decrease intrinsic and extrinsic moral concerns and therefore would positively increase a person's affection, cognition and behavior (Breckler, 1984) towards GM food and thus the positive attitude of an individual towards GM food.

2.3.2. Cognitive framing

Cognitive legitimacy is based on cognition instead of on evaluation or interest (Aldrich & Fiol, 1994). Cognitive legitimacy, and as an assumption in this thesis an increase in positive attitude of an individual towards GM food, would therefore be gained by framing on cognition. Suchman (1995) made the distinction between two variants of cognitive legitimacy: legitimacy based on comprehensibility and legitimacy based on taken-for-grantedness. In case of GM food, regarding legitimacy based on comprehensibility, the main concern would be that people understand what GM is and how it works (Scott, 2013). In the case in where there is an absence of explanations and knowledge about a certain activity, this activity would collapse due to oversights, miscues and distractions (Suchman, 1995). Taken-for-granted legitimacy is seen as the highest form of legitimacy. Another reality would then be literally unthinkable (Suchman, 1995). GM food would then be embedded in the institutional system (Aldrich & Fiol, 1994) and alternatives for GM food would not be thought of anymore. Both forms of cognitive legitimacy are not seen in the Netherlands, since there is a lack of knowledge about GM food among politicians and the general public, and although most of the public is aware that GM food exists, they do not have knowledge about its working principles (Hanssen et al., 2018; Jansma et al., 2019; Lucht, 2015). Due to this lack of basic understanding about GM food, irrational and emotional thoughts about the topic are formed (Gaskell et al., 2004). McPhetres et al. (2019) studied how science predictors influence attitudes towards GM food. It turned out that knowledge of GM technology is a unique

predictor of GM food attitudes and that learning about the science behind GM technology leads to a more positive attitude towards GM foods, more willingness to eat GM foods and lowered perceptions of the risk of GM foods. This outcome is also applicable in the UK, US and in the Netherlands. Therefore, it is assumed that providing knowledge about GM food through cognitive framing, could avoid these irrational and emotional thoughts, which would increase the positive affection, cognition and behavior (Breckler, 1984) of a person towards GM food and thus increase the attitude of an individual towards GM food in a positive way.

2.3.3. Pragmatic framing

Pragmatic legitimacy rests on judgments about whether a given activity benefits the evaluator, in contrast to normative legitimacy which rests on judgments about whether the given activity is the right thing to do for the society (Suchman, 1995). Unlike normative and cognitive legitimacy, pragmatic legitimacy rests on audience self-interest (Binz et al., 2016). Pragmatic legitimacy, and as an assumption in this thesis an increase in positive attitude of an individual towards GM food, would therefore be gained by framing on which utility GM food has for its stakeholders. This type of legitimacy plays an important role in the early stadia of an innovation - like GM food - since stakeholders would only accept an innovation if they see the potential utility of it (Kaganer, Pawloski, & Wiley-Patton, 2010). However, it should be borne in mind that there are many different types of stakeholders in the Netherlands in the industry of GM food, with different opinions about the utility it could bring. For example, a pragmatic framing for consumers is that nutritional qualities of crops could be increased (Harmon, 2013; Sharma, Kaur, & Singh, 2017) for distributors in the GM industry this could be a rise in profit when they sell GM food products. In the Netherlands there is a lack of pragmatic legitimacy, since many Dutch citizens have a lack of knowledge when it comes to the benefits GM food could provide (Hanssen et al., 2018; Lucht, 2015). Suchman (1995) states that pragmatic legitimacy is a form of legitimacy which generally is the easiest form to manipulate, since it is a reflection of direct exchange of the organization and its specific constituents. Therefore, it is assumed that providing benefits associated with GM food through framing according to the pragmatic pillar, will increase the evaluator's perceived benefits of GM food. As a result this could increase that person's affection, cognition and behavior (Breckler, 1984) towards GM food in a positive way and thus increase the attitude of an individual towards GM food in a positive way.

2.3.4. Regulative framing

Regulative legitimacy is obtained by institutions which regularize and constrain behavior (Scott, 2013). These institutions could for example be governments, powerful organizations, professional bodies and credential associations (Zimmerman & Zeitz, 2002) which perform activities as rule-setting, monitoring

and sanctioning activities (Scott, 2013). In case of GM food a good example is that all food produced from GMOs are required to have labels (European Commission, 2003a). Regulative legitimacy, and as an assumption in this thesis an increase in positive attitude of an individual towards GM food, would therefore be gained by framing on whether GM food activities are in line with the rules, monitoring and sanctioning activities. According to Einsele (2007), in Europe the regulation is mainly process based, instead of in America, where regulations are mainly product based. For the innovations which are based on processes, like GM food, the regulation is different and more profound than the product-based regulation in America. Europe is in general more strict when it comes to GM, but it is proven that the strict regulation in Europe added nothing to the safety of the products and does not result in more trust towards GM food. Gaskell et al. (2010) suggest that there is a link between public policies and private attitudes regarding GM food, since members in EU countries where GM crops are banned show lower levels of support than countries where GM crops are grown. Also according to more studies, technological innovations which are in line with existing rules, laws and regulations will have a higher level of regulative legitimacy than if they would not be in line (Binz et al., 2016). When technological innovations are not in line with existing rules, although scientifically proven safe, the innovation is seen as dangerous and risky (Einsele, 2007). Therefore, it is assumed that convincing people about GM food being in line with existing rules, monitoring and sanctioning activities through regulative framing, would decrease skeptical thoughts about GM food. When skeptical thoughts towards GM food of an individual decrease, its affection, cognition and behavior (Breckler, 1984) towards GM food will increase in a positive way and will thus increase the attitude of an individual towards GM food in a positive way.

2.3.5. Summary

Table 1 summarizes the four definitions of legitimacy according to the previous literature.

Table 1.

Descriptions of the four pillars of legitimacy based on previous literature

Concept	Description
Normative framing	Framing on judgements, which are formed over time by norms and values of the society, whether the activity is "the right thing to do".
Cognitive framing	Framing on objective knowledge about GM food to improve people's comprehensibility. It is about teaching people what GM (food) is and how it works.
Pragmatic framing	Framing on judgments about benefits of GM food for the evaluator.
Regulative framing	Framing on how GM food is in line with the existing rules and laws of the government or authorities.

2.4. Hypotheses of framing effects

To conclude how the four pillars relate to each other, the main concerns of the Dutch public which could be solved by giving a type of framed information are looked at. According to literature described in Chapter 1, the main concerns which could be solved by framing are: a lack of knowledge about the working principles of GM food (Hanssen et al., 2018; Lucht, 2015; Jansma et al., 2019), moral concerns due to beliefs or to the associated risks with GM food (Augoustinos, Crabb, & Shepherd, 2010), and a lack of knowledge about the benefits GM food could provide (Hanssen et al., 2018; Lucht, 2015). In this chapter it is reviewed how each pillar would reduce these three concerns (see Table 2) and to other factors which may influence their framing effect.

2.4.1. Regulative framing effect

It is expected that out of the four pillars, a regulative framing will have the least effect on the individual attitudes. Regulative framing is about convincing why GM would be in line with existing laws, rules and monitoring activities of authorities and therefore would not contribute much to the lack of knowledge of an individual towards GM food about the working principles or the benefits of GM food. It could slightly reduce moral concerns, because when an individual associates the processes of GM food to be in line with existing laws of authorities it could slightly reduce its perceived risks and moral concerns towards GM food. There are two other reasons why the regulative framing effect would probably not not be as high as the rest. First of all, it turns out that a high percentage of the Dutch population does not trust the government. While a study in the Netherlands shows that people have a more positive attitude towards GM food, when they have higher levels of trust in the government (Gutteling, Hanssen, Van Der Veer & Seydel, 2006). Trust in government means that the government takes the interest of the public into account, that control is in good hands and that the government is competent. When people have higher levels of trust in the government, with respect to GM food, they are generally more optimistic about the technological developments of GM food, are more likely to accept it and show less protesting behavior. According to the same study, only a third of the sample trusted the government with regard to the GM food development. Therefore, it is expected when regulative framing is used, this could only affect approximately one third of the people questioned. Second of all, in the Netherlands GM food is still highly regulated. In the European Union, only genetic modification of corn, soy, cotton, sugar beet and rapeseed is allowed for use in human food and thus the same goes for the Netherlands. To inform consumers about the presence of ingredients from GMOs, there are special labeling rules, based on EU Regulation EC No 1829/2003 and 1830/2003. When an ingredient in a food comes from genetically modified corn, soy, cotton, sugar beet or rapeseed, the ingredient declaration must use the term "genetically modified", with a threshold value of 0.9% of GMOs (art. 4.16b Section 2 Law IB 2001/18). Since a strict regulation does not result in trust towards GM food (Einsele, 2007), it is expected that due to the strict regulation in the Netherlands there will be

not much framing effect. Due to the other three pillars having fewer potential negative influence factors, it is expected that a regulative framing will have the least positive effect of all four pillars. This results in the following hypotheses:

H1: A regulative framing will have a less positive effect on the positive attitude of an individual towards GM foods than normative, cognitive and pragmatic framing would have.

2.4.2. Pragmatic framing effect

The second least framing effect is expected to be pragmatic framing, which is based on judgements on whether a given activity benefits the evaluator. This type of framing is expected to highly reduce the lack of knowledge of the public about the benefits GM food could provide. When zoomed in on the benefits, the working principles of the process of GM food will also be slightly made clear. For example, when stated through pragmatic framing that consumers could benefit from higher nutritional values, a person gets insight in the working principle that GM could be used for nutritional values. But pragmatic framing does not reduce any moral concerns the Dutch population would have, since the focus lies on the benefits, and therefore risks are not made clear with pragmatic framing. Suchman (1995) stated that pragmatic legitimacy is the easiest form to manipulate, since it is a reflection of direct exchange of the organization and its specific stakeholders. But it has to be taken into account that there are different kinds of stakeholders with different perspectives about the benefits. For example, one consumer of GM food could find it very important that nutritional values could be increased, while a seller of GM food or even another consumer does not give weight to the nutritional values. Therefore, it is not possible to let pragmatic framing work for all evaluators. Also, it is expected since pragmatic framing rests on judgements rather on facts, that this will result in less trustworthiness of the given information. Since it is expected that normative and cognitive framing reduce more concerns of the Dutch population, it is expected that a pragmatic framing will have the second least framing effect among the four pillars. This results in the following hypotheses:

H2: A pragmatic framing will have a more positive effect on the positive attitude of an individual towards GM foods than regulative framing, but less than normative and cognitive framing would have.

2.4.3. Normative framing effect

The second highest framing effect is expected to be normative framing, which is framing on judgements why GM food would be ‘the right to do’. The main reason why it is expected that this will have a high effect is because the main concerns of the Dutch population are based on norms and values. Many people in the Netherlands have a lack of knowledge which leads to irrational and emotional thoughts about GM food (Gaskell et al., 2004). Therefore a high result could be made with framing on why GM food would

be ‘the right thing to do’ to change their normative perspective towards GM food. Also this type of framing gives evaluators a slight insight in the benefits GM food could bring to society. But, like pragmatic framing, these benefits are not of equal importance to every evaluator, which makes the effect less high. For example, one evaluator could find it very important to find solutions for future food scarcity, while another evaluator does not give weight to that. Therefore it is expected that providing knowledge about benefits for society through pragmatic framing, does not work for all people. Furthermore, a normative framing could give slight insight in the working principles of GM food, but since normative framing is based on judgements rather than on facts, it is expected that this will result in less trustworthiness of the given information. Since, it is expected that normative framing will reduce more concerns of the Dutch population than regulative and pragmatic framing, but less concerns than cognitive framing, it is expected that a normative framing will have the second highest framing effect among the four pillars. This results in the following hypotheses:

H3: A normative framing will have a more positive effect on the positive attitude of an individual towards GM foods than regulative and pragmatic framing, but less than cognitive framing would have.

2.4.4. Cognitive framing effect

The highest framing effect is expected to be cognitive framing. By providing objective knowledge, this type of framing contributes to reduce all types of stated concerns the Dutch population have. There is a lack of knowledge among the Dutch population about what GM is and how it works (Scott, 2013), which results in irrational and emotional thoughts about the topic (Gaskell et al., 2004). Cognitive framing mainly focuses on the working principles of GM food, but could address benefits and risks in an objective way as well. This reduces the lack of knowledge about the working principles of GM food and at the same time it is expected to reduce moral concerns by reducing the associated risks involved with GM food (McPhetres et al., 2019). Also, by providing knowledge, the evaluator could learn about certain benefits GM food could bring. Since cognitive framing is based on facts instead of judgements, it is expected that an evaluator perceives the information as highly trustworthy and therefore this sort of framing is expected to have a strong framing effect. This results in the following hypotheses:

H4: A cognitive framing will have a more positive effect on the positive attitude of an individual towards GM foods than regulative, pragmatic and normative framing would have.

Table 2.

Conclusions about expected framing effects

Main solvable concerns:	**Framing effects on concerns:**			
	Normative framing:	Cognitive framing:	Pragmatic framing:	Regulative framing:
Lack of knowledge about working principles	Intermediate	High	Intermediate	Low
Moral concerns	High	High	Low	Intermediate
Lack of knowledge about benefits	Intermediate	High	High	Low
Based on:	Judgements	Facts	Judgements	Facts

2.5. Conceptual model

To summarize, the following hypotheses are going to be tested in this thesis:

- *H1: A regulative framing will have a less positive effect on the positive attitude of an individual towards GM foods than normative, cognitive and pragmatic framing would have.*
- *H2: A pragmatic framing will have a more positive effect on the positive attitude of an individual towards GM foods than regulative framing, but less than normative and cognitive framing would have.*
- *H3: A normative framing will have a more positive effect on the positive attitude of an individual towards GM foods than regulative and pragmatic framing, but less than cognitive framing would have.*
- *H4: A cognitive framing will have a more positive effect on the positive attitude of an individual towards GM foods than regulative, pragmatic and normative framing would have.*

Based on the four formulated hypotheses, a conceptual model is constructed (see Figure 1 on the next page).

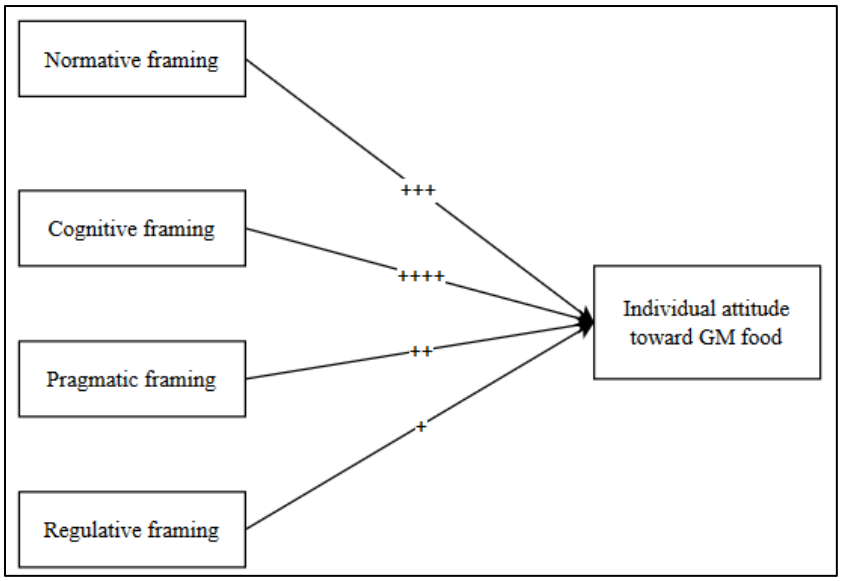

Figure 1. *Conceptual model*

The conceptual model shows the four types of framing (according to the four pillars of legitimacy) and the expected relations they have with an individual attitude towards GM food. As shown in the model, it is expected that regulative framing will have the least effect, followed by pragmatic framing. Normative will top pragmatic and cognitive framing will take the crown by having the highest framing effect towards GM food.

3. Research methodology

In this thesis, the following research question is central:

"Is there a difference between the effects of framing (according to the four pillars of legitimacy) on individual attitudes towards genetically modified food in the Netherlands?"

To answer this research question, an experimental vignette study is executed. This chapter gives answer to which method is used, how the data is collected, how the data is analysed, how the variables have been operationalized and how the results are in terms of validity and reliability.

3.1. Questionnaires

A between-subjects-design was used to compare the framing effects on individual attitudes towards GM food. Four different questionnaires are made, each measuring one of the four different framing effects (see the template of the questionnaires in Appendix A). Based on the four types of framing, four different vignettes are constructed. Each of the four questionnaires consists of a different vignette. One questionnaire will measure the normative framing effect, another questionnaire will measure the cognitive framing effect, another questionnaire will measure the pragmatic framing effect and another questionnaire will measure the regulative framing effect. It has been decided that there will not be a fifth questionnaire to serve as control group, since there is only an interest in how the four ways of framing relate to each other. All questionnaires (including the vignettes) were made in Dutch, but translated to English for this thesis.

3.1.1. Questions

All questions in the questionnaire are based on a 7-point Likert scale. Every questionnaire starts with an introduction and a short definition of GM food. Next, there are three questions about how aware respondents are regarding to (buying) food ("Aware") and one question about how familiar they already are with GM food ("Familiar"). After these four questions, one of the four vignettes is shown. Respondents were instructed to read the text carefully. After the vignette was shown, respondents had to fill in 13 questions. These 13 questions measure the construct "Attitude". The end of the questionnaires consists of the question whether the respondents had the feeling if their opinion changed due to the article they read and with three multiple choice questions about the demographic variables: "Gender", "Age" and "Education level". See Table B1 in Appendix B for a summary of the measures used.

3.1.2. Vignettes

The vignettes listed below (Figure 2, 3, 4 & 5) are based on the found literature from Chapter 2 and on existing newspapers found online. Each vignette represents a specific framing type. All vignettes are formulated in a positive way to promote GM food and were approximately 130 words long. The vignettes are being tested on whether they are evenly strong formulated as perceived by the respondent by doing a pre-test. The vignettes all had the same subject, namely GM potatoes. This subject is chosen to make GM food more imaginable for the respondents. The normative vignette is based on judgements on whether genetically modified food would be right for society. Therefore, the text is written in a subjective way. Examples of statements made in the vignette are that the GM potato is just as natural as a 'regular' potato and that there are benefits for society, such as sustainability. The cognitive vignette had to highlight objectivity. Therefore, the text is written in a more scientific way and states only the benefits which are scientifically proven facts. The pragmatic vignette had to be about judgements on why GM potatoes would benefit the consumer. Therefore, the text includes examples such as nutritional values and the price. Lastly, the regulative vignette had to be about how the government acts towards GM potatoes. Therefore, the text is about how the Dutch government wants to reduce legislation of the process of GM potatoes to convince readers that the government has trust in GM food.

Take genetically modified potatoes, for example. It would truly be the right thing for Dutch society to apply genetic modification to potatoes. The genetically modified potato is just as natural as the 'regular' potato. Only the useful genes that one type of potato has are extracted and put into another potato that does not have them yet. This makes genetically modified potatoes superior to the 'regular' potato. The Netherlands has a very large market share in potatoes worldwide. However, potato harvests cause crop failures. This causes the Netherlands to incur millions of euros in damage each year. The Netherlands should stop this by applying genetic modification. Especially now at a time when sustainability is so important. Not only the economy, but the entire Dutch society would benefit from a healthier, more sustainable and more efficient potato cultivation through genetic modification.

***Figure 2**. Normative framing vignette*

A genetically modified organism (GMO) is a viable organism whose genetic information has been altered by genetic technology. An example of this are genetically modified potatoes. The 'cisgenesis' technique transfers useful genes that one potato variety has to another potato variety that does not yet have them. After ten years of research, scientists of Wageningen University have succeeded in developing potato plants that require up to eighty percent less chemical pesticide this way. By introducing genes from wild potatoes, genetically modified potatoes are resistant (insensitive) to the potato disease 'Phytophthora infestans'. This is a contagious fungal disease in which the entire crop can be destroyed in case of strong infection. This disease is difficult to combat with chemical pesticides, because it quickly develops a resistance (insensitivity) to pesticides.

***Figure 3**. Cognitive framing vignette*

Take genetically modified potatoes, for example. It would offer so many advantages for the Dutch consumer if genetic modification is applied to potatoes. Because useful genes are obtained from one type of potato that does have them, and then put in another that does not yet have them, potatoes can be grown with benefits for the consumer. For example, they can contain higher nutritional values or are less likely to get brown spots than the 'regular' potato. In addition, genetically modified potatoes are insensitive to potato diseases, which means that less chemical pesticides have to be used. This would mean that you as a consumer may consume less carcinogenic substances. In addition, this would mean fewer crop failures resulting in full shelves in the supermarket and a lower price for the potato.

***Figure 4**. Pragmatic framing vignette*

Take the genetically modified potatoes, for example. In Europe, the application of genetic modification to potatoes is not allowed. However, the Netherlands is in favour of an exemption from these regulations. On behalf of the Dutch government, our State Secretary for Infrastructure and the Environment argued for the authorization of 'cisgenesis' (a form of genetic modification on potatoes) within Europe. The reason for this was mainly to keep the potato disease-free. The Secretary of State points to the advice of the EU food safety authority a year and a half ago that cisgenesis does not entail more risks than the crops to which no cisgenesis has been applied. MPs from CDA and Christian Union request the government to make the exemption for cisgenesis a top priority. The cultivation of genetically modified potatoes is already permitted in countries such as the United States, Canada, Japan, Australia and New Zealand.

***Figure 5.** Regulative framing vignette*

3.2. Variables

This chapter discusses the main variables of this research. In Table B1 in Appendix B, is a detailed overview of these variables with their indicators and how they are called and measured in this thesis.

3.2.1. Main constructs

Attitude: Since attitude is a multidimensional construct (Ostrom, 1969), it has to be measured in a multidimensional way. Magnusson and Hursti (2002) did research about consumer attitudes towards GM food. This research is very similar to the research in this thesis and therefore their scale is considered as a useful scale to measure attitude. The scale consisted of 13 indicators, shown in Table B1 in Appendix B. It turned out that one indicator which was about how much control a person has over the consumption of GM food did only correlate with one other indicator. Therefore, this indicator has been removed, which resulted in 12 remaining indicators. The mean score of these 12 indicators is seen as an

individual attitude ("Attitude_C"). See Chapter 4.2 for a more detailed explanation and procedure behind the construct validity.

Familiar: "Familiar" functions as a covariate in this thesis. Maes et al. (2018) state that knowledge about genetic modification affect the acceptance of GM food. This indicates that when a person already had knowledge about GM food, the person's attitude towards GM food is already biased. Therefore, when individuals are already more familiar with GM food, it is expected that the framing types provide less new knowledge to these individuals and therefore have less effect than when they would have not been familiar with GM food.

Awareness: "Awareness" was meant to function as covariate. First, there has been decided to let it have two indicators: how aware respondents were regarding to information at the label of foods when buying food ("Aware_info_label") and how aware respondents were regarding to buying biological products ("Aware_bio"). It was expected that when people looked on the labels of food and bought biological food more often, they would be more skeptical towards GM food and therefore framing types would have less effect on them. Later in the experiment, it turned out that respondents misinterpreted the question about the information at the labels, since they associated 'information' with information as the brand name and taste, for example. Therefore, the indicator "Aware_healthy" was later on added, to measure how aware people are regarding to the health of foods. It was expected that when people found health more important, they are more skeptical towards GM food. The mean of the three indicators formed the construct "Awareness". However, this construct did not correlate with "Attitude_C" and therefore it could not be used as covariate. See Chapter 4.6 for a more detailed explanation and procedure behind this logic.

Framing types: The framing types are the fixed factors and consists of normative framing, cognitive framing, pragmatic framing and regulative framing.

3.2.2. Demographic variables

Gender: Research indicates that gender affect the acceptance of GM food (Chen, 2011; Moerbeek & Casimir, 2005; Maes et al., 2018). Women in general have a less positive attitude towards GM food than men. Also, Simon (2010) found a difference between men and women in the correlation between attitude and knowledge. Women with an increase of knowledge about GM food, will have an increase in pessimistic thoughts about this topic. In contrast, men with an increase of knowledge about GM food, will have a decrease in pessimistic thoughts about the topic.

Age: According James and Burton (2003) age is a predictor of attitude towards GM technology. This is because age affects the preferences for a certain type of food. Younger people tend to be generally less

accepting towards the use of gene technology. Age could not differ significantly between the groups since only people between 18 and 30 years old filled in the questionnaire.

Education level: Hanssen et al. (2018) studied Dutch attitudes towards GMOs and state that education level is linked to how much information a person seeks about GM food. In general, the higher the education level, the more information a person seeks about GM food. It is expected that when a person seeks more information about GM food, the person is more rational and therefore framing based on judgements (normative and pragmatic framing) would have less effect on them .

3.3. Data-collection

The population of the study are Dutch consumers between 18 and 30 years old. According to CBS (2019), this age range represented approximately 13% of the Dutch population in 2019. To reach as many people as possible, an online questionnaire was considered to be the best option (Saunders, Lewis, & Thornhill, 2012). By using Qualtrics (Online Survey Software), which was made available by Radboud University Nijmegen, it was possible to design and spread the questionnaire online. Data was randomly collected in May 2020, by spreading the questionnaire through Facebook and by asking whether respondents could spread the questionnaire further to other potential respondents. Participants were not being paid for filling in the questionnaire. The questionnaire was closed at the end of May 2020. The four groups were almost even in group size: the questionnaire with the pragmatic framed vignette had 62 respondents and the other three groups consisted of 58 respondents each. Gender did not differ significantly with an alpha of 0.05 from the averages in the population, but education did. Lower educated people were underrepresented in the sample. For more detailed information about the results of the demographic variables see chapters 4.3, 4.4 and 4.5.

3.4. Data analysis procedure

The statistical software program IBM SPSS Statistics 23 is used to analyse the outcomes of the final questionnaires. Statistics being used for this research are descriptive statistics, chi-square tests ($\chi 2$), Spearman's rho (r_s) correlations, one-way analysis of variance (ANOVA) and analysis of covariance (ANCOVA). For all results, a p-value of 0.05 or lower is seen as statistically significant. To prepare the data, the variable and answer labels were translated to English. There were seven questions which had to be reversely coded, since those questions were asked in a negative way. The reversely coded variables are marked with an R at the end (for example "ConcernR"). A high number of respondents dropped out of the questionnaire when they had to read the vignette. These respondents are not included in the study, since they have not given any information about the dependent variable ("Attitude_C). Also, there were three respondents older than 30, which are not included in the research. A missing Values Analysis (MVA) is scrutinized. According to Madley-Dowd, Hughes, Tilling and Heron (2019), when the total

data consists of more than 10% missing values, bias is likely. When there is more than 40% missing data in variables, the results should only be considered as hypothesis generating. Furthermore, the construct validity of "Awareness" and "Attitude" was measured. Construct validity measures whether a constructs underlying indicators are internally consistent or not. This is done by the Cronbachs alpha (α). A general accepted rule is that $\alpha > 0.8$ indicates a very good level of reliability, an α of 0.6-0.8 an acceptable level of reliability, and $\alpha < 0.6$ not a good level of reliability (Hulin, Netemeyer, & Cudeck, 2001). When an item would be deleted and it gives a higher α, it is seen as an internally inconsistent item. This was the case with "Control_over_consumption". There has been decided to not perform a factor analysis, since "Attitude_C" already had a strong internal consistency ($\alpha = 8.00$). Next, the descriptive statistics are being analysed on how the three demographic variables (gender, age and education level) differ from the population and from each other in the four groups. Also, correlations are analysed with the Spearman's rho, which measures the direction and strength between two ordinal variables. This is an appropriate measure, since all variables are measured with a 7-point Likert scale.

ANOVA and ANCOVA are conducted to analyse the main effects. These are appropriate tests since the data meets the assumptions. The first assumption is that there is only one dependent variable ("Attitude_C") with a metric measure level. "Attititude_C is measured by a Likert scale, so it is of an ordinal level. However, according to Field (2009), an ordinal level is acceptable. The second assumption is that there are one or more independent variables (framing types) that are of categorical level (nominal). The third assumption is that there are independent and randomly chosen experimental units. This is partly the case since data was only distributed on Facebook and by snowballing. The other assumptions had to be tested and therefore can be found in Chapter 4.6.

An ANOVA was executed to test whether there are differences between and within groups ("Framing_types") on its mean scores on "Attitude_C". The following two hypotheses are tested:

H0 = The means of "Attitude_C" are the same for all four framing types.

H1 = The means of "Attitude_C" are not the same for all four framing types.

Based on whether this test is significant or not significant, there can be concluded whether the means of individual attitudes among the four different groups are significantly different from each other, without controlling for "familiar". Next, the main results are being analysed with ANCOVA. This method tests whether there are differences between and within groups ("Framing_types") on its mean scores on "Attitude_C", while controlling for the covariate ("Familiar"), which reduces the error term. This results in the following hypotheses:

H0 = The means of "Attitude_C" are the same for all four framing types, controlling for "Familiar".

H1 = The means of "Attitude_C" are not the same for all four framing types, controlling for "Familiar".

When the result of the ANCOVA is statistically significant, it means that there is a difference between the four groups, while controlling for "Familiar". No post hoc analysis was needed. An estimated marginal means table was analysed to see how means changed when controlling for "Familiar". Furthermore, a crosstab was made to give an image for each different framing type and whether respondents felt their opinion was affected due to the article they read.

3.5. Research ethics

An advertisement was placed on Facebook with the online Qualtrics link to the questionnaire. In this advertisement, potential respondents were informed that they could always contact me to ask questions. The response was completely voluntarily. People were not asked personally to press on the link and it has been decided to not hand out rewards to respondents who filled in the whole questionnaire. This way, respondents did not take the questionnaire with the sole interest of the prospect of a reward. In the questionnaire introduction, respondents were informed that participating in the questionnaire was completely anonymous, their data was kept confidential and that it would took them five minutes to complete. Also, respondents were informed that this research was for my graduation research at Radboud University and that it was about the opinion of Dutch consumers about GM food. To avoid bias, it was not explained that the research was an experiment with four different vignettes. Furthermore, the respondents could stop filling in the questionnaire at any time. Respondents were given the option to leave their email at the end of the questionnaire if they wanted to be updated about the outcomes of the research. The respondents who did this, receive an e-mail at the end of June with the procedure, results and conclusions of this research.

4. Results

This chapter will describe the results of the present study. Firstly, several descriptive results will be discussed, including missing values and age, gender and education level of the research sample. Secondly, the assumptions and the results of ANOVA and ANCOVA will be discussed. Lastly, the results of this study as to which types of framing made respondents feel like their individual attitude towards GMOs and GM foods had changed, will be presented. For both the descriptive results and the results of the assumptions, only the tables which have important outcomes for the end results are shown in this chapter. The other tables can be found in the appendix.

4.1. Missing values

Firstly, the dataset was scrutinized for missing values through a MVA. Results show that the item "Aware_healthy" consists of 94 missing values (Table C1 in Appendix C). It has to be taken into account that this is 39.8% of the output and that this may influence the results. All other items scored well on the MVA, since they do not have more than 0.8% missing values per item. There is a total of 47.8% missing values, which would have been 8% if "Aware_healthy" had not been included.

4.2. Construct validity

The construct "Awareness" is the mean of "Aware_Info_label", "Aware_Bio" and "Aware_Healthy". Together they have an α of 0.679 (Table C2 in Appendix C), which indicates an acceptable level of reliability. Table C3 in Appendix C shows that α could not have been increased by deleting an indicator. The construct "Attitude", which is the mean of 13 indicators, has an α of 0.777 (Table 3), indicating that it has an acceptable reliability level as well. Table 5 shows that the α of "Attitude" would be increased by deleting "Control_over_the_consumption". As can be seen in the Spearman's rho correlation matrix in Table C10, the indicator "Control_over_the_consumption only correlates with "Reluctance" (r_s (236) = -.13, p = .040). Since "Control_over_the_consumption" only correlates with one of the twelve other indicators, it is not considered to be a useful indicator for "Attitude". Therefore, the indicator "Control_over_the_consumption" has been removed, resulting in the new construct "Attitude_C" with an increased α of 0.798 (Table 4). This new α suggests that the indicators of "Attitude_C" are now strongly internally consistent.

Table. 3.

Reliability Statistics of "Attitude"

Cronbach's Alpha	N of Items
,777	13

Table 4.

Reliability statistics of "Attitude_C"

Cronbach's Alpha	N of Items
,798	12

Table 5.

Item-Total Statistics of "Attitude"

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Healthy	52,15	82,013	,472	,757
Serves_a_good_purpose	51,21	82,874	,318	,772
ConcernR	51,88	79,438	,534	,750
Tampering_with_natureR	53,00	80,912	,340	,771
Necessary	52,06	82,431	,384	,764
Benefit	51,08	83,406	,355	,767
UnethicalR	51,69	76,906	,643	,739
Risk_for_societyR	51,90	77,754	,567	,746
Knowledge_about_the_consequences	52,96	82,608	,395	,763
Used_for_profit_aloneR	53,17	85,624	,290	,773
ReluctanceR	51,12	79,301	,526	,751
Risk_for_misuseR	52,55	81,222	,468	,757
Control_over_the_consumption	51,73	90,837	,042	,798

4.3. Gender

As shown in Table 7, of the respondents in the current sample 52.3% were men (n = 123) and 47.7% were women (n = 112). According to CBS, the Dutch population in 2019 consisted of 49.7% men (8 581 086) and 50.3% women (8 701 077). Table C4 in Appendix C shows that in the sample there is a slight overrepresentation of men (Residual = 6.2) and an underrepresentation of women (Residual = -6.2) compared to the Dutch population. When the different framing types are being compared regarding "gender", Table 6 shows that men are underrepresented in "Normative" (46.6% vs. M = 52.3%) and therefore women are overrepresented in this framing type (53.4% vs. M = 47.7%). The results of the Chi square test are not significant assuming an alpha of .30 (χ^2 (1, n = 235) = 0.66, p = .418)) (Appendix C, Table C5). Therefore, it can be concluded that gender is representative of the Dutch population in the total sample. Furthermore, Table 6 shows that the 123 men show a higher mean score on "Attitude_C" (M = 4.43, SD = .83) than the 112 women (M = 4.16, SD = .75).

Table 6.

Means and standard deviations of Attitude_C by gender

Gender	Mean	N	Std. Deviation
Men	4,4255	123	,82515
Women	4,1550	112	,74791
Total	4,2966	235	,79916

Table 7.

Frequencies of gender

			Gender		
			Men	Woman	Total
Framing type	Cognitive	Count	32	25	57
		% within Framing type	56,1%	43,9%	100,0%
	Normative	Count	27	31	58
		% within Framing type	46,6%	53,4%	100,0%
	Pragmatic	Count	31	31	62
		% within Framing type	50,0%	50,0%	100,0%
	Regulative	Count	33	25	58
		% within Framing type	56,9%	43,1%	100,0%
Total		Count	123	112	235
		% within Framing type	52,3%	47,7%	100,0%

4.4. Age

Regarding the age of the research sample, it was verified whether all respondents were between 18 and 30 years old and whether their responses were normally distributed. According to Table C6 in Appendix C, the lowest age in the response sample was 18 and the highest age was 30. These results conform to the age requirement for this thesis. The rounded mean age was 24, which is exactly in between 18 and 30. Skewness refers to the extent to which the distribution of a variable stretches towards the left or right tail and kurtosis refers to the extent to which a distribution peaks (Hair et al., 2017, p. 61). When the scores of skewness and kurtosis, divided by their own standard error, are in between -1.96 and 1.96, there is a normal distribution. For "Age" the level of skewness is 1,51 (.24/.159), which means the distribution of the responses stretches slightly to the right tail but is still considered to be a normal distribution. The kurtosis is -1.46 (-.46/.316), which means that the distribution of the responses is slightly flat, but is still considered to be a normal distribution.

4.5. Education

No CBS data was available for the 18-30 age category in 2019. Therefore it was decided to look at the CBS age category of 25-30 (2,208,000). According to CBS (2019), the following percentages are being pursued for this thesis: 2.94% (65,000/2,208,000) "Primary education", 8.02% (177,000/2,208,000) "VMBO MAVO", 38.27% (845,000/2,208,000) "HAVO VWO MBO", 49.41% (1091,000/2,208,000) "HBO WO" and 1.36% (30,000/2,208,000) "Other". Assuming an Alpha of 0.30, the results of the Chi square test in Table 8 show that "Education" in the sample is not representative of the Dutch population (χ^2 (3, n = 235) = 30.864, p < .001). In the sample there is an overrepresentation of "HBO WO" educated

respondents (Residual = 41,4) and an underrepresentation of "HAVO VWO MBO" (Residual = -31.7) and of "VMBO MAVO" (Residual = -10.4) compared to the Dutch population (Table 9). Therefore, highly educated people are overrepresented and less educated people underrepresented in the sample. When comparing the framing types (see Table 10), "VMBO MAVO" is underrepresented in "Cognitive" (0% vs. M = 3.8%) and is overrepresented in "Normative" (8.6% vs. M = 3.8%). "HAVO VWO MBO" is overrepresented in "Cognitive" (42.1% vs. M = 26%) and underrepresented in "Regulative" (15.5% vs. M = 26%). "HBO WO" is overrepresented in "Regulative" (79.3% vs. M = 68.5%) and underrepresented in "Cognitive" (56.1% vs. M = 68.5%).

Table 8.

Chi-square test of "Education"

	Education
Chi-Square	30,864
df	3
Asymp. Sig.	,000

Table 9.

Residuals of "Education" (based on Dutch population)

	Observed N	Expected N	Residual
VMBO MAVO	9	19,4	-10,4
HAVO VWO MBO	61	92,7	-31,7
HBO of WO	161	119,6	41,4
Other	4	3,3	,7
Total	235		

Table 10.

"Education" frequencies

			Education				
			VMBO MAVO	HAVO VWO MBO	HBO WO	Other	Total
Framing type	Cognitive	Count	0	24	32	1	57
		% within Framing type	0,0%	42,1%	56,1%	1,8%	100,0%
	Normative	Count	5	14	38	1	58
		% within Framing type	8,6%	24,1%	65,5%	1,7%	100,0%
	Pragmatic	Count	2	14	45	1	62
		% within Framing type	3,2%	22,6%	72,6%	1,6%	100,0%
	Regulative	Count	2	9	46	1	58
		% within Framing type	3,4%	15,5%	79,3%	1,7%	100,0%
Total		Count	9	61	161	4	235
		% within Framing type	3,8%	26,0%	68,5%	1,7%	100,0%

4.6. Assumptions

This chapter only shows the tables with figures that violate the assumptions for ANCOVA, which influence the results of the study. The assumptions which are met are discussed briefly and its tables can be found in Appendix C. Testing the ANCOVA assumptions gave the following results. One assumption is that the covariates "Awareness" and "Familiar" must correlate with the dependent variable "Attitude_C". A Spearman's rho analysis (Table 11) revealed that there was only a low positive correlation between the covariate "Familiar" and the dependent variable "Attitude_C" (r_s (236) = .20, p = .002). For the covariate "Awareness", no significant correlation was found with "Attitude_C" (r_s (236) = -.12, p = .079). Therefore, the assumption is only met for "Familiar" and not for "Awareness". To check whether an indicator of "Awareness" could act as a covariate, the indicators of "Awareness" were tested as well on correlations with "Attitude_C". As shown in Table 11, all three indicators "Aware_info_label" (r_s (236) = -.06, p = .386), "Aware_bio" (r_s (235) = -.13, p = .051) and "Aware_healthy" (r_s (142) = -.07, p = .443) do not significantly correlate with "Attitude_C". This indicates that the construct "Awareness" and its indicators individually can not act as covariates, which is why the construct "Awareness" has been left out of the research.

Table 11.

*Spearman's rho correlations (** = significant at the 0.01 level (2-tailed); * =significant at the 0.05 level (2-tailed))*

			Attitude_C	Awareness	Familiar	Aware_info_label	Aware_bio	Aware_healthy
Spearman's rho	Attitude_C	Correlation Coefficient	1,000	-,115	,197**	-,057	-,128	-,065
		Sig. (2-tailed)	.	,079	,002	,386	,051	,443
		N	236	236	236	236	235	142
	Awareness	Correlation Coefficient	-,115	1,000	,253**	,813**	,666**	,763**
		Sig. (2-tailed)	,079	.	,000	,000	,000	,000
		N	236	236	236	236	235	142
	Familiar	Correlation Coefficient	,197**	,253**	1,000	,220**	,155*	,133
		Sig. (2-tailed)	,002	,000	.	,001	,017	,113
		N	236	236	236	236	235	142
	Aware_info_label	Correlation Coefficient	-,057	,813**	,220**	1,000	,307**	,493**
		Sig. (2-tailed)	,386	,000	,001	.	,000	,000
		N	236	236	236	236	235	142
	Aware_bio	Correlation Coefficient	-,128	,666**	,155*	,307**	1,000	,374**
		Sig. (2-tailed)	,051	,000	,017	,000	.	,000
		N	235	235	235	235	235	142
	Aware_healthy	Correlation Coefficient	-,065	,763**	,133	,493**	,374**	1,000
		Sig. (2-tailed)	,443	,000	,113	,000	,000	.
		N	142	142	142	142	142	142

Another assumption for ANCOVA is that the covariate ("Familiar") and the factors ("Framing_type") have to be independent. As shown in Table C7 in Appendix C this assumption is met (F(3, 236) = 0.718, p = .542). Since this is not significant, "Familiar" is not related to "Framing_type". Furthermore, there has to be homogeneity of the regression lines. Table C8 in Appendix C shows that there is no interaction effect between "Framing_type" and "Familiar" (F(3, 236) = 1.164, p = .324) and therefore this assumption is met as well. Also, the Levene's Test (Appendix C, Table C9) shows that there are equal variances within the categories of the factors (F(3, 232) = 1.865, p = .136. The assumption for homogeneity of variances is therefore met as well.

4.7. Results

236 Dutch adults between 18 and 30 years old were surveyed about their attitude towards genetically modified potatoes after reading one of the four cases. Descriptive statistics in Table 14 indicate that cognitive framing (n=58) results in the highest attitude towards genetically modified potatoes (M = 4.48, SD = .79), pragmatic framing (n=62) results in the second highest attitude (M = 4.30, SD = .94), regulative framing (n=58) results in the second lowest attitude (M = 4.22, SD = .78) and normative framing (n=58) results in the lowest attitude (M = 4.18, SD = .63). ANOVA tests whether these differences are significant, while ANCOVA tests these differences while controlling for the covariate "Familiar".

Table 14. Means of "Attitude_C" for "Framing_type"

Framing type	Mean	N	Std. Deviation
Cognitive	4,4833	58	,78839
Normative	4,1825	58	,63435
Pragmatic	4,2981	62	,93522
Regulative	4,2241	58	,77974
Total	4,2970	236	,79748

As shown in Table 15, an ANOVA was executed. In this analysis, only "Framing_type" and "Attitude_C" were taken into consideration. First, the Partial Eta Squared (η_p^2) was measured. According to Field (2009), a Partial Eta Squared of 0.2 indicates a small effect size, 0.5 a moderate effect size and 0.8 a large effect size. This model explains 2.1% ($\eta_p^2 = 0.021$) of the variance, which is less than a small effect size. The main effect of "Framing_type" on "Attitude_C" is not significant (F(236) = 1.628, p = .184). This indicates that there is no significant difference between the types of framing on "Attitude_C" when the covariate "Familiar" is not taken into consideration. Second, an ANCOVA was executed with "Familiar" as covariate (Table 16). This model explains 9.2% (η_p^2 = 0.092) of the variance, which means that the model explains the variance better when "Familiar" is

added as covariate, but is still less than a small effect size. The covariate "Familiar" is significant ($F(1, 231) = 18.21$, $p < .001$) and has a positive effect on "Attitude_C" ($\beta = ,134$) (Table 16, Table 17). This means that when people were already more familiar with GM food, they had a more positive attitude towards it. "Framing_type" is not significant ($F(3, 231) = 1.87$ $p = .136$). This means that when adjusted for "Familiar", there is still no significant difference between the four types of framing on "Attitude_C", therefore there is no Post Hoc analysis needed.

Table 15. Tests of Between-Subjects Effects (dependent variable = "Attitude_C")

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power
Corrected Model	3,081	3	1,027	1,628	,184	,021	4,883	,425
Intercept	4353,925	1	4353,925	6900,860	,000	,967	6900,860	1,000
Framing_type	3,081	3	1,027	1,628	,184	,021	4,883	,425
Error	146,375	232	,631					
Total	4507,051	236						
Corrected Total	149,455	235						

Table 16. Tests of Between-Subjects Effects (dependent variable = "Attitude_C", covariate = "Familiar")

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power
Corrected Model	13,778	4	3,445	5,865	,000	,092	23,458	,982
Intercept	673,395	1	673,395	1146,501	,000	,832	1146,501	1,000
Familiar	10,697	1	10,697	18,213	,000	,073	18,213	,989
Framing_type	3,289	3	1,096	1,867	,136	,024	5,600	,480
Error	135,677	231	,587					
Total	4507,051	236						
Corrected Total	149,455	235						

Table 17. Parameter estimates (dependent variable = "Attitude_C", covariate = "Familiar")

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Partial Eta Squared	Noncent. Parameter	Observed Power
					Lower Bound	Upper Bound			
Intercept	3,753	,149	25,124	,000	3,459	4,047	,732	25,124	1,000
Familiar	,134	,031	4,268	,000	,072	,196	,073	4,268	,989
Cognitive	,294	,143	2,061	,040	,013	,575	,018	2,061	,537
Normative	,007	,143	,048	,962	-,274	,288	,000	,048	,050
Pragmatic	,126	,141	,897	,371	-,151	,403	,003	,897	,145
Regulative	0[a]	.	.	.	.	.	.	.	.

Furthermore, The Estimated Marginal Means (EMM) have been measured (Table18). The EMM adjust for "Familiar" by reporting the means of "Attitude_C" for each level of the factor ("Framing_type") at the mean value of "Familiar" (= 3.26). All of their 95% confidence intervals overlap each other, which confirms that the different types of framing do not differ significantly in their effects on "Attitude_C". When adjusted for the covariate "Familiar", cognitive framing (n=58) results in the same mean "Attitude_C" as when the covariate is not taken into consideration (EMM = 4.48 vs. M = 4.48, SD = .79), pragmatic framing (n=62) increases slightly with 0.02 in its mean (EMM = 4.32 vs. M = 4.30, SD = .94), regulative framing (n=58) decreases slightly with 0.03 in its mean (EMM = 4.19 vs. M = 4.22, SD = .78) and normative framing (n=58) increases slightly with 0.02 in its mean (EMM = 4.20 vs. M = 4.18, SD = .63). Although no conclusions can be made since the differences in "Framing_type" are not significant, these outcomes indicate that regulative framing is the least effective type of framing when adjusted for "Familiar", instead of normative framing when "Familiar" is not taken into consideration.

Table 18. Estimated marginal means (Covariate in the model is evaluated at the following value: "Familiar" = 3,26.

Framing type	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Cognitive	4,484	,101	4,286	4,682
Normative	4,197[a]	,101	3,998	4,395
Pragmatic	4,316[a]	,097	4,124	4,508
Regulative	4,190[a]	,101	3,991	4,389

Furthermore, Table 19 shows the results of the question whether the opinion of respondents was affected due to the article they read. These outcomes indicate that most people's opinions were affected by pragmatic and cognitive framing (48.4%; 42.1%). Normative and regulative framing affected only 32.8% and 33.3% of the groups. Furthermore, a Spearman's rho (rs) test (Table 20) indicates that "Familiar" does positively correlate with "Attitude_C" (rs.= .197, p = .002). This means that when people are more familiar with GM foods, they have a more positive attitude towards genetically modified potatoes.

Table 19. Cross table of "Opinion_affected" and "Framing_type"

			Opinion_affected			
			Yes	No	I don't know	Total
Framing type	Cognitive	Count	24	28	5	57
		% within Framing type	42,1%	49,1%	8,8%	100,0%
	Normative	Count	19	30	9	58
		% within Framing type	32,8%	51,7%	15,5%	100,0%
	Pragmatic	Count	30	28	4	62
		% within Framing type	48,4%	45,2%	6,5%	100,0%
	Regulative	Count	19	31	7	57
		% within Framing type	33,3%	54,4%	12,3%	100,0%
Total		Count	92	117	25	234
		% within Framing type	39,3%	50,0%	10,7%	100,0%

Table 20. Spearman's rho correlations of "Attitude_C" and "Familiar"

			Attitude_C	Familiar
Spearman's rho	Attitude_C	Correlation Coefficient	1,000	,197**
		Sig. (2-tailed)	.	,002
		N	236	236
	Familiar	Correlation Coefficient	,197**	1,000
		Sig. (2-tailed)	,002	.
		N	236	236

**. Correlation is significant at the 0.01 level (2-tailed).

5. Discussion

The aim of this study was to contribute to existing literature by comparing the effects of framing (according to the four pillars of legitimacy) on individual attitudes towards GM food in the Netherlands. The four types of framing are normative, cognitive, pragmatic and regulative framing. An experiment with four different questionnaires was constructed to measure the effects of these types of framing on individual attitudes. Hypothesized was that regulative framing would have the least framing effect (H1), pragmatic framing would have the second least framing effect (H2), normative framing would have the second highest framing effect (H3) and cognitive framing would have the highest framing effect (H4). In this chapter, the interpretation of the results (including theoretical and practical implications), limitations, future directions and conclusions of this thesis are discussed.

5.1. Interpretation of results

The result of this thesis was that the differences in means of the individual attitudes between the four groups was not high enough to be significant. This was both the case when the familiarity of GM food of respondents was taken into consideration as when the familiarity was not taken into consideration. Since the framing effects did not significantly differ, H1, H2, H3 and H4 are all rejected. The reason behind this result may be that certain messages and information were sometimes the same in the different vignettes, even though the messages were formulated differently. This could indicate that when people read an article, they take most notice on the general message of the article and less notice about the formulation behind the message. Another explanation for this result could have to do with the theory of Chong and Druckman (2007), which is that attitudes are conceptualized as the 'weighted sums' of various 'considerations' applied to an issue. Therefore, the weighted sums of the considerations may be the same, but it could still be the case that the weights of the considerations are different between the four groups. Another reason why there was no difference between the groups may be that highly educated people were overpopulated in the sample. According to Hanssen et al. (2018), highly educated people seek more information about GM food, which could mean that they are more rational and don't believe everything stated in framed texts. When people were asked in the questionnaire about whether they thought they were influenced due to the article read, most people answered that they felt that they were most influenced by cognitive and pragmatic framing. This gives an indication that there could be a difference between the four framing effects, even though the difference is not high.

Theoretically, the outcomes of this thesis contribute to existing academic literature that framing according to the four pillars of legitimacy have no significant difference in their framing effects. However, there was a significant weak positive correlation between how familiar respondents already were with GM food and their individual attitude toward GM food. This indicates that the more knowledge people have about GM food, the more positive they are toward GM food. This confirms the

study of McPhetres et al. (2019), who stated that science and knowledge is an unique predictor of GM food. Also, it was found that the mean attitude toward GM food of women were less positive than the attitude of men as a result. Therefore, this research confirms several studies that women have a less positive attitude toward GM food than men in general (Chen, 2011; Moerbeek & Casimir, 2005; Maes et al., 2018). Practically, the results indicate that when trying to make the GM food industry more legitimate, it makes no difference in whether a text is normatively, cognitively, pragmatically or regulatory framed. However, when people are more familiar with GM food they have a more positive attitude, so it does make a difference to inform people about the topic. But one text might not be enough to change the attitude of an individual.

5.2. Limitations and directions for further research

This thesis has some important limitations that are relevant for future research. This thesis was based on the assumption that the framework "The four pillars of legitimacy" works to investigate its effect on the attitudes of individuals. The framework was actually meant to measure how an industry could be made more legitimate, and thus is about the whole society. Further research is needed to investigate whether the sum of the framing effects on individuals do make an industry more legitimate in the eyes of a whole society. Another limitation is that the generalizability of the results may be limited. The four groups consisted of 58 and 62 respondents, which is relatively low to draw conclusions for the whole population of the Netherlands. Also, the sample only represented the Dutch population of 18 to 30 year olds. Results could be different for other age categories. At the same time higher educated people were overrepresented and lower educated people underrepresented. It might be the case that differences between framing effects are lower among higher educated people than lower educated people. Therefore, it is recommended to replicate this study with a larger sample, which is representative of the Dutch population in terms of age and education, to see whether this gives other outcomes. Another limitation is that, although the vignettes were tested by preliminary research on their strength as perceived by the respondent, this may not have excluded the whole bias that the vignettes differ in their strengths. Also, the vignettes only focussed on GM potatoes and gave only a small insight in GM food, so they could give a limited generalization to GM food in its whole. This research could therefore be done over with other types of GM food and different vignettes to find out if this gives different results. Furthermore, the attitudes of individuals were measured as a whole. There has not been looked at the differences of the individual indicators of the attitudes between the four groups. More research is needed to investigate how the four ways of framing affect different considerations of attitudes.

5.3. Conclusion

The reason behind this study was because existing scientific research is mainly positive about GM food, while the Dutch population mainly had a negative attitude towards the topic. According to the literature regarding to this topic, framing could be the stimulus to affect the attitude of an individual. This is known as the framing effect. An experimental vignette study has been carried out among 236 Dutch respondents between 18 and 30 years old to study how four framing types (normative, cognitive, pragmatic and regulative framing) differ in their framing effects from each other. No significant results were found. Additional research will be required to investigate whether this outcome will also replicate under other circumstances.

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Appendix A – Template of the four questionnaires

Page 1:

Dear Sir/Madam,

For my graduation at Radboud University Nijmegen, I am researching the opinion of Dutch consumers about genetically modified foods. These are foods whose genetic properties have been altered through technology. I would like to hear your opinion on this. Knowledge on this topic is not necessary. I am looking for respondents between the ages of 18 and 30. Therefore, only complete this questionnaire if you are within this age category. Completing the questionnaire takes about 5 minutes. The data will be used exclusively for this research and will be used completely anonymously.

Thank you very much in advance for your cooperation!

Sincerely,

Krista Westervoort

Page 2:

1. When buying food, do you pay special attention to:

	Never	Almost never	Less than half the time	Half the time	More than half the time	Almost always	Always
A. ... the information on the food packaging? (think of ingredients, nutritional values etc.)	O	O	O	O	O	O	O
B. ... that the food is organic?	O	O	O	O	O	O	O
C. ... that the food is considered healthy?	O	O	O	O	O	O	O

2. How familiar are you with genetically modified food?

	1	2	3	4	5	6	7	
Not familiar	O	O	O	O	O	O	O	Completely familiar

Page 3:

Please read the following article about genetically modified potatoes carefully. After this text, a couple of questions will follow.

In this frame one of the four vignettes is shown (see Chapter 3.1.2. for the vignettes).

Page 4:

Please answer the following questions. Go to the previous page if you want to read the article again. Your progress will not be lost.

3. The application of genetic modification to potatoes ...

	1	2	3	4	5	6	7	
is not healthy	O	O	O	O	O	O	O	is very healthy
does not serve a good purpose	O	O	O	O	O	O	O	serves a good purpose
is not worrying	O	O	O	O	O	O	O	is very worrying
is not tampering with nature	O	O	O	O	O	O	O	is tampering with nature
is not necessary	O	O	O	O	O	O	O	is very necessary

4. To what extent do you agree with the following 8 statements:

	Completely disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Completely agree
4a. We can benefit greatly from the	O	O	O	O	O	O	O

application of genetic modification to potatoes.							
4b. The application of genetic modification to potatoes is morally irresponsible.	O	O	O	O	O	O	O
4c. The application of genetic modification to potatoes poses a great risk to society.	O	O	O	O	O	O	O
4d. We know the consequences of the application of genetic modification to potatoes.	O	O	O	O	O	O	O
	Completely disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Completely agree
4e. Companies mainly apply genetic modification to potatoes for the extra profit.	O	O	O	O	O	O	O
4f. If I know that potatoes are genetically modified, I don't buy them.	O	O	O	O	O	O	O
4g. There is a high risk of misuse when applying genetic modification to potatoes.	O	O	O	O	O	O	O
4h. I can decide for myself whether I	O	O	O	O	O	O	O

buy potatoes that have been produced through genetic modification.							

Page 5:

5. Do you feel that your opinion on genetically modified food has been influenced by the article you read at the beginning of this questionnaire?

- Yes
- No
- I don't know

6. What is your gender?

- Man
- Woman
- Other
- I don't want to tell

7. Wat is your age?

_____

8. What is your highest completed education?

- Primary education
- VMBO MAVO
- HAVO VWO MBO
- HBO of WO

- Other, namely: _____

Pagina 6:

This is the end of the questionnaire. Thank you for your contribution to my graduation research. If you want to be kept informed about the results of this research, please enter your email address here:

_____

Appendix B – Codes of variables and indicators

Table B1.

Codes of variables and indicators

Variable label	Indicators	Type
"Attitude"	1. "Healthy" 2. "Serves a good purpose" 3. "ConcernR" 4. "Tampering with natureR" 5. "Necessary" 6. "Benefit" 7. "UnethicalR" 8. "Risk for societyR" 9. "Knowledge_about_the_consequences" 10. "Used_for_profit_aloneR" 11. "ReluctanceR" 12. "Risk_for_misuseR" 13. "Control_over_the_consumption"	Scale: 1-7 (low to high)
"Attitude_C"	1. "Healthy" 2. "Serves a good purpose" 3. "ConcernR" 4. "Tampering with natureR" 5. "Necessary" 6. "Benefit" 7. "UnethicalR" 8. "Risk for societyR" 9. "Knowledge_about_the_consequences" 10. "Used_for_profit_aloneR" 11. "ReluctanceR" 12. "Risk_for_misuseR"	Scale: 1-7 (low to high)
"Awareness"	1. "Aware_info_label" 2. "Aware_bio" 3. "Aware_healthy"	Scale: 1-7 (low to high)
"Familiar"		Scale: 1-7 (low to high)
"Framing_type"	1. "Normative framing"	Fixed factor

	2. “Cognitive framing” 3. “Pragmatic framing” 4. “Regulative framing”	
“Opinion_affected”		Nominal: A. Yes B. No C. I don’t know
“Gender”		Nominal A. Man B. Woman C. Other D. I don’t want to tell:
“Age”		String
“Education”		Nominal: A. Primary education B. VMBO MAVO C. HAVO VWO MBO D. HBO of WO E. Other

Appendix C – Tables

Table C1.

Missing values

	N	Mean	Std. Deviation	Missing		No. of Extremes	
				Count	Percent	Low	High
Aware_info_label	236	3,42	1,623	0	,0	0	0
Aware_bio	235	2,46	1,272	1	,4	0	16
Aware_healthy	142	4,61	1,424	94	39,8	5	0
Healthy	236	4,23	1,279	0	,0	25	11
Serves_a_good_purpose	236	5,11	1,621	0	,0	11	0
ConcernR	235	4,47	1,391	1	,4	17	19
Tampering_with_natureR	236	3,39	1,724	0	,0	0	0
Necessary	234	4,31	1,448	2	,8	0	0
Benefit	234	5,26	1,425	2	,8	25	0
UnethicalR	235	4,68	1,392	1	,4	2	0
Risk_for_societyR	235	4,46	1,445	1	,4	0	0
Knowledge_about_the_consequences	235	3,40	1,378	1	,4	0	7
Used_for_profit_aloneR	235	3,20	1,310	1	,4	0	3
ReluctanceR	235	5,24	1,412	1	,4	3	0
Risk_for_misuseR	234	3,82	1,336	2	,8	4	31
Control_over_the_consumption	234	4,65	1,538	2	,8	5	0
Familiar	236			0	,0		
Opinion_affected	234			2	,8		
Gender	235			1	,4		
Age	235			1	,4		
Education	235			1	,4		

Table C2.

Reliability statistics of "Awareness"

Cronbach's Alpha	N of Items
,679	3

Table C3.

Item-Total Statistics of "Awareness"

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Aware_info_label	7,05	4,629	,540	,532
Aware_bio	8,13	7,289	,422	,674
Aware_healthy	5,96	5,609	,547	,512

Table C4.

Residuals of gender (based on Dutch population of p = .497 men; p = 503 women)

	Observed N	Expected N	Residual
Men	123	116,8	6,2
Women	112	118,2	-6,2
Total	235		

Table C5.

Chi-square test of "Gender"

	Gender
Chi-Square	,655[a]
df	1
Asymp. Sig.	,418

Table C6.

"Age" descriptives

N	Valid	235
	Missing	1
Mean		23,95
Median		24,00
Mode		22
Std. Deviation		2,747
Skewness		,240
Std. Error of Skewness		,159
Kurtosis		-,460
Std. Error of Kurtosis		,316
Minimum		18
Maximum		30

Table C7.

Tests of Between-Subjects Effects (dependent variable = "Familiar")

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[b]
Corrected Model	5,537[a]	3	1,846	,718	,542	,009	2,155	,202
Intercept	2513,742	1	2513,742	978,217	,000	,808	978,217	1,000
Framing_type	5,537	3	1,846	,718	,542	,009	2,155	,202
Error	596,175	232	2,570					
Total	3114,000	236						
Corrected Total	601,712	235						

Table C8.

Tests of Between-Subjects Effects (dependent variable = "Attitude_C")

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[b]
Corrected Model	15,824[a]	7	2,261	3,857	,001	,106	27,000	,980
Intercept	663,363	1	663,363	1131,824	,000	,832	1131,824	1,000
Framing_type	2,275	3	,758	1,294	,277	,017	3,882	,343
Familiar	10,714	1	10,714	18,281	,000	,074	18,281	,989
Framing_type * Familiar	2,046	3	,682	1,164	,324	,015	3,492	,311
Error	133,631	228	,586					
Total	4507,051	236						
Corrected Total	149,455	235						

Table C9.

Levene's Test of Equality of Error

Variances (dependent variable = "Attitude_C")

F	df1	df2	Sig.
1,865	3	232	,136

Table C10.

Spearman's rho correlations of the indicators of "Attitude"

		Healthy	Serves_a_good_purpose	ConcernR	Tampering_with_natureR	Necessary	Benefit	UnethicalR	Risk_for_societyR	Knowledge_about_the_consequences	Used_for_profit_aloneR	ReluctanceR	Risk_for_misuseR	Control_over_the_consumption
Healthy	Correlation Coefficient	1,000	,514**	,219**	,154*	,387**	,368**	,286**	,246**	,186**	,130*	,262**	,110	-,031
	Sig. (2-tailed)	.	,000	,001	,018	,000	,000	,000	,000	,004	,047	,000	,094	,637
	N	236	236	235	236	234	234	235	235	235	235	235	234	234
Serves_a_good_purpose	Correlation Coefficient	,514**	1,000	,315**	-,124	,349**	,442**	,260**	,242**	,160*	,102	,328**	,117	,037
	Sig. (2-tailed)	,000	.	,000	,057	,000	,000	,000	,000	,014	,117	,000	,075	,575
	N	236	236	235	236	234	234	235	235	235	235	235	234	234
ConcernR	Correlation Coefficient	,219**	,315**	1,000	,322**	,224**	,236**	,357**	,365**	,206**	,206**	,374**	,295**	,100
	Sig. (2-tailed)	,001	,000	.	,000	,001	,000	,000	,000	,002	,002	,000	,000	,130
	N	235	235	235	235	233	233	234	234	234	234	234	233	233
Tampering_with_natureR	Correlation Coefficient	,154*	-,124	,322**	1,000	,185**	,069	,373**	,319**	,230**	,220**	,300**	,351**	-,023
	Sig. (2-tailed)	,018	,057	,000	.	,005	,296	,000	,000	,000	,001	,000	,000	,732
	N	236	236	235	236	234	234	235	235	235	235	235	234	234
Necessary	Correlation Coefficient	,387**	,349**	,224**	,185**	1,000	,323**	,264**	,155*	,236**	,185**	,239**	,198**	-,118
	Sig. (2-tailed)	,000	,000	,001	,005	.	,000	,000	,018	,000	,005	,000	,002	,073

	N	234	234	233	234	234	232	233	233	233	233	233	232	232
Benefit	Correlation Coefficient	,368**	,442**	,236**	,069	,323**	1,000	,398**	,310**	,098	,041	,417**	,170**	,052
	Sig. (2-tailed)	,000	,000	,000	,296	,000	.	,000	,000	,137	,537	,000	,009	,426
	N	234	234	233	234	232	234	234	234	234	234	234	233	233
UnethicalR	Correlation Coefficient	,286**	,260**	,357**	,373**	,264**	,398**	1,000	,587**	,336**	,282**	,516**	,384**	,002
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	.	,000	,000	,000	,000	,000	,979
	N	235	235	234	235	233	234	235	235	235	235	235	234	234
Risk_for_societyR	Correlation Coefficient	,246**	,242**	,365**	,319**	,155*	,310**	,587**	1,000	,217**	,222**	,459**	,391**	,007
	Sig. (2-tailed)	,000	,000	,000	,000	,018	,000	,000	.	,001	,001	,000	,000	,914
	N	235	235	234	235	233	234	235	235	235	235	235	234	234
Knowledge_about_the_consequences	Correlation Coefficient	,186**	,160*	,206**	,230**	,236**	,098	,336**	,217**	1,000	,126	,286**	,272**	,038
	Sig. (2-tailed)	,004	,014	,002	,000	,000	,137	,000	,001	.	,054	,000	,000	,559
	N	235	235	234	235	233	234	235	235	235	235	235	234	234
Used_for_profit_aloneR	Correlation Coefficient	,130*	,102	,206**	,220**	,185**	,041	,282**	,222**	,126	1,000	,107	,286**	,028
	Sig. (2-tailed)	,047	,117	,002	,001	,005	,537	,000	,001	,054	.	,101	,000	,672
	N	235	235	234	235	233	234	235	235	235	235	235	234	234
ReluctanceR	Correlation Coefficient	,262**	,328**	,374**	,300**	,239**	,417**	,516**	,459**	,286**	,107	1,000	,328**	-,134*
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000	,000	,000	,000	,101	.	,000	,040
	N	235	235	234	235	233	234	235	235	235	235	235	234	234

Risk_for_misuseR	Correlation Coefficient	,110	,117	,295**	,351**	,198**	,170**	,384**	,391**	,272**	,286**	,328**	1,000	,026
	Sig. (2-tailed)	,094	,075	,000	,000	,002	,009	,000	,000	,000	,000	,000	.	,694
	N	234	234	233	234	232	233	234	234	234	234	234	234	233
Control_over_the_consumption	Correlation Coefficient	-,031	,037	,100	-,023	-,118	,052	,002	,007	,038	,028	-,134*	,026	1,000
	Sig. (2-tailed)	,637	,575	,130	,732	,073	,426	,979	,914	,559	,672	,040	,694	.
	N	234	234	233	234	232	233	234	234	234	234	234	233	234

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).