

**IT IS ALL ABOUT TASTE: THE CRUCIAL
FACTOR FOR THE STIMULATION OF
HEALTHY FOOD CONSUMPTION**

The effect of fluency on consumers' implicit intuitions about food

Master's Thesis in Marketing

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The stimulation of healthy food consumption

To which extent could fluency affect the three implicit intuitions of taste, fillingness and expensiveness regarding food?

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I declare that this thesis is an original work, written exclusively by me. When I have obtained information and ideas of other sources, I explicitly mentioned this in the text.

Preface

Welcome,

This thesis is written for the completion of the Master in Business Administration, with a specialization in Marketing, at the Radboud University Nijmegen. After working hard for months, I can proudly present my master thesis to all of you. Writing this master thesis has not only improved my academic skills, but also prepared me as a future marketer.

The interest to research if marketers could contribute to the stimulation of healthy food consumption was already present before the first meeting. Every day, I am confronted with the emerging trend of a healthy lifestyle. This trend confronts consumers more and more with their own diet-patterns. At the same time, the supply of healthy foods and healthy substitutes for unhealthy foods largely increased. This makes me wonder how it is possible that many consumers still seem to prefer unhealthy food over healthy food. This intrigues me to study the domain of food consumption and to obtain knowledge about the triggers that determine food decisions.

In special, I would like to thank Dr. N.V.T. Belei for her intensive support while writing this master thesis. She helped me a lot with finding an interesting subject in the domain of food consumption and helped me to guarantee the quality of my thesis. Additionally, I would like to thank Dr. C. Horváth for her time and effort in reading my thesis. Furthermore, I would like to thank all the respondents for their participation in my study. Lastly, I would like to thank my family and friends for all their support and help.

Enjoy reading my master thesis!

Kind regards,

Caro Willems

Nijmegen, 16 June 2017

Abstract

The problems of obesity and diet-related diseases are still growing and, due to its high burden on society, the need for a solution is more urgent than ever. Major progress could be achieved by increasing the consumption of healthy food and reducing the consumption of unhealthy food. However, prior research has shown that healthy food is perceived as less tasty, less filling and more expensive compared to unhealthy food. This is detrimental for the stimulation of healthy food consumption, and therefore healthy food should be made more attractive in terms of its tastiness, fillingness and expensiveness.

The concept of metacognitive difficulty could be a useful method to achieve this desired effect, and as such the goal of this study was to examine to which extent fluency could affect the three implicit intuitions (tastiness, fillingness, and expensiveness) regarding food. It was expected that the implicit intuitions would be in favor of unhealthy food when the nutrition information was presented in a fluent manner, whereas a disfluent presentation would mitigate the strength of these implicit intuitions. Consequently, a disfluent presentation of the nutrition information of food could be used to stimulate the consumption of healthy food and impede the consumption of unhealthy food.

The results of this study demonstrate that disfluency indeed could be a useful tool to influence the implicit intuitions about food. A disfluent presentation of the nutrition information mitigated the strength of the implicit intuitions that unhealthy food is tastier than healthy food and that unhealthy food is more filling than healthy food. For the implicit intuition of expensiveness, no difference was found between healthy and unhealthy food in both the fluent and disfluent condition. Furthermore, the effect of the implicit intuitions on the desire to eat and the purchase intention has been examined to understand the decision-making process behind food consumption. Taste is the crucial factor that influences food decisions when it comes to the desire to eat and purchase intentions.

Thus, improving the perceived tastiness of healthy food would be most effective to stimulate the consumption of healthy food, something that can be achieved by presenting nutrition information in a disfluent way.

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Chapter 1: Introduction

A central question in the marketing discipline addresses the role of marketing in the stimulation of healthy food consumption. The necessity to change food consumption is the result of an increase in diet-related diseases such as obesity and diabetes (Haws & Winterich, 2013; Marteau, Hollands & Fletcher, 2012). These diseases have developed into a serious global health issue (Orehek & Vazeou-Nieuwenhuis, 2016). Public policy makers aim to restrain people from these diseases by stimulating healthier lifestyles for people. Therefore it is crucial to change food consumption patterns of consumers. However, it turns out to be tough to transform these health concerns into real actions that help to the stimulation of healthy food consumption (Mai, Hoffmann, Hoppert, Schwarz & Rohm, 2014). Marketers could fulfill a pivotal role in tackling diet-related health problems by stimulating healthy food consumption. However, marketers could also impede the transformation process of healthy concerns into real action, because they just try to sell their products irrespectively if their product is healthy or not. Nevertheless, the decisions that consumers make about food consumption are interesting for marketers, because they could play an essential role in the diet pattern of people and therefore could contribute to the solution of the diet-related diseases.

Major facilitators of diet-related diseases are the quality and quantity of food that people consume (Orehek & Vazeou-Nieuwenhuis, 2016). The quantity of food refers to the amount of calories that people consume, and mostly depends on the estimation of the amount of calories in food (Larkin & Martin, 2016). An underestimation of the caloric content of food results in overeating, which contributes to overweight and therefore increases diet-related diseases (Larkin & Martin, 2016). The quality of food is described as ‘a bundle of attributes that determine the performance of one food’ (Caswell & Mojduszka, 1996, p.1). The perception of quality of food is captured in categories that consumers give to food and drinks in terms of healthy and unhealthy food (Larkin & Martin, 2016). These labels are linked to thoughts and beliefs that are in favor of unhealthy foods. This also increases the chance of eating unhealthy food instead of healthy food (Raghunathan, Naylor & Hoyer, 2006; Suher, Raghunathan & Hoyer, 2005).

Previous research has already accentuated the role of rational cognitive processes in diet-related choices (Mai et al., 2014). The most commonly used explanation for diet-related diseases in the rational processes is the underestimation of the caloric content of unhealthy food (Larkin & Martin, 2016). The focus on the rational processes was based on the fact that people believed that these cognitive processes were shaping food preferences (Anderson,

Winett & Wojcik, 2000; Mai et al., 2014; Mai & Hoffmann, 2012). However, recently it has been proven that just the unconscious associations of food (implicit intuitions) formalize the rational cognitive processes and therefore also dominate consumer's food preferences (Mai et al., 2014; Raghunathan, et al., 2006; Suher et al., 2015). So, solely focusing on the rational cognitive processes will not result in extraordinary actions towards a healthier diet (Mai et al., 2014). In contrast to previous studies, this paper will respond to this new insight and will consider the effect of the implicit intuitions on food consumptions. This study is in line with more recent studies towards food consumption, which emphasize the importance of a more deeply understanding of the implicit intuitions about food. By addressing these implicit processes, marketers and the public policy could enhance the success of positively modifying consumers' food consumption patterns (Mai et al., 2014).

In this paper, the focus will be aimed at three intuitions people subscribe to, with respect to selecting foods. First, consumers perceive unhealthy food as tastier than healthy foods and thereby implying that consumers get the feeling they have to choose for either healthiness or the delight of foods (Magee & Hennessy-Priest, 2014; Raghunathan et al., 2006). This choice is detrimental for the stimulation of healthy food consumption, because taste is perceived as the most important factor that influences food choices (Glanz, Basil, Maibach, Goldberg & Snyder, 1998; Lennernäs et al., 1997) Second, Suher et al. (2015) argue, that people implicitly belief that healthy food is less filling compared to unhealthy food. This means that people feel less saturated after eating healthy food, which is also negative for the stimulation of a healthy diet. Finally, people believe that healthy food is more expensive than unhealthy food (Rao, Afshin, Singh & Mozaffarian, 2013). So, people implicitly presume that healthy food is less tasty, less filling and more expensive compared to unhealthy food. The favorable implicit intuitions about unhealthy food result in a lower chance of consuming healthy food. Therefore, it is essential to modify the earlier mentioned implicit intuitions about food, in order to stimulate healthy food and therefore reduce diet-related diseases.

Marketers could fulfill a key role in the stimulation of healthy food consumption. However, one major problem is that people do not like to be marketed at all (Fournier, 1998). As soon as people get the feeling something is sold to them, they resist against the stimulus. Current marketing strategies often explicitly try to convince consumers to change their diet pattern, which could results in a contrasting and unfavorable attitude of consumers towards a more healthy diet (Laran, Dalton & Andrade, 2011). So, getting consumers engaged on a subtler field would be more effective to reduce the resistance against marketing actions and

ultimately improves the effectiveness of stimulating healthy food (Knowles & Linn, 2004; Laran et al., 2011).

A more subtle way to interrupt the three intuitions of consumers about food could be achieved by relying on metacognitive difficulty. Metacognitive difficulty, which involves active control and thinking over intuitions, influences the way in which people process information and activates analytical processing of information (Alter, Oppenheimer, Epley & Eyre, 2007; Livingston, 1997). In general, people could use two different information-processing styles. The first information processing style consists of quick, intuitive and effortless thinking, whereas the second information processing style is a slow and analytical way of thinking (Alter et al., 2007). The first information processing style will be activated when the nutrition information is easy-to-process (fluent) and leads to the feeling of a valid intuition, whereas the second information processing style will be activated when information is difficult-to-process (disfluent). When people are exposed to a fluent presentation of the nutrition information (easy-to-read), they would not reconsider their intuitions, and thus not change their mind about food as well. In contrast, when people are exposed to a disfluent presentation of nutrition information (difficult-to-read), it will be harder to process the information, which leads to a reconsideration and possible correction of their intuitions (Alter et al., 2007). Therefore, metacognitive difficulty could be a useful manner to subtly modify the implicit intuitions about food.

This paper wants to advance the knowledge concerning the effect of the unconscious intuitions of food on consumer's food decisions. Therefore, this paper contributes to the literature exploring the effect of implicit intuitions on food choices (Haws, Reczek & Sample, 2016; Haws & Winterich, 2013; Mai et al., 2014; Raghunathan et al., 2006; Suher, et al., 2015). Moreover, this study will differ from earlier studies, because it aims to alter the implicit intuitions in favor of healthy foods, whereas prior studies just focused on the effect of the implicit intuitions on food decisions (Mai et al., 2014; Raghunathan, et al., 2006; Suher et al., 2015).

Thus, in this paper, it will be examined if marketers could use disfluent nutrition information as a more subtle way of influencing food consumption. The goal of this paper is to theoretically conceptualize and demonstrate that the use of a disfluent presentation of healthy food will interrupt consumers' implicit intuitions about food and therefore could contribute to the stimulation of healthy food consumption. The main research question that fits with the goal of this paper is the following: 'To which extent could fluency affect the three implicit intuitions of taste, fillingness and expensiveness regarding food?' The

expectation is that disfluency will, at least, weaken the strength of the three implicit intuitions about food. This means that disfluency will lead to a more a favorable implicit intuition regarding healthy food and to a less beneficial intuition of unhealthy food. This research offers marketers theoretical insights for altering implicit intuitions in the favor of healthy foods. The following sub questions were designed to answer the research question:

RQ₁: How is the ‘healthy-is-less-tasty’ intuition established?

RQ₂: How is the ‘healthy-is-less-filling’ intuition established?

RQ₃: How is the ‘healthy-is-expensive’ intuition established?

RQ₄: How can fluency positively affect the three implicit intuitions of people about healthy food?

RQ₅: How do food perceptions affect intentional food consumption of consumers?

In the next section, this paper will start with reviewing the literature regarding the categories healthy/unhealthy food, consumers’ implicit intuitions about healthy food and the metacognitive difficulty theory. Furthermore, a theoretical framework will be developed to test the different hypotheses. Subsequently, the methodology for data collection is described. Furthermore, the results of the hypotheses will be presented and discussed. Finally, the limitations of this study and directions for further research will be considered and highlighted. The results of this study may facilitate marketers to stimulate healthy food consumption.

Chapter 2: Literature review

In this chapter, it will be outlined how consumers generally categorize food in terms of its healthiness. Thereafter, the literature about the three implicit intuitions about food and the principles of the metacognitive difficulty will be reviewed. Finally, the hypotheses and a conceptual model will be composed and form the expected outcomes of the main paper.

2.1 Categorization of food as healthy or unhealthy

Consumers unconsciously tend to classify food in terms of the degree of healthiness of food (Chernev & Gal, 2010). According to the degree in which foods are healthy, people categorize food based on the good/bad dichotomy of virtues and vices (Chernev & Gal, 2010; Rozin, Ashmore & Markwith, 1996). The good/bad dichotomy refers to the supposition that foods are either good or bad and it presumes that people categorize food in one of both. Virtues are options, which are mainly related to the good side of the dichotomy, and therefore they can be seen as healthier foods, like fruits and vegetables (Chernev & Gal, 2010). In contrast, vices are related to the bad side of the dichotomy and can be seen as the more unhealthy foods, like hamburgers and pizzas (Chernev & Gal, 2010). Suppose that someone would like to eat a hamburger on short-term, but would like to eat healthy on longer term. Virtues are then linked to compliance with the long-term goal of the desire to eat healthy. However, the short-term goal is then not satisfied, because people resist the desire to eat unhealthy and therefore they attempt to resist the desire to eat the hamburger. On the other hand, vices are linked to the immediate desire to eat the hamburger and that is why they are coherent with the short-term goal instead of the long-term goal. In summary, virtues are in line with the long-term goal (eat healthy) but do not necessarily offer immediate satisfaction of the short-term goal. Vices, on the other hand, are consistent with the short-term goal (eating a hamburger) of quick satisfaction and inconsistent with the long-term goal (Chernev & Gal, 2010). This means that virtues are correlated to the choice for healthy food and vices are associated with the unhealthy food options.

However, not all foods can be categorized into either healthy or unhealthy. Some foods are ambidextrous, which means that they can be both good and bad (Chernev & Gal, 2010). This often depends on how consumers compare healthy food with several other options. For example, low-fat yogurt could be a virtue compared to high-fat yogurt and a vice compared to fat-free yogurt. It can be said that, although the general principle of categorizing food into either vices or virtues is common among consumers, the categorization process is

mainly based on the decision-making context and the individual characteristics of the consumer (Chernev & Gal, 2010).

2.2 The ‘unhealthy-is-tasty’ intuition

Raghunathan et al. (2006) have shown a negative relationship between the healthiness and the tastiness of food. Consumers likely perceive unhealthy food as more tasty and attractive compared to healthy foods (Raghunathan et al., 2006). This implies that people perceive unhealthy food as tasty, hereafter called the ‘unhealthy-is-tasty’ intuition. This intuition could deliver a significant contribution to diet-related diseases, because it raises the chance that people will overeat unhealthy food, because consumers expect that unhealthy food taste better (Raghunathan et al., 2006). This also leads to the misbelief of consumers that they need to eat unhealthy to eat tasty. Furthermore, the results of Raghunathan et al. (2006) show that the healthiness of food is less important than the tastiness of food. In addition, Verbeke (2006) has mentioned that consumers are resistant to compromise on flavor even if they are aware of the benefits to their healthiness. This implicit belief makes it complex to promote healthy food. Furthermore, people perceive tasty food as enjoyable, and therefore they get the feeling, they need to make a choice between the healthiness and the joy of food (Magee & Hennessy-Priest, 2014). This could also result in a lower chance of healthy food consumption. Moreover, unhealthy food is perceived as less expensive compared to healthy food, which stimulates the consumption of unhealthy food even more (Hughner, McDonagh, Prothero, Schultz & Stanton, 2007).

In summary, consumers perceive healthy food as less tasty, and therefore less enjoyable, which results in a lower willingness to consume healthy food (Magee & Hennessy-Priest, 2014; Raghunathan et al., 2006).

2.3 The ‘healthy-is-less-filling’ intuition

Next, consumers intuitively perceive healthy food as less filling than unhealthy food, hereafter called the ‘healthy-is-less-filling’ intuition (Suher et al., 2015). The fillingness of food is related to a subjective perception of people concerning the gratification of hunger levels (Oakes, 2006).

Suher et al. (2015) have mentioned that there is a negative relationship between the fillingness and the healthiness of food. This negative relationship has two main sources. The first source is linked to ideas that people have when they think about healthy and unhealthy food, also called exemplar generation (Suher et al., 2015). An example of exemplar

generation is the association of healthy foods with products like lettuce and vegetables and the association of unhealthy food with products like fries and pizzas. The consequence of exemplar generation is that people suppose that healthy food is less filling than unhealthy food. The standard generated examples of both food categories are becoming implicit over time, which means that people unconsciously are going to associate a certain food as either healthy or unhealthy. Earlier experiences with the consumption of both healthy and unhealthy food are the second source of the negative relationship between satiation and healthiness of food (Suher et al., 2015). Consumer experiences in the past (such as the taste and portion size of a product) have unintentionally influenced the belief that healthy food is less filling and therefore hamper the stimulation of healthy food consumption (Suher et al., 2015; Wansink, 2006).

The consequence of the ‘healthy-is-less-filling’ intuition is that people believe that they need to eat larger quantities of food in order to feel the same level of satiation. This means that larger portions of healthy food will be consumed. This is in essence a good thing, because it helps to eat more healthy food. However, it could be detrimental for the favorability of healthy food, because consumers are reporting higher hunger levels and therefore they are not satisfied when they consumed healthy food. Especially when consumers feel they need to eat more, to achieve the same level of satiation as unhealthy food, the expensiveness of healthy food could also form a barrier to consume healthy food (Page-Reeves, Mishra, Niforatos, Regino & Bulten, 2013; Stolberg, 2010).

In summary, consumers unconsciously assume that healthy food is less filling (Suher et al., 2015). Furthermore, people report increased hunger levels when they consumed healthy food. This implies that larger amounts need to be consumed in order to achieve the same level of satiation as in unhealthy food consuming.

2.4 The ‘healthy-is-expensive’ intuition

The current belief of consumers is that healthy food is more expensive compared to unhealthy food, also called the ‘healthy-is-expensive’ intuition (Dale & Söderhamn, 2015; Nikolaou, Hankey & Lean, 2015; Page-Reeves et al., 2013; Stolberg, 2010). However, this intuition is accurate in some cases, but definitely not for all, which leads to the tendency to overgeneralize the ‘healthy-is-expensive’ intuition to contexts and products where it is not objectively true (Haws et al., 2016). Furthermore, consumers are frequently exposed to value based pricing of unhealthy foods, which makes these specific examples of cheap and unhealthy food more salient (Haws & Winterich, 2013). The study of Page-Reeves et al.

(2013) has also demonstrated that the costs of healthy food could form a barrier to the actual consumption of healthy food. This is one of the hurdles marketers have to get over, in order to make healthy food more favorable. Moreover, it was shown that income is an impediment to buy healthy food. Students are for example hindered in consuming healthy food by their budget. They implicitly assume that unhealthy food is cheaper and that it is mostly offered at a discounted price, in contrast to healthy food (Nikolaou, et al., 2015). But, the perception of a high price is not in every country the main reason to buy no healthy food. Also, poor food access could be an important reason that people are not able to obtain food (Lee, 2002). However, in this study, there will be expected that poor food access will not be a problem in the Netherlands, because there are a lot of local groceries and supermarkets in every city (CBL, 2017).

Story, Kaphingst, Robinson-O'Brien & Glanz (2008) have demonstrated that a price reduction of healthy food will increase the actual consumption by almost eight per cent. So, lower perceived costs of healthy food are an incentive for eating healthy food. The consumption of healthy food is tempered by the income that consumers earn (Page-Reeves et al., 2013). For consumers with a low-income, it has been shown that 'healthy-is-expensive' intuition will be more salient and therefore it could limit them to purchase healthy food compared to consumers with a high-income. Consumers with a low income need to consider their expenses carefully. Since unhealthy food is seen as more affordable than healthy food, low-income consumers prefer to buy unhealthy food. Therefore, low-income families relatively spend less money to healthy food in comparison to high-income families (Story et al., 2008). So, income causes inequalities in the affordability to buy healthy food.

In summary, consumers perceive healthy food as more expensive, and this intuition will be more salient for consumers with a low income, because they can afford to consume healthy food to a lesser extent.

2.5 The effect of fluency on the three implicit intuitions

This paper aims to subtly influence consumer's perceptions about healthy food. All the above-mentioned intuitions are operating at an implicit level (Raghunathan et al., 2006). However, all these intuitions are in favor of unhealthy food and therefore not for the benefit of stimulating healthy food. Nevertheless, the three dominant intuitions people subscribe to, with respect to selecting food, have to become more favorable towards healthy food. So, it is crucial to identify tactics that operate at an implicit level and affect the unconscious intuitions of food (Suher et al., 2015). This study tries to alter these intuitions by relying on the

principles of metacognitive difficulty. Metacognitive difficulty refers to analytical thinking about intuitions and can be activated by stimulating the systematic reasoning processing style (Livingston, 1997).

Divergence in decisions depends on the adoption of two different mental experiences and metacognitive difficulty influences the activation of mental experiences. First, the intuitive processing style will be adopted when people can process information about food easily (fluent). In the intuitive processing style, information will be processed in a very fast, associative and intuitive way, without a lot of effort. Second, the systematic processing style will be activated when people can hardly process information (disfluent). In the systematic processing style, information will be processed in a slow, analytic and deliberate way, with a lot of mental effort. Errors could occur in the intuitive processing style, due to a lack of mental effort and a quick response. However, these errors are less likely to be corrected by the system itself. In contrast, the systematic system style could interrupt the intuitions of people and therefore override or undo the effect of intuitive reasoning systems (Alter et al., 2007). So, disfluency triggers a kind of an alarm in the mind of the consumers that encourages them to reconsider their intuitions and to adopt a systematic approach to process information (Alter et al., 2007). This systematic processing style thus needs to be activated in order to let consumers reconsider their implicit intuitions about healthy food and alter them in a more positive way than they did before. This could be achieved by making the nutrition information difficult-to-process.

Prior studies already have proven that disfluency is an effective way to alter the implicit intuitions of consumers. Gomez, Werle & Corneille (2015) already have proven that fluency of nutrition information affects purchase intentions of consumers. In addition, Alter et al. (2007) have shown that disfluency promotes analytical reasoning and therefore prevents negative outcomes, associated with intuitive reasoning. For example, the ‘healthy-is-less-filling’ intuition is initially in favor of unhealthy food. The disfluent food description must weaken the strength of this intuition and need to give the anticipated feeling of being more filled and satiated after the exposure to the disfluent food description. Disfluency thus could decrease the chance that consumers only base their decisions on their initial intuitions. Furthermore, the manipulation of readability of nutrition information (e.g. disfluency) reduces the chance that intuitions of a consumer are being confirmed as well, which also reduces the strength of the intuitions (Hernandez & Preston, 2013). Therefore, disfluency of the nutrition information is seen as a useful method to alter the intuitions of consumers.

In summary, metacognitive difficulty (activated by disfluency) is expected to interrupt the implicit intuitions about healthy food by encouraging consumers to reconsider their initial intuitions about food. When nutrition information is easy-to-process, consumers will reason from the intuitive processing style and see their initial intuitions as valid. By giving consumers the experience that information about food is difficult-to-process, consumers will activate the systematic processing style and reconsider their initial implicit intuitions. This will hopefully result in a revision of the initial intuitions and therefore in a mitigation of the strength of these implicit intuitions. So, disfluency of nutrition information is seen as an effective tactic to interrupt the intuitions of consumers regarding food.

2.6 The effect of the three implicit intuitions on food consumption decisions

The question remains whether the three implicit intuitions influence food consumption decisions. Consumers need to deal with multiple objectives, which are mostly conflicting, when they have to make choices about food consumption (Haws & Winterich, 2013). For example, if consumers would like to eat healthy, they have the feeling that they have to compromise on taste (Verbeke, 2006). So, consumers perceive a need to make considerations between the healthiness of food and the tastiness, fillingness and expensiveness of food (Haws et al., 2016; Raghunathan et al., 2006; Suher et al., 2015). Additionally, the unconscious associations of food (implicit intuitions) dominate consumer's food decisions (Mai et al., 2014). However, it is still not clear how the three intuitions jointly affect food decisions. Therefore, the desire to eat and the purchase intention, both being a food decision, have been added to this study to examine how the intuitions jointly affect these food decisions (Gomez et al., 2015; Raghunathan et al., 2006).

2.7 Hypotheses

In short, earlier studies have demonstrated the three implicit intuitions that people have about healthy food. The first implicit intuition is the 'unhealthy-is-tasty' intuition. This intuition implies that healthy food intuitively is perceived as less tasty than unhealthy food and thereby implying that healthy food also is intuitively perceived as less enjoyable (Raghunathan et al., 2006). The second implicit intuition is the 'healthy-is-less-filling' intuition (Suher et al., 2015). Healthy food is intuitively perceived as less filling than unhealthy food, and therefore consumers get the feeling that they need to eat more in order to feel as equally full. At last, the third implicit intuition about healthy food is the 'healthy-is-expensive' intuition. This intuition says that healthy food intuitively is seen as more expensive than unhealthy food.

This intuition is more salient for people with a lower-income and therefore affects the healthy food choice of people even more (Page-Reeves et al., 2013).

The contribution of this paper, to the current literature about food consumption is the investigation of the effect of fluency on the three implicit intuitions about food. In the case of a fluent description of food, it will be expected that people perceive their implicit intuitions as right and thereby the implicit intuitions automatically form the food decision-making process (Alter et al., 2007). However, the three implicit intuitions about food could be interrupted by a disfluent presentation of the nutrition information. In the case of disfluent description of food, it will be expected that people reconsider their implicit intuitions and hopefully weaken their implicit perceptions. (Alter et al., 2007). This implies that the three implicit intuitions about healthy food will have a more beneficial effect on food perceptions and therefore also on the desire to eat and purchase healthy food. Hypotheses have been formulated, in order to examine the effect of fluency on the three implicit intuitions about healthy food. The expected results are summarized in Table 1.

Hypothesis 1: Fluent descriptions of (un) healthy food result in consumers perceiving the food as:

- (A) Less (more) tasty relative to unhealthy (healthy) food
- (B) Less (more) filling relative to unhealthy (healthy) food
- (C) (In)expensive relative to unhealthy (healthy) food; this intuition is expected to be more salient for consumers with a low income

Hypothesis 2: Disfluent descriptions of unhealthy/healthy food mitigate the strength of the three implicit intuitions compared to the fluent description of food.

	Healthy food		Unhealthy food	
Fluency	Tastiness:	-	Tastiness:	+
	Fillingness:	-	Fillingness:	+
	Expensiveness	+	Expensiveness	-
Disfluency	Tastiness:	+	Tastiness:	-
	Fillingness:	+	Fillingness:	-
	Expensiveness	-	Expensiveness	+

Table 1: Expected effect of fluency on food intuitions

Nevertheless, in the end, the effect of food perceptions on food decisions of the consumers needs to be investigated. It will be expected that when people perceive that one food taste better, is more filling and is less expensive, the chance of buying and the desire to consume that certain food increase (Raghunathan et al., 2006). In addition Gomez et al. (2015) have shown that labeling type (easy-to-read versus difficult-to-read) also affects purchase intentions. If a certain food label is perceived as easy-to-read, the purchase intention also increases. Thus, besides an indirect effect of the three implicit intuitions on the desire to eat and purchase intentions, there is also expected a direct effect of fluency on purchase intentions. Furthermore, it will be expected that the desire to eat certain food and the purchase intention, will positively affect each other. If someone would have a great desire to eat, the chance of buying that product will raise. On the other hand, if someone buys a product, the chance of the desire to consume the product probably will increase as well. This leads to the following hypotheses:

Hypothesis 3: If people perceive food as tasty, filling and inexpensive this will positively affect the:

- (a) Desire to eat
- (b) Purchase intention

Hypothesis 4: A fluent description of food will positively affect purchase intentions

Hypothesis 5: The desire to eat and purchase intentions will positively affect each other

2.8 Conceptual model

Now the literature has been reviewed and the hypotheses are formalized, the conceptual model shown in Figure 1 has been developed. Control variables were added to the conceptual model to increase the validity of the research (Vennix, 2009). The current hunger level is the first control variable. If a respondent has a lot of hunger during the experiment, it can affect the extent to which someone subscribes to the three intuitions and / or to what extent someone wants to consume and buy the product (Finkelstein & Fishbach, 2010). The general liking of food will be taken into account as the second control variable. If a participant does not like the product in advance, the taste, the filling and the expensiveness of the product would be less important (Havermans, Janssen, Giesen, Roefs & Jansen, 2009). The third control variable is

the dieting status of consumers. Dieting status refers to the purposely attempt to structurally lose weight (Luomala et al., 2015). Dieting consumers make more conscious decisions of their food consumptions and thereby the implicit intuitions regarding food will become more salient (Irmak, Vallen & Robinson, 2011; Cavanagh & Forestell, 2013). Therefore, it will be expected that dieting consumer subscribe more to the three intuitions than non-dieting consumers. Finally, the fourth control variable control is the allergy for food. If a respondent has an allergy for one of the exposed foods, the respondent probably does not find taste, fillingness or price important, because he or she will become sick of eating it and therefore he or she will never consider the food in their food consumption (Frewer & van Trijp, 2006).

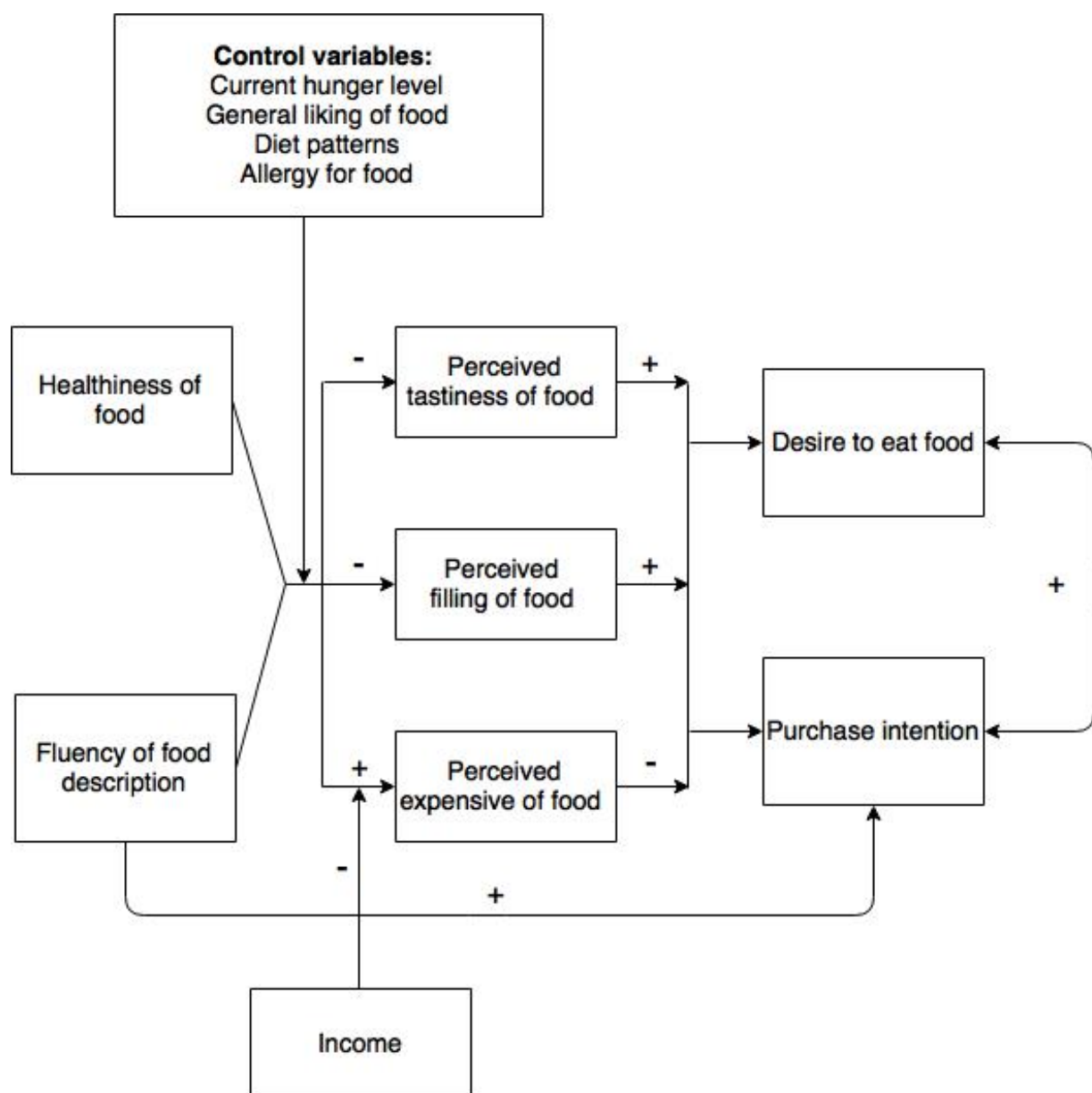


Figure 1: Conceptual model

Chapter 3: Methodology

This chapter discusses the methodology of this paper. First, the research design will be explained. Second, the operationalization and questionnaire of the paper will be composed. Finally, the manner in which the validity and reliability of the research will be guaranteed will be summarized.

3.1 Research design

The goal of the current study was to examine whether a disfluent food description would mitigate the strength of the three implicit intuitions in the fluent description of food. Furthermore, a distinction had been made in the healthiness of food. This paper aimed to compare combinations of two different stimuli with each other (fluency versus disfluency in combination with healthy versus unhealthy food). Furthermore, the hypotheses indicated that there was a causal relationship between the three implicit intuitions and the purchase intentions and the desire to eat expected. An experiment was seen as a suitable research design, because this study uses a quantitative research approach that examined a causal relationship (Vennix, 2009). The experiment of this study manipulated the healthiness of food and the fluency of the food description.

This study used a between-group design, because this design made it possible to test several variables simultaneously for different conditions (Vennix, 2009). So, this design enabled the study to examine and to compare the effect of the intuitions in different conditions. This study did not add a control group to the design, because the two fluency conditions already served as the baseline measurement. The respondents, who were exposed to the fluent food description, were compared with respondents exposed to the disfluent food description, in order to examine the mitigation of the strength of the three implicit intuitions.

The observation method was an online experiment with a questionnaire. This experiment was made public on the Internet in order to achieve a sufficient large sample size. The different conditions were randomly assigned to participants, because randomization reduces the influence of external factors on the results and the generalizability of the results increased (Vennix, 2009).

The sample size needed to be sufficient enough, in order to be allowed to conduct an experiment. Every different group needed to have at least thirty observations (Field, 2009). This study used a 2x2 factor design of food type (Healthy or unhealthy) versus fluency type (Easy-to-read or Difficult-to-read). This implies that there were 4 conditions and at least 120 observations were required.

3.2 Operationalization and measurement

This paragraph gives a theoretical and operational definition as well as the measurement for each construct. At the end of the paragraph, all the items per construct have been summarized in Table 3. Finally, the participants of the study, the procedure and the questionnaire of this study will be discussed.

Before the definition and the measurement per construct are mentioned, a general comment needs to be made. Earlier studies have used the Implicit Association Test (IAT), in order to measure relationships between healthy food and the intuitions that exist in consumers' minds (Raghunathan et al., 2006; Suher et al., 2015). Unfortunately, this specific tool is not available for everyone and therefore it was not possible to use this measurement tool for this study. Therefore, this study needs to rely on earlier results. This means that this study assumed that people implicitly subscribe to the intuitions, that healthy food is less tasty, less filling and more expensive (Raghunathan et al., 2006; Suher et al., 2015).

3.2.1 Manipulation of the healthiness of food and the fluency of food descriptions

Two variables were manipulated in this study, namely (1) the healthiness of food and (2) the fluency of the food description. First, the perceived healthiness of food was operationalized. The meaning of the construct perceived healthiness is straightforward and theoretical definitions were difficult to find. In this study, the perceived healthiness of food is seen as the expectation that one food contains nutrition that is 'good' for your health and does not contain an excessive amount of fat, sugar or calories (Ruggeri, 2013; Voedingscentrum, n.d). The perceived healthiness of one food was manipulated by showing respondents three healthy- or three unhealthy food pictures. Respondents were exposed to three pictures instead of one, because this reduces the effect that a respondent just accidentally subscribes to the implicit intuitions. Healthy food (Salad, apple and low-fat quark) and unhealthy food (Hamburger, donut and fries) choices, employed by earlier studies, have been used in this study (Raghunathan et al., 2006; Suher et al., 2015). Furthermore, the healthiness of one food was also be manipulated by presenting a NuVal score of that food (Suher et al., 2015). The NuVal score showed in one glance the nutritional value of one food. The NuVal score could range from one till hundred, and the higher the NuVal score, the better the nutrition of the food for your health (<https://www.nuval.com/how>). In this study, the NuVal scores of the healthy foods (Salad: 94, Apple: 96 and Low-fat quark: 90) were much higher than the NuVal scores of the unhealthy foods (Hamburger: 24, Donut: 15 and Fries: 19) (<https://www.nuval.com/scores>) and therefore they suggested that the displayed healthy food

pictures were actually healthier than the displayed unhealthy food pictures. After exposing consumers to one food picture in combination with the NuVal score, they were asked to rate the perceived likelihood of gaining weight (1 = not at all, 7 = very much) on a seven-point Likert scale (Gomez et al., 2015).

The second manipulated construct was fluency. Fluency is the way in which people process information and it has two divergent categories, namely a fluent way (easy-to-process information) and a disfluent way (difficult-to-process information) (Alter et al., 2007). In this study, fluency is seen as the manner in which respondents deal with given information. The fluency of the food description was manipulated by several actions. First, fluency was manipulated by providing nutrition information in an easy-to-read or a difficult-to-read font readability (Alter & Oppenheimer, 2008). This manipulation is widely used in earlier research and therefore it increases the validity of this study (Alter & Oppenheimer, 2008; Gomez et al., 2015). In the easy-to-read condition, the nutrition information was presented in black, Times New Roman font 12. In the difficult-to-read condition, the nutrition information was presented in light grey, Times New Roman font 12. Second, some letters of the nutrition information in the disfluent food descriptions were replaced by another symbol (Alter et al., 2007). Six earlier manipulated letters were used to make the food description more difficult to read (Alter et al., 2007). Table 2 shows the original letters and the associated manipulated letters. In addition, the fluency of both the food picture and NuVal scores were manipulated. In the difficult-to-read version, the food pictures and NuVal scores were made transparent. See Appendix 1 for the English version of the manipulation of every food and Appendix 2 for the Dutch version.

Fluent	Disfluent
A	@
B	β
I	î
O	Ø
R	®
S	\$

Table 2: Manipulation of letters in the disfluent food description condition

Now it is clear what both constructs mean and how they were manipulated, it needed to be measured if the manipulation worked. Therefore, a manipulation check was conducted, to increase the internal validity of the research. This manipulation check was conducted after separately showing the randomized healthy or unhealthy pictures of foods in the fluent or

disfluent condition and asking the questions related to every picture (Vennix, 2009). For the manipulation check of the healthiness of food, participants were asked if the pictures, they have seen, were samples of healthy foods or not, on a seven-point Likert scale (1= very unhealthy, 7 = very healthy) (Gomez et al., 2015). To examine if the fluency manipulation worked, participants were asked to rate the difficulty of processing the nutrition information on a seven-point Likert scale (1= extremely difficult, 7 = not difficult at all), and to rate the readability and visibility of the nutrition information on a seven-point Likert scale (1 = totally disagree, 7 = totally agree) (Gomez et al., 2015).

3.2.2 Perceived tastiness of food

The first implicit intuition is the ‘healthy-is-less-tasty’ intuition. Theoretically, tastiness of food is related to the visual attractiveness and the smell of that particular food (Hirschman, 1980). In this study, tastiness is seen as the perceived deliciousness of food. Furthermore, tastiness is correlated to joy. Joy is the feeling of a positive and satisfying pleasure (‘Genoegen’, 2017) and in this study it is seen as the degree of perceived pleasure enduring eating food.

After showing three healthy or three unhealthy pictures in the fluent or disfluent condition, respondents were initially asked if they liked the product, in order to exclude that people did not subscribe to the implicit intuition, because they did not like the product at all. Afterwards, consumers were demanded to rate the statement: ‘This food is perceived as tasty’ on a seven-point Likert scale (1= not tasty at all, 7= very tasty). Furthermore, people were asked to rate the perceived joy of consuming the product (‘How much would you enjoy eating the food?’ and ‘Eating this food will give me pleasure’). All these statements and questions were measured on a seven-point Likert scale (1= no joy/pleasure at all, 7 = a lot of joy/pleasure) (Gomez et al., 2015; Raghunathan et al., 2006). After measuring if people implicitly subscribed to the implicit intuition, it was measured if people also explicitly subscribed to the ‘healthy-is-tasty’ intuition. These questions were asked after the manipulation check questions. For the tastiness of food, people were asked to rate the following statements: ‘The more unhealthy the food, the better its taste’, ‘There is no way to make food healthier without sacrificing taste’ and ‘Food that is unhealthy generally tastes better’ on a seven-point Likert scale (1= strongly disagree, 7 = strongly agree) (Raghunathan et al., 2006).

3.2.3 Perceived fillingness of food

The second implicit intuition is the ‘healthy-is-less-filling’ intuition. Filling is related to the subjective judgment of whether one type of food will satisfy hunger, also called satiation (Oakes, 2006). Hunger level reflects the perceived fillingness after consuming food (Finkelstein & Fishback, 2010). So, in this study, the perceived filling of food is seen as the anticipated hunger level after imagining eating one type of food.

Before respondents were exposed to the food pictures, they were initially asked to indicate their current hunger level. This served as a control question. The satiation of one type of food was examined, by asking participants to rate the following two statements: ‘I would feel hungry after consuming this food’ and ‘I would feel filled after consuming this food’ on a seven-point Likert scale (1 = not at all, 7 = very) (Suher et al., 2015). In addition, also now it was measured if participants explicitly agreed with the ‘healthy-is-less-filling’ intuition (Unhealthy/processed/fatting/high sugar content food is more filling compared to healthy/unprocessed/low fatting/low sugar content food) (Suher et al., 2015). These statements, related to measuring the explicitness of the filling intuition, were also asked after the manipulation check.

3.2.4 Perceived expensiveness of food

The third implicit intuition is the ‘healthy-is-expensive’ intuition. This implicit intuition refers to the perception of the price. Price perception is related to the relative amount that someone needs to pay when buying something compared to a similar product (Ditzel, Galetzka & van Rompay, 2011). The perceived expensiveness in this study refers to perception whether a consumer perceives the price is righteous compared to other products.. As mentioned before, income level is a boundary condition for the effect of this implicit intuition on the perception of food. Income is defined as the gross salary that one household earns per year (CPB, 2016). Thereby, a distinction has been made between a below modal income (below €18.250), a modal income (between €18.250 and €73.000) and an above modal income (above €73.000) (CBS, 2016; CPB, 2016). In this paper, households with a low-income belong to the below modal income group and households with a high-income belong to the above modal income group.

As a measurement of the perceived expensiveness, respondents rated the perceived expensiveness on a 7-point Likert scale (1 = not expensive at all, 7 = very expensive) (Haws et al., 2016). The gross salary per year was measured, in order to examine if the boundary condition of income level influenced the perceived expensiveness of food. To measure if

respondents explicitly subscribe to this intuition, respondents were asked if they find healthy products more expensive than unhealthy products.

3.2.5 Desire to eat

The desire to eat is associated with the liking of food (Ochner et al., 2012). However, the only the liking of food does not reflect a desire. That is why in this paper the desire to eat is seen as the eagerness to consume one type of food right now. To measure the desire to eat, respondents were asked to answer the question: ‘How much did what you just saw, make, that you want to eat?’ (1= not at all, 7 = very much) and rate the desire to consume the food right now (1= not at all, 7= very much) (Ochner et al., 2012).

3.2.6 Purchase intention

Purchase intention is theoretically and in this study, defined as the likeliness of buying food (Gomez et al., 2015). Participants were asked to indicate if they would like to purchase the product and if the buying the food financially would fit in their groceries expenses pattern (1 = very unlikely to buy, 7 = very likely to buy) (Gomez et al., 2015).

3.2.7 Measurement item table

Construct	Items	Source
Tastiness of food	- This food is perceived as tasty - How much would you enjoy eating this food? - Eating this food would give me pleasure - The more unhealthy the food, the better its taste - There is no way to make the food healthier without sacrificing taste - Food that is unhealthy generally taste better	Gomez et al., 2015; Raghunathan et al., 2006
Fillingness of food	- I would still feel hungry after consuming this food - I would feel filled after consuming this food - Unhealthy/processed/fatting/high sugar content food is more filling compared to healthy/unprocessed/not fatting/low sugar content food	Suher et al., 2015
Expensiveness of food	- I expect this food to be rather expensive - Unhealthy food is cheaper than healthy food	Haws et al., 2015
Desire to eat	- How much did what you just saw, make, that you want to eat? - I would like to consume this food	Gomez et al., 2015; Ochner et al., 2012
Purchase intention	- I would like to purchase this food - Buying this food fits my groceries expenses	Gomez et al., 2015
Healthiness	- Regular consumption of this food will cause an increase in weight - The pictures I have seen were examples of healthy foods	Gomez et al., 2015
Fluency	- The nutrition information was clearly visible and readable - I found it difficult to process the nutrition information	Gomez et al., 2015

Table 3: Summary of measurement items per construct

3.2.8 Control variables

The four control variables were all measured with only one item. The current hungriness of consumers was measured with the question ‘How hungry are you right now?’ on a 7-point Likert scale (1= not hungry at all, 7 = very hungry) (Suher et al., 2015). The general liking of food was measured for every food separately with the statement ‘I like this food’ on a 7-point Likert scale (1= dislike intensely, 7 = like very much). The diet pattern of consumers was measured with the question ‘Are you on a diet at the present moment?’ on a 5-point Likert scale (1= not at all, 5 = yes, completely). Last, the allergy for food was measured with the question ‘Are you allergic for one of the foods that has been shown to you?’ (1 = yes, 2 = no). The questionnaire in English and Dutch can be found in Appendix 3 and 4.

3.3 Participants and procedure

Everyone who wanted to participate in the experiment could be a participant, because all people are consumers and there were no further restrictions for being a participant in this experiment. People were invited to participate in an online product test and they were randomly assigned to one of the four conditions (healthy versus unhealthy and fluent versus disfluent). Participants were requested to read the nutrition information carefully and to look at the food picture. After looking at the picture and reading the nutrition information carefully, participants were demanded to evaluate the product on the perceived taste, filling and price. Then, a second picture was shown and the same questions were asked. Finally, the third picture was shown and again the same questions were asked. All the pictures and nutritional information were presented separately, to avoid an information overload and to prevent confusing the participants. After the questions related to the three food pictures, manipulation check questions were asked, to be able to confirm if the manipulation worked as intended. Next, several questions were asked to measure if respondents also explicitly subscribe to the implicit intuitions. At the end of the questionnaire, some demographical questions (age, gender, BMI and education) were asked.

3.4 Quality of the research

To ensure the quality of this study, several actions were taken. First, manipulation check questions were asked, to measure if the intended manipulation worked. This guaranteed the internal validity, because it could confirm that the effect occurs due to the manipulated variables (Hair, Black, Babin & Anderson, 2010; Vennix, 2009). Second, control variables were added to the conceptual model and questionnaire, to monitor for evaluative differences

caused by factors other than the three implicit intuitions. Furthermore, people were randomly assigned to one of the four conditions, to reduce the effect of the evaluation differences caused by other factors (Vennix, 2009). In addition, both the food pictures in every condition and the questions related to these food pictures, were also randomized in order to exclude order-effects, which will also improved the internal validity of the research (Hair et al., 2010; Vennix, 2009). Third, existing scales were used, because their internal validity already has been proven (Vennix, 2009). Fourth, a pre-test was conducted to measure if all the items were obvious for the participants. This pre-test needed to consists of approximately twenty participants (five per condition). Fifth, the questionnaire was conducted in the Netherlands. Therefore, the questionnaire was translated into Dutch. Afterwards, the questionnaire was re-translated in English by someone else, to guarantee the resemblance of both questionnaires. This also improved the internal validity and reliability of the study. Sixth, within the timeframe a maximized sample size was sought, in order to increase the generalizability of the study. Finally, all taken actions have been written down to enable others to repeat the study, which increased the reliability of this research.

3.5 Research ethics

Prior to participation in this study, respondents were explicitly informed that their responses will be used for academic purposes only and as such, will not be used for any other purposes. To protect (sensitive) personal data and reduce the threshold for participation, participants' responses were anonymous. Additionally, anonymous participation reduced a potential bias caused by social desirable responses (Hair et al., 2010). Responses could be linked to specific individuals only if they filled out their email address at the end of the survey. This opportunity was solely provided for the purpose to inform respondents about the outcomes of this master thesis. Last, it was not clearly mentioned what the goal of my research was to my respondents, because this also could bias their answers.

Chapter 4: Results

This chapter discusses the results of this paper. First, the execution of the research will be described. Second, the results of every analysis will be given. In the end, all the hypotheses will be either accepted or rejected.

4.1 Execution of the research

The survey was made available online using a single anonymous distribution link provided by Qualtrics. Prior to large-scale data collection, a pre-test including 24 respondents was conducted. This pre-test was designed to examine the effectiveness of the manipulation of both healthiness and fluency. First, respondents were asked to rate the healthiness of the food showed to them on a 7-point scale (1 = very unhealthy to 7 = very healthy). First, respondents actually rated the healthiness of foods in the healthy condition ($M = 6.42$, $SD = 0.52$) higher than in the unhealthy condition ($M = 1.25$, $SD = 0.45$); $F(1, 22) = 682.00$, $p < .001$. Furthermore, participants perceived a higher increase in weight if they would consume unhealthy foods ($M = 5.06$, $SD = 0.99$) than if they would consume healthy foods ($M = 2.06$, $SD = 1.66$), $F(1, 22) = 23.274$, $p < .001$. Therefore, the manipulation of healthiness was significant. The manipulation of fluency was also found to be significant. Participants were asked to rate the fluency of the food descriptions with two different statements. Both the visibility and readability of the nutrition information were perceived to be more clearly in the fluent condition ($M = 6.00$, $SD = 1.04$) than in the disfluent condition ($M = 3.40$, $SD = 1.58$); $F(1, 22) = 23.83$, $p < .001$. Subsequently, respondents perceived the processing of nutrition information more difficult in the disfluent conditions ($M = 3.90$, $SD = 1.52$) than in the fluent conditions ($M = 2.07$, $SD = 1.52$); $F(1, 22) = 12.69$, $p < .01$. This implies that both the manipulation of healthiness and fluency were effective in the pre-test and therefore may be used in the main survey. However, some participants notified that although the disfluent condition should be difficult to read, it still remains relatively easy to understand and process the food description. Therefore, the nutrition information has been made lighter grey (grey 15% instead of grey 25%) and the pictures of foods have been made more transparent (from 70% to 80%). In addition, participants were asked to list all their remarks about the survey at the end of the pre-test. Most interesting was that participants perceived the manipulation of the letters in the food description (e.g. '@' as equivalent of 'a') as a mistake. All comments about the pre-test and the processing of these remarks in the main survey can be found in Appendix 5.

After the manipulation for fluency was improved, respondents were approached to participate in the main study by a personal message via email, Facebook, Whatsapp and LinkedIn. Furthermore, a general comment was posted on the social media accounts of the author in order to reach as much persons as possible. This message was shared several times, thereby increasing the reach of this survey even further.

Within the first week of the survey being online, 414 respondents already started the survey. However, 95 of these respondents only partially completed the survey, resulting in 319 eligible respondents for this study (completion rate = 78%). Within the survey, a reversed item with a similar meaning has been used to check for the validity of the responses ('I would still feel hungry after eating this food' vs. 'I would feel filled after consuming this food'). Multiple inconsistencies between responses on these two were found (misresponse to reversed items). Therefore, participants with a misresponse larger than two points on the 7-point scale were excluded from this study (Weijters, Cabooter & Schillewaert, 2010). This has led to a further elimination of 64 participants. Also, respondents with an allergy for one of the showed foods have been deleted in the dataset. This has led to a deletion of twelve participants (N = 243). Therefore the total sample size of this study was 243 participants. All conditions (healthy fluent, healthy disfluent, unhealthy fluent and unhealthy disfluent) consisted of at least 30 respondents, thereby implying that the minimal required sample size of 120 people was met. The sample size is thus sufficient to perform the required statistical analyses (Field, 2009; Hair et al., 2010).

4.2 Results

The first section of this paragraph contains demographic data of the sample population. Thereafter, the results of the manipulation check and factor analysis will be shown. Subsequently, the mean scores and standard deviations of the main variables of the conceptual model will be described. Finally, the hypotheses as mentioned in paragraph 2.8 will be examined. Assumptions of all statistical tests were checked in prior to the analyses.

4.2.1 Sample description

All descriptive data of the sample population is summated in Table 4. Unequal group sizes are the result of the exclusion of several respondents as described in paragraph 4.1.

Descriptive factor	<i>n</i> (%)
Condition	
Healthy Fluent	51 (21.0)
Healthy Disfluent	59 (24.3)
Unhealthy Fluent	72 (29.6)
Unhealthy Disfluent	61 (25.1)
Age groups ^A	
Young people	73 (30.0)
Young adults	75 (30.9)
Adults	49 (20.2)
People aged 50+	44 (18.1)
Sex	
Male	92 (36.1)
Female	163 (63.9)
Education	
Primary vocational education	8 (3.3)
Secondary education	14 (5.8)
Intermediate education	51 (21.0)
Tertiary education	24 (9.9)
Higher vocational education	72 (29.6)
College	73 (30.0)
PhD	1 (0.4)
Gross salary of household	
< 18.250 euros per year	104 (42.8)
Between 18.250 and 73.000 euros per year	112 (46.1)
> 73.000 euros per year	27 (11.1)
Body Mass Index ^B	
Underweight	27 (11.1)
Normal weight	137 (56.4)
Overweight	55 (22.6)
Obesity	18 (7.4)
Morbid obesity	1 (0.4)

Table 4: Descriptive statistics of the sample population, (N = 243)

^A: Young people = ≤ 22 years; Young adults = 23-31 years; adults = 32 - 49 years; People aged 50+ = ≥ 50 years. The median age is 25 years old. Values for age were missing for two participants.

^B: Underweight = $< 18.5 \text{ kg/m}^2$; Normal weight = $18.5 - 24.9 \text{ kg/m}^2$; Overweight: $25.0 - 29.9 \text{ kg/m}^2$; Obesity: $30.00 - 39.99 \text{ kg/m}^2$; Morbid obesity: $> 40 \text{ kg/m}^2$. Values for weight and/or length were missing for five respondents.

4.2.2 Manipulation check

In this paragraph, the success of the manipulation of healthiness and fluency in the main survey will be tested. Participants rated the healthiness in the healthy condition ($M = 6.11$, $SD = 0.79$) higher than in the unhealthy condition ($M = 1.53$, $SD = 0.76$); $F(1, 241) = 2118.39$, $p < .001$. In addition, the increase in weight was rated lower by participants in the healthy condition ($M = 2.50$, $SD = 0.99$) than by respondents in the unhealthy condition ($M = 5.34$, $SD = 1.15$); $F(1, 241) = 416.00$, $p < .001$. The manipulation of healthiness was thus significant. Second, participants were asked to rate the fluency of the nutrition information. Participants perceived both the visibility and readability higher in the fluent condition ($M = 5.05$, $SD = 1.53$) compared to the disfluent condition ($M = 3.53$, $SD = 1.82$); $F(1, 241) = 49.76$, $p < .001$. Furthermore, respondents in the disfluent ($M = 3.37$, $SD = 1.63$) found it more difficult to process the nutrition information compared to respondents in the fluent condition ($M = 2.54$, $SD = 1.37$); $F(1, 241) = 18.53$, $p < .001$. The manipulation of fluency was thus significant as well. In summary, both the manipulation of healthiness and fluency were significant, thereby implying a successful manipulation in the survey. In addition, the adjustments that were made in the survey, based on the pre-test, had a positive effect for the manipulation of fluency. The significance of the fluency manipulation for the final survey ($p < .001$) improved compared to the results of the pre-test ($p < .01$).

4.2.3 Factor analysis

The first analysis that has been executed is the factor analysis. The dataset has been restructured for the purpose of the factor analysis. Every respondent has been exposed to three different food items. All the scores of the items relating to one food (e.g. salad, quark and apple) were placed in a separate row. Therefore, the number of observations became 765 instead of 255 (3 per respondent).

The goal of this factor analysis was to identify the underlying dimensions of the items and their common variance. All items related to the predetermined variables were selected for a principal axis factoring analysis. The overall correlation between the items was desirable, because Bartlett's test of sphericity was significant ($p < .001$). Furthermore, the Kaiser-Meyer-Olkin (KMO) of Sampling Adequacy score, a measurement for the adequacy of the sample size, was .881 and thus above the minimal requirement of .5 (Hair et al., 2010). Therefore, it was valid to conduct a factor analysis with these items. The item 'I expect this food to be rather expensive' has not been taken into account in this factor analysis, because this single item only measured the variable 'perceived expensiveness'. The communalities

were all above the minimally required value of .5, except for the item ‘buying this food would fit my financial groceries expenses’ (.376). Nevertheless, if this item had been deleted, the construct purchase intention would consist of a single item. Therefore, Cronbachs alfa level of this construct was used to determine if the item had to be deleted. The Cronbachs alfa was .639 and therefore indicating that this scale could be considered as reasonably reliable (Hair et al., 2010). Therefore the item was not be deleted from this set of items, despites its low communality.

The model explains 77 per cent of the explained variance within the sample population. Nevertheless, although it was selected that there need to be four factors extracted (tastiness, fillingness, desire to eat and purchase intention), the factor analysis only revealed three factors. The items related to fillingness and purchase intention correctly form two separate factors. However, the items related to tastiness and the desire to eat all loaded highly on a single factor. This could be the result of tastiness and the desire to eat being closely related to each other (Gomez et al., 2015). Furthermore, the item ‘How much did what you just saw, make, that you want to eat?’ did not load on any factor. Therefore, the factors were oblique rotated in order to facilitate the interpretation. The oblique rotation already caused three instead of two factors and therefore was seen as more useful. However, the problem that the perceived tastiness and the desire to eat loaded highly on a single factor remained. Therefore, it has been decided to consider the value of Cronbachs alfa to make a decision. The reliability analysis shown that both the items related to tastiness (.943) and to the desire to eat (.841) were forming a highly reliable scale (Hair et al., 2010). In addition, individual principal axis factoring analyses have been executed for both constructs with the number of extracted factors set to be one. The factor analysis with the predetermined items related to the perceived tastiness had a significant Bartlett’s test of sphericity ($p < .001$) and the KMO score was above the minimal requirement of .5 (KMO = .769). In addition, all communalities were above .5. Therefore, it was allowed to conduct a factor analysis with these items separately and no item had to be deleted. The factor loadings of the items were highly significant (Tasty = .905, joy = .940 and pleasure .914). A factor analysis was also conducted with the predetermined items related to the desire to eat was. Again, Bartlett’s test of sphericity was significant ($p < .001$), the KMO score was above the minimal requirement of .5 and all communalities were above .5. The items loaded highly on a single factor, with both items reporting a factor loading of .851. Based on the results of these factor analyses, it was decided to create separate factors for the perceived tastiness of food and the desire to eat. Nevertheless, it needs to be reminded that the general factor analysis only revealed one factor

for both. The implications of this will be discussed in section 5.4.

All the other factor loadings were significant except for ‘I would like to purchase this food’. However, the factor loading is above .3 and therefore was considered as sufficiently significant (Field, 2009; Hair et al., 2010). The loadings of the items on the three extracted factors had been summated in Table 5. Summated scales were calculated for every construct per food item, based on the results of the factor analysis (Hair et al., 2010).

Variable	Factor loading
Factor 1	
This food is perceived as tasty	.957
How much would you enjoy eating this food?	.943
Eating this food would give me pleasure	.868
I would like to consume this food	.552
Factor 2:	
I would like to purchase this food	.338
Buying this food will fit my weekly groceries expenses	.616
Factor 3:	
I would still feel hungry after consuming this food ^A	.910
I would feel filled after consuming this food	.890

Table 5: Factor analysis results, (N = 243)

^A: values were reversed to maintain a similar direction of the Likert-scale for all items

4.2.4 Reliability analysis

After the underlying dimensions of the items were determined, the reliability of the scales was examined. Cronbachs alfa was computed for all constructs in order to assess reliability, which is acceptable if the values are above .5 (Hair et al., 2010). The results of the reliability analysis have been summated in Table 6. All the values of the Cronbachs alfa were above the acceptable reliability of .5 and three of four reported values above .8, and therefore their scales were considered as highly reliable (Hair et al., 2010). In addition, it has been checked if Cronbachs alfa levels increased for any constructs if an item was deleted, but this was not the case.

Variable	Cronbachs alfa	Items
Tastiness	.943	3
Fillingness	.891	2
Desire to eat	.841	2
Purchase intention	.639	2

Table 6: Cronbachs alfa of the constructs

4.2.5 Descriptive statistics of variables

In this paragraph, the mean score and standard deviation for every construct for every condition were analyzed. Results have been summated in Table 7.

Condition	<i>M (SD)</i> Tastiness	<i>M (SD)</i> Fillingness	<i>M (SD)</i> Expensiveness	<i>M (SD)</i> Desire to eat	<i>M (SD)</i> Purchase intention
Healthy fluent	4.92 (1.39)	3.90 (1.58)	3.08 (1.44)	4.46 (1.49)	5.13 (1.33)
Healthy disfluent	5.10 (1.31)	4.03 (1.34)	3.14 (1.43)	4.55 (1.41)	5.16 (1.33)
Unhealthy fluent	4.75 (1.62)	4.61 (1.54)	2.92 (1.24)	4.02 (1.67)	3.85 (1.55)
Unhealthy disfluent	4.85 (1.54)	4.48 (1.55)	3.04 (1.27)	4.10 (1.52)	3.95 (1.52)

Table 7: Mean score of all intuitions per condition on a 7-point Likert scale, (N = 243)

In general, first it seems like respondents perceived healthy foods ($M = 5.02$, $SD = 1.35$) as tastier compared to unhealthy foods ($M = 4.80$, $SD = 1.58$). This is not in line with the expectation that people perceive unhealthy foods as tastier than healthy foods (Raghunathan et al., 2006). Furthermore, participants rated the tastiness of healthy foods in the fluent conditions ($M = 4.92$, $SD = 1.39$) lower than in the disfluent conditions ($M = 5.10$, $SD = 1.31$). In addition, the perceived tastiness of the unhealthy foods in the disfluent condition ($M = 4.85$, $SD = 1.54$) increased compared to tastiness in the fluent condition ($M = 4.75$, $SD = 1.62$), while it was hoped that tastiness here would decrease. The perceived fillingness of the healthy foods ($M = 3.97$, $SD = 1.46$) was lower than unhealthy foods ($M = 4.55$, $SD = 1.54$) in the fluent condition. This is in line with the expectation that healthy foods are less filling than unhealthy foods (Suher et al., 2015). In addition, the perceived fillingness of healthy food in the fluent conditions ($M = 3.90$, $SD = 1.58$) is lower than in the disfluent condition ($M = 4.03$, $SD = 1.34$). Also the perceived fillingness of unhealthy food in the fluent condition ($M = 4.61$, $SD = 1.54$) is lower than in the disfluent condition ($M = 4.48$, $SD = 1.55$). Both are thus in line with the expectation that disfluency would mitigate the strength of the implicit intuitions (Alter et al., 2007; Gomez et al., 2015). Third, it seems that

participants ranked the expensiveness of the healthy food ($M = 3.11$, $SD = 1.43$) higher than of unhealthy food ($M = 2.97$, $SD = 1.25$). This is also in line with the expectation that people perceived healthy foods as more expensive than unhealthy foods, however there still should be controlled for the income of people (Story et al., 2008). Respondents ranked the expensiveness of healthy food in the fluent condition ($M = 3.08$, $SD = 1.44$) lower than in the disfluent condition ($M = 3.14$, $SD = 1.34$). In addition, respondents perceived the expensiveness of unhealthy food in the fluent condition ($M = 2.92$, $SD = 1.24$) lower than in the unhealthy disfluent condition ($M = 3.04$, $SD = 1.27$). These mean scores are still in line with the expectation that disfluency would mitigate the strength of the implicit intuitions, however the expensiveness of healthy food increased due to the disfluent presentation of nutrition information. It seems that participants perceived the desire to eat higher for healthy food ($M = 4.46$, $SD = 1.49$) than for unhealthy food ($M = 4.02$, $SD = 1.67$) in the fluent condition. In addition, the desire to eat seemed to be higher for healthy food in the disfluent condition ($M = 4.55$, $SD = 1.41$) than in the fluent conditions ($M = 4.46$, $SD = 1.49$). The same applied for unhealthy foods ($M_{Disfluent} = 4.10$, $SD = 1.52$ and $M_{Fluent} = 4.02$, $SD = 1.67$). Purchase intention appeared to be higher in the disfluent conditions of both healthy ($M = 5.16$, $SD = 1.33$) and unhealthy food ($M = 3.95$, $SD = 1.52$) than in the fluent conditions of both healthy ($M = 5.13$, $SD = 1.33$) and unhealthy food ($M = 3.85$, $SD = 1.55$). Although this hypothesis still needs to be examined with a one-way Anova, it seems not in line with the expectation that a fluent food description would positively affect purchase intention (Gomez et al., 2015). Furthermore, it seems like the intention to purchase for healthy food is higher ($M = 5.15$, $SD = 1.33$) than for unhealthy food ($M = 3.90$, $SD = 1.49$). Therefore, results suggest that participants perceived both the desire to eat and purchase intention higher for healthy foods than for unhealthy foods. This has also give the impression that the desire to eat and purchase intention indeed could be positively related to each other.

The mean scores of all foods individually in both the fluent and disfluent condition were also compared to each other. Results can be found in Table 8. In short, participants in the disfluent condition seemed to perceive the tastiness of the salad ($M = 5.39$, $SD = 1.17$), apple ($M = 5.37$, $SD = 1.06$), donut ($M = 4.29$, $SD = 1.94$) and fries ($M = 5.41$, $SD = 0.99$) higher than in the fluent condition of the salad ($M = 5.17$, $SD = 1.29$), apple ($M = 4.99$, $SD = 1.43$), donut ($M = 4.00$, $SD = 1.89$) and fries ($M = 5.30$, $SD = 1.12$). An opposite effect occurred for the low-fat quark ($M_{Fluent} = 4.60$, $SD = 1.42$; $M_{Disfluent} = 4.55$, $SD = 1.51$) and hamburger ($M_{Fluent} = 4.95$, $SD = 1.49$; $M_{Disfluent} = 4.86$, $SD = 1.36$). The results

suggested that participants perceived the fries by far as the tastiest when comparing all the scores on tastiness of the fluent condition ($M = 5.30$, $SD = 1.12$). However, when comparing the tastiness of food in disfluent condition, respondents still perceived the fries as most tasty ($M = 5.41$, $SD = 0.99$), although the tastiness of the salad ($M = 5.37$, $SD = 1.06$) and apple ($M = 5.39$, $SD = 1.17$) became extremely close.

In general, it seems like respondents perceived the tastiness of foods higher in the disfluent than in the fluent condition regardless of the healthiness of food. As expected, it looks like respondents perceived the fillingness of the salad ($M = 3.70$, $SD = 1.72$) and apple ($M = 3.34$, $SD = 1.27$) in the fluent conditions lower than in the disfluent condition ($M_{\text{Salad}} = 4.04$, $SD = 1.29$; $M_{\text{Apple}} = 3.53$, $SD = 1.26$). Nevertheless the perceived fillingness of the low-fat quark in the disfluent condition ($M = 4.53$, $SD = 1.27$) was lower than in the fluent condition ($M = 4.66$, $SD = 1.45$), while the opposite was expected. Nevertheless, it appears that the fillingness of the low-fat quark is perceived as highest compared to the salad and apple regardless whether the nutrition information was presented fluent or disfluent. The perceived fillingness of all the unhealthy foods decreased in the disfluent condition compared to the fluent condition. Participants perceived the hamburger as the most filling ($M = 5.18$, $SD = 1.24$). The perceived expensiveness of the salad and apple decreased in the disfluent condition, while the expensiveness of all the other foods were equal or increased in the disfluent condition. So, results suggest that all is in line with the expectation, except for the low-fat quark, because the perceived expensiveness increased while a decrease was expected. At last, participants perceived the desire to eat and purchase intention for the apple in both the fluent ($M_{\text{Desire to eat}} = 4.68$, $SD = 1.32$; $M_{\text{Purchase intention}} = 5.15$, $SD = 1.14$) and disfluent condition as the highest ($M_{\text{Desire to eat}} = 4.80$, $SD = 1.26$; $M_{\text{Purchase intention}} = 5.45$, $SD = 1.23$) the highest. In general, the purchase intention in the disfluent condition was higher than the fluent condition, while the opposite was expected (Gomez et al., 2015).

Food item	Tastiness <i>M (SD)</i>	Fillingness <i>M (SD)</i>	Expensiveness <i>M (SD)</i>	Desire to eat <i>M (SD)</i>	Purchase intention <i>M (SD)</i>
Salad Fluent	5.17 (1.29)	3.70 (1.72)	3.88 (1.54)	4.68 (1.32)	5.15 (1.14)
Salad Disfluent	5.39 (1.17)	4.04 (1.29)	3.76 (1.45)	4.78 (1.18)	5.29 (1.10)
Low-fat quark Fluent	4.60 (1.42)	4.66 (1.45)	2.67 (1.14)	4.12 (1.51)	5.04 (1.42)
Low-fat quark Disfluent	4.55 (1.51)	4.53 (1.27)	3.05 (1.28)	4.08 (1.65)	4.75 (1.53)
Apple Fluent	4.99 (1.43)	3.34 (1.27)	2.69 (1.29)	4.58 (1.60)	5.20 (1.44)
Apple Disfluent	5.37 (1.06)	3.53 (1.26)	2.61 (1.31)	4.80 (1.26)	5.45 (1.23)
Hamburger Fluent	4.95 (1.49)	5.18 (1.24)	3.38 (1.26)	4.23 (1.62)	3.97 (1.61)
Hamburger Disfluent	4.86 (1.36)	5.12 (1.34)	3.59 (1.28)	4.08 (1.44)	3.95 (1.22)
Donut Fluent	4.00 (1.89)	3.59 (1.61)	2.92 (1.22)	3.37 (1.82)	3.29 (1.60)
Donut Disfluent	4.29 (1.94)	3.30 (1.42)	2.89 (1.25)	3.68 (1.85)	3.47 (1.51)
Fries Fluent	5.30 (1.12)	5.06 (1.21)	2.47 (1.07)	4.47 (1.34)	4.31 (1.25)
Fries Disfluent	5.41 (0.99)	5.01 (1.14)	2.64 (1.08)	4.52 (1.09)	4.42 (1.37)

Table 8: Mean score of all intuitions per food item in a condition on a 7-point Likert scale, (N = 243)

4.2.6 Hypotheses testing

The first two hypotheses were analyzed with a two-way multivariate analysis of variance (MANOVA), because multiple constructs (tastiness, fillingness et cetera) of different groups (healthiness versus fluency) had to be compared with each other. Furthermore, the two independent variables were categorical (healthiness and fluency) and the three dependent variables were metrically scaled (the perceived tastiness, fillingness and expensiveness of food). The effect of healthiness and fluency on the perceived expensiveness was expected to depend on the level of income. Therefore, an interaction effect between fluency, healthiness and expensiveness was taken into account. In addition, the conceptual model showed that the relationship between healthiness and fluency on the three implicit intuitions had to be controlled for the current hungriness, the general liking of food and diet pattern. Therefore, a two-way multivariate analysis of covariance (MANCOVA) was executed for both hypotheses.

Hypothesis three investigated the effect of the intuitions on the desire to eat and the intention to purchase food. This hypothesis was examined with a regression analysis. This dataset was eligible for a regression analysis, because there were at least 100 observations and all the variables inserted in the regression analysis were metrically scaled (Hair et al., 2010).

The fourth hypothesis assumed that purchase intention would be higher for people in the fluent condition. A one-way analysis of variance (ANOVA) was executed to compare the

purchase intention in the fluent condition with the purchase intention in the disfluent condition.

The last hypothesis assumed that the desire to eat correlates with purchase intention. This assumption was tested with the Pearson correlation coefficient, because this coefficient allows drawing a conclusion about the relationship between the two variables (Hair et al., 2010). As a final remark, the assumptions for all the statistical analyses were checked before the analysis were executed. To meet this assumptions, a logarithm transformation of all the non-normally distributed variables (the perceived tastiness, expensiveness, the desire to eat and purchase intention) was conducted.

Hypothesis 1

The first hypothesis of this study was as follows: Fluent descriptions of (un)healthy food result in consumers perceiving the food as:

- (A) Less (more) tasty relative to unhealthy (healthy) food
- (B) Less (more) filling relative to unhealthy (healthy) food
- (C) (In)expensive relative to unhealthy (healthy) food.

As said before, the fluent descriptions of both healthy- and unhealthy food have been compared for the perceived tastiness, fillingness and expensiveness of food.

Main analysis without covariates (MANOVA)

There was no main significant effect of the healthiness of food on the perceived tastiness of food; $F(1, 363) = 2.476$, $p = .12$, $\eta^2 = .007$. This outcome did not support hypothesis 1A, which expected that participants perceived unhealthy food as tastier than healthy food. Moreover, a significant, weak effect, of the healthiness of food on the perceived fillingness of food was found; $F(1, 363) = 16.324$, $p < .001$, $\eta^2 = .043$. The post hoc analysis (Fisher's least significant difference, LSD) showed that the perceived fillingness of healthy foods significantly differs from unhealthy foods in the fluent condition ($MDifference = -.789$, $p < .001$). In line with the expectation and earlier research, participants in the healthy fluent condition perceived the fillingness of healthy food ($M_{Healthy\ food} = 3.79$, $SD = 0.15$) significantly lower than participants in the unhealthy fluent condition ($M_{Unhealthy\ food} = 4.58$, $SD = 0.13$), and thus Hypothesis 1B was supported. Lastly, there was no main significant effect of the healthiness of food on the perceived expensiveness of food; $F(1, 363) = .570$, $p = .45$, $\eta^2 = .002$. In addition, also the interaction effect was also not significant, $F(2,$

363) = .643, $p = .53$, $\eta^2 = .004$. Hypothesis 1C was thus not supported by the findings. The results of MANOVA were summated in table 9.

	Sum of Squares	df	Mean Square	F	p	η^2
Tastiness	0.098	1	0.098	2.476	.116	.007
Fillingness	39.698	1	39.698	16.324	< .001	.043
Expensiveness	.024	1	.024	.570	.451	.002
Gross salary*Healthiness ^A	.055	2	.028	.643	.526	.004

Table 9: MANOVA for the healthy fluent versus the unhealthy fluent condition, (N=123), $R^2 = .036$

^A: the interaction term is only applied for the perceived expensiveness of food

In summary, Hypothesis 1 only was partially supported, when not controlling for the covariates. Results showed that only the perceived fillingness significantly differed among respondents in the fluent condition of healthy and unhealthy foods; $F(1, 363) = 16.324$, $p < .001$, $\eta^2 = .043$. Therefore, only Hypothesis 1B was supported. However, the conceptual model showed that the effect of healthiness and fluency on the three implicit intuitions also had to be controlled for the current hungriness of respondents, the degree of liking and diet patterns. Therefore, these control variables were added to the main analysis to see if controlling for them would change the main result.

Main analysis with covariates (MANCOVA)

First, it should be noticed that the covariate ‘diet patterns’ did not have a significant effect on the three intuitions and therefore had been excluded from the covariates in this analysis; $\Lambda = .984$, $F(3, 358) = 1.998$, $p = .114$. The assumption of equal variance in the population for tastiness is violated; $F(5, 363) = 2.736$, $P < .05$, thereby implying that there is no equal variance in the population sample. A main significant weak effect of the healthiness of food on the perceived tastiness of food was found, $F(1, 361) = 6.961$, $p < .01$, $\eta^2 = .019$. The post hoc analysis (LSD) revealed that the perceived tastiness of healthy food compared to unhealthy food in the fluent condition significantly differed from each other ($MDifference = -.043$, $p < .01$). Participants in the fluent condition perceived the tastiness of the healthy foods ($M_{Healthy\ food} = .526$, $SD = .012$) significantly lower than unhealthy foods instead of lower ($M_{Unhealthy\ food} = .569$, $SD = .011$). This is in line with the expectation that participants

perceived the tastiness of unhealthy foods higher than healthy foods (Raghunathan et al., 2006). Therefore, Hypothesis 1A was supported.

Furthermore, the healthiness of food had a significant, weak effect on the perceived fillingness of food; $F(1, 361) = 17.014$, $p < .001$, $\eta^2 = .045$. The post hoc analysis (LSD) revealed that the perceived fillingness between respondents in the fluent version of the healthy condition significantly differs from participants in the unhealthy condition ($MDifference = -.787$, $p < .001$). As expected, respondents perceived the fillingness of healthy foods ($M_{Healthy\ food} = 3.77$, $SD = .14$) significantly lower than unhealthy foods ($M_{Unhealthy\ food} = 4.56$, $SD = .13$). For the perceived expensiveness of food, no main significant effect of the healthiness of food was found, $F(1, 361) = .650$, $p = .42$, $\eta^2 = .002$. In addition, there was also no significant interaction effect between the gross salary and the healthiness of food on the perceived expensiveness of food, $F(2, 361) = .847$, $p = .43$, $\eta^2 = .005$. The results of the MANCOVA have been summated in table 10.

Variable	Sum of Squares	df	Mean Square	F	p	η^2
Tastiness	.117	1	.117	6.961	< .01	.019
Fillingness	39.464	1	39.464	17.014	< .001	.045
Expensiveness	.027	1	.027	.650	.421	.002
Gross salary*Healthiness ^A	.072	2	.036	.847	.429	.005

Table 10: MANCOVA for the healthy fluent versus the unhealthy fluent condition, when controlling for the four control variables, (N=123), $R^2 = .594$

^A: the interaction term was only applied for the perceived expensiveness of food

In general, results partially supported Hypothesis 1. When controlling for the current hungeriness of respondent and the general liking of food, the perceived tastiness and fillingness significantly differed for healthy and unhealthy foods in the fluent condition, whereas when not controlling for the control variables, only the perceived fillingness of food significantly differ from each other. However the explained proportion in the dependent variable increased a lot when the covariates were included in the analysis ($R^2_{MANOVA} = .036$, $R^2_{MANCOVA} = .594$), and therefore these insights were seen as more useful. So, hypotheses 1A and 1B have been supported by the findings, whereas Hypothesis 1C was not supported.

Hypothesis 2

The second hypothesis was as follows: Disfluent descriptions of (un)healthy food mitigate the strength of the three implicit intuitions compared to the fluent description of food. Again, this hypothesis was analyzed with MANOVA. First, the effect of disfluency on the implicit intuitions for both healthy and unhealthy foods separately was examined. Afterwards, the perceived tastiness, fillingness and expensiveness of healthy and unhealthy food in the disfluent condition were compared with each other. To determine if the strength of the implicit intuitions has been mitigated, results of the difference between healthy and unhealthy food in the fluent condition were compared with the results of the disfluent condition. The model was first tested without control variables prior to the complete model including the covariates. It should be noticed that the covariate ‘diet patterns’ again did not have a significant effect on the three intuitions in all cases and therefore had been excluded from the covariates in all analyses; $\Lambda = .947$, $F(6, 610) = .527$, $p = .788$.

Main analysis for the healthy food conditions without covariates (MANOVA)

First, the fluent and disfluent versions of healthy food were compared with each other. Levene’s test of equality of error variance for fillingness was significant; $F(5, 324) = 3.102$, $P < .01$. Therefore, it could not be assumed that there was equal variance in the sample population. There was no significant effect of fluency on the perceived tastiness of healthy food; $F(1, 324) = 2.733$, $p = .10$, $\eta^2 = .008$. Also the effect of fluency on the perceived fillingness of healthy food was not significant; $F(1, 324) = 1.163$, $p = .28$, $\eta^2 = .004$. Furthermore, there was no main significant effect of fluency on the perceived expensiveness of healthy food; $F(1, 324) = .010$, $p = .92$, $\eta^2 = .000$. There was also no significant interaction effect between the gross salary and fluency on the perceived expensiveness of healthy food, $F(2, 324) = 2.843$, $p = .06$, $\eta^2 = .017$. Results were summated in Table 11.

Variable	Sum of Squares	df	Mean Square	F	p	η^2
Tastiness	.096	1	.096	2.733	.099	.008
Fillingness	2.463	1	2.463	1.163	.282	.004
Expensiveness	.000	1	.000	.010	.919	.000
Gross salary*Fluency ^A	.274	2	.137	2.843	.060	.017

Table 11: MANOVA for the healthy fluent versus disfluent condition, (N=110), $R^2 = .006$

^A: the interaction term was only applied for the perceived expensiveness of food

Main analysis for the healthy food conditions with covariates (MANCOVA)

The model was tested again, but covariates were included for this analysis. Levene's test of equality of error variance was still significant for the perceived fullness; $F(5, 324) = 2.400$, $P < .05$. There was just no significant effect of fluency on the perceived tastiness of healthy food; $F(1, 322) = 3.855$, $p = .05$, $\eta^2 = .012$. Although the means do not significantly differ from each other ($p = .05$), it has been decided to analyze the mean scores of the perceived tastiness in more detail, as the significance equals the .05. Participants perceived the tastiness of healthy food in the fluent condition ($M = .547$, $SD = .013$) lower than the tastiness of healthy food in the disfluent condition ($M = .582$, $SD = .012$), but the difference was not significant. The effect of fluency on the perceived fullness of healthy food was also not significant; $F(1, 322) = 1.011$, $p = .32$, $\eta^2 = .003$. Furthermore, no main significant effect of fluency on the perceived expensiveness of healthy food was found; $F(1, 322) = .005$, $p = .94$, $\eta^2 = .000$. Moreover, there was also no significant interaction effect between the gross salary and fluency on the perceived expensiveness of healthy food found, $F(2, 322) = 2.749$, $p = .07$, $\eta^2 = .017$. Results have been summated in Table 12.

Variable	Sum of Squares	df	Mean Square	F	p	η^2
Tastiness	.078	1	.078	3.855	.050	.012
Fullness	2.069	1	2.069	1.011	.315	.003
Expensiveness	.000	1	.000	.005	.942	.000
Gross salary*Fluency ^A	.265	2	.133	2.749	.066	.017

Table 12: MANCOVA for the healthy fluent versus disfluent condition, when controlling for the four control variables, (N=110), $R^2 = .427$

^A: the interaction term was only applied for the perceived expensiveness of food

The explained variances increased largely the control variables were inserted into the main analysis ($R^2_{\text{MANCOVA}} = .427$; $R^2_{\text{MANOVA}} = .006$). The MANCOVA showed that the perceived tastiness of healthy food in the disfluent condition just not significantly decreased from the perceived tastiness in the fluent condition ($p = .05$).

Main analysis for the unhealthy food conditions without covariates (MANOVA)

The fluent and disfluent versions of the unhealthy foods were also compared with each other. Levene's test of equality of error variance was significant for the perceived expensiveness of

food; $F(5, 393) = 2.331$, $p < .05$. There was no significant main effect of fluency on the perceived tastiness of unhealthy food, $F(1, 393) = 3.023$, $p = .08$, $\eta^2 = .008$. Also the effect of fluency on the perceived fillingness of unhealthy food was not significant, $F(1, 393) = .434$, $p = .51$, $\eta^2 = .001$, even as the effect of fluency on the perceived expensiveness of unhealthy food, $F(1, 393) = .314$, $p = .58$, $\eta^2 = .001$. However, there was a significant, weak interaction effect between the gross salary and fluency on the perceived expensiveness of unhealthy food, $F(2, 393) = 4.106$, $p < .05$, $\eta^2 = .020$. Therefore, the main effect of healthiness on the perceived expensiveness became less relevant (Hair et al., 2010). The post hoc analysis (LSD) showed that consumers with a below modal income, perceived the expensiveness of unhealthy food in the fluent condition significantly lower than in the disfluent condition ($MDifference = -.080$, $p < .05$). In addition, consumers with a below modal income perceived the expensiveness of unhealthy food significantly higher than consumers with a modal income in the disfluent condition ($MDifference = .089$, $p < .01$). The results have been summated in Table 13.

Variable	Sum of Squares	df	Mean Square	F	p	η^2
Tastiness	.132	1	.132	3.023	.083	.008
Fillingness	1.026	1	1.026	.434	.511	.001
Expensiveness	.012	1	.012	.314	.575	.001
Gross salary*Fluency ^A	.321	2	.160	4.106	< .05	.020

Table 13: MANOVA for the unhealthy fluent versus disfluent condition, (N=133), $R^2 = .029$

^A: the interaction term was only applied for the perceived expensiveness of food

Main analysis for the unhealthy food conditions with covariates (MANCOVA)

The control variables were again added to the main analysis to see if the main result would change if they were taken into account. When conducting the MANCOVA for the fluent and disfluent condition of the unhealthy foods, Levene's test was still significant for expensiveness; $F(5, 393) = 2.578$, $p < .05$. The effect of disfluency on the perceived tastiness of unhealthy food was not significant; $F(1, 391) = 1.181$, $p = .28$, $\eta^2 = .003$. Also the effect of disfluency on the perceived fillingness of unhealthy food was not significant, $F(1, 391) = .135$, $p = .71$, $\eta^2 = .000$. In addition, the effect of fluency on the perceived expensiveness for unhealthy food was not significant; $F(1, 391) = .348$, $p = .56$, $\eta^2 = .001$. However, the interaction between the gross salary and fluency had still a significant weak effect on the

perceived expensiveness of food; $F(2, 391) = 3.032, p < .05, \eta^2 = .015$. Therefore, the main effect became again less relevant (Hair et al., 2010). The post hoc analysis (LSD) showed that participants with a below moderate income perceived the expensiveness of unhealthy food in the fluent condition significant higher than respondents with an above modal income in the fluent condition ($MDifference = .063, p < .05$). In contrast, participants with a below moderate income, perceived the expensiveness of unhealthy food in the disfluent condition lower than participants with an above modal income ($MDifference = -.087, p < .05$). Furthermore, respondents with a modal income perceived the expensiveness of unhealthy food in the fluent condition significantly higher than respondents with an above modal income ($MDifference = .076, p < .05$). Respondents with a moderate income perceived the expensiveness of unhealthy food in the fluent condition significantly higher than respondents with a below modal income in the disfluent condition ($MDifference = .041, p < .05$). Finally, participants with an above modal income perceived the expensiveness of unhealthy food in the fluent condition significantly lower than in the disfluent condition ($MDifference = -.122, p < .05$). Results have been summated in Table 14.

Variable	Sum of Squares	df	Mean Square	F	p	η^2
Tastiness	.021	1	.021	1.181	.278	.003
Fillingness	.310	1	.310	.135	.714	.000
Expensiveness	.014	1	.014	.348	.556	.001
Gross salary*Fluency ^A	.236	2	.118	3.032	< .05	.015

Table 14: MANCOVA for the unhealthy fluent versus disfluent condition, when controlling for the four control variables, (N=133), $R^2 = .612$

^A: the interaction term was only applied for the perceived expensiveness of food

The explained variances increased largely when inserting the control variables to the main analysis ($R^2_{MANCOVA} = .612; R^2_{MANOVA} = .029$), and the results of the MANCOVA are more useful. Only the interaction effect was significant for both the main analysis with and without covariates.

Main analysis for healthy and unhealthy food in the disfluent condition without covariates (MANOVA)

It remains still unclear if presenting the nutrition information in a disfluent way really mitigated the strength of the implicit intuitions when comparing healthy and unhealthy foods. Therefore, the disfluent conditions of the healthy and unhealthy foods were also compared with each other. It first needs to be notified that Levene's test was significant for expensiveness, $F(5, 354) = 3.376$, $p < .01$. The effect of disfluency on the perceived tastiness of food was not significant; $F(1, 354) = 3.243$, $p = .07$, $\eta^2 = .009$. The effect of disfluency on the perceived fillingness of food remained significant, $F(1, 354) = 5.018$, $p < .05$, $\eta^2 = .014$. The post hoc analysis showed that the perceived fillingness of healthy food was significantly lower than unhealthy foods ($MDifference = -.450$, $p < .01$). There was no main significant effect of disfluency on the perceived expensiveness of food, $F(1, 354) = .003$, $p = .96$, $\eta^2 = .000$. Moreover, the interaction effect was not significant, $F(2, 354) = .694$, $p = .50$, $\eta^2 = .004$. The above-mentioned results were summated in Table 15.

Variable	Sum of Squares	df	Mean Square	F	p	η^2
Tastiness	.129	1	.129	3.243	.073	.009
Fillingness	10.402	1	10.402	5.018	.026	.014
Expensiveness	.000	1	.000	.003	.959	.000
Gross salary*Fluency ^A	.060	2	.030	.694	.500	.004

Table 15: MANOVA for the healthy versus unhealthy disfluent condition, (N=120), $R^2 = .003$

^A: the interaction term was only applied for the perceived expensiveness of food

Main analysis for healthy and unhealthy food in the disfluent condition with covariates (MANCOVA)

Afterwards, MANCOVA was executed for healthy and unhealthy food in the disfluent condition. It first needs to be notified that Levene's test was again significant for expensiveness, $F(5, 354) = 3.352$, $p < .01$. The effect of disfluency on the perceived tastiness was not significant; $F(1, 352) = .349$, $p = .56$, $\eta^2 = .001$. Again, disfluency had a significant, weak effect on the perceived fillingness of food, $F(1, 352) = 6.460$, $p < .05$, $\eta^2 = .018$. The post hoc analysis showed that the perceived fillingness of healthy food ($M = 3.97$, $SD = 0.13$) was significantly lower than unhealthy foods ($M = 4.49$, $SD = .16$) ($MDifference = -.512$, $p < .05$). There was no significant effect of disfluency on the perceived expensiveness of food, F

(1, 352) = .011, $p = .92$, $\eta^2 = .000$, and no significant interaction effect, $F(2, 352) = .759$, $p = .47$, $\eta^2 = .004$. Results have been summated in Table 16.

Variable	Sum of Squares	df	Mean Square	F	p	η^2
Tastiness	.007	1	.007	.349	.555	.001
Fillingness	13.181	1	13.181	6.460	< .05	.018
Expensiveness	.000	1	.000	.011	.917	.000
Gross salary*Fluency ^A	.066	2	.033	.759	.469	.004

Table 16: MANCOVA for the healthy versus unhealthy disfluent condition, when controlling for the four control variables, (N=120), $R^2 = .479$

^A: the interaction term was only applied for the perceived expensiveness of food

The explained variances again increased largely when inserting the control variables to the main analysis ($R^2_{\text{MANCOVA}} = .479$; $R^2_{\text{MANOVA}} = .003$). Therefore the results of the MANCOVA have been seen as more useful and were used to test the hypothesis. The results of Table 16 (healthy versus unhealthy disfluent) were compared with the results of Table 10 (healthy versus unhealthy fluent) to determine if the strengths of the implicit intuitions were mitigated. In the fluent condition, the perceived tastiness was significantly in favor of unhealthy food, whereas this significant effect disappeared in the disfluent condition. Therefore, disfluency mitigated the strength of the implicit belief of tastiness. The perceived fillingness of food stayed in favor of unhealthy food, but the strength increased ($M_{\text{Difference Fluent}} = .787$, $M_{\text{Difference Disfluent}} = -.512$). Therefore, also the strength of this intuition was mitigated. There was no significant effect in the fluent condition for the perceived expensiveness. Also the disfluent condition did not reveal a significant effect. Therefore, Hypothesis 2 was supported for the perceived tastiness and fillingness of food, but not for the perceived expensiveness.

Hypothesis 3

A regression analysis was executed in order to examine Hypothesis 3. Hypothesis three was as follows: If people perceive food as tasty, filling and inexpensive this will positively affect the: (a) desire to eat and (b) purchase intention. There has been looked at the standardized regression coefficients.

The regression model with the desire to eat as dependent variable and the perceived tastiness, fillingness and expensiveness as independent variables was significant, $F(3, 725) =$

462.746, $p < 0.001$. The regression model was thus useful to explain the desire to eat. However the prediction had a moderate strength: 66 per cent of the difference in the desire to eat can be explained by the perceived tastiness, fillingness and expensiveness of food ($R^2 = .656$). Tastiness, $\beta = .814$, $t = 36.20$, $p < .001$, 95% CI [.730, .814], had a significant strong cohesion with the desire to eat. One point extra to the 7-point scale of tastiness cohered with an increase of .814 on the desire to eat. Fillingness, $\beta = -.010$, $t = .77$, $p = .45$, 95% CI [-.007, .004], had no significant cohesion with the desire to eat, as well as expensiveness, $\beta = .030$, $t = 1.37$, $p = .171$, 95% CI [-.012, .067]. Therefore, Hypothesis 3A was only partially accepted, thereby implying that only the perceived tastiness had a positive significant effect on the desire to eat.

The regression model with purchase intention as dependent variable and the perceived tastiness, fillingness and the perceived expensiveness as independent variables was also significant, $F(3, 725) = 151.22$, $p < 0.001$. The regression model was thus useful to explain purchase intention. The prediction had a moderate strength: 38 per cent of the difference in purchase intention could be explained by the perceived tastiness, fillingness and expensiveness of food ($R^2 = .382$). Tastiness, $\beta = .619$, $t = 20.55$, $p < .001$, 95% CI [.554, .672], had a significant cohesion with purchase intention. Every point extra on the 7-point scales of tastiness cohered with an increase of .619 on purchase intention. The perceived fillingness of food had no significant cohesion with purchase intention, $\beta = .000$, $t = .08$, $p = .994$, 95% CI [-.008, .008]. Furthermore, the perceived expensiveness, $\beta = -.021$, $t = -.729$, $p = .466$, 95% CI [-.076, .035], also had no significant coherency with purchase intention. Therefore, also Hypothesis 3B was partially accepted. Again, only the perceived tastiness of food had a significant positive effect on purchase intention. Results of the regression analysis were summated in Table 17.

Model	Desire to eat	Purchase intention
	β	β
Constant	.192	.212
Tastiness	.814**	.619**
Fillingness	-.010	.000
Expensiveness	.030	-.021
R^2	.656	.382
F	462.75**	151.22**

Table 17: Regression analysis for both (a) the desire to eat and (b) purchase intention, (N=243)

* $p < .05$, ** $p < .001$

Hypothesis 4

The fourth Hypothesis assumed that a fluent description of food would positively affect purchase intention compared to a disfluent description of food. A one-way variance analysis was executed in order to examine the hypothesis. There was no significant effect between fluency and purchase intention found, $F(1, 727) = 1.271$, $p = .26$, $\eta^2 = .002$. Therefore, the result did not support Hypothesis 4.

Hypothesis 5

The fifth Hypothesis assumed that the desire to eat and purchase intention positively affect each other. This was tested with the Pearson correlation coefficient. There was a significant positive relationship between the desire to eat and purchase intention, $r = .654$, $n = 729$, $p < .001$. Therefore, Hypothesis 5 was supported.

4.2.7 Testing explicitness of beliefs about food

This study also measured if participants explicitly agreed with the three intuitions. First, a factor analysis was conducted in order to determine if the prearranged statements related to tastiness and fillingness could be merged into two factors. The perceived expensiveness of food was excluded from the factor analysis, because a single item measured the factor. The KMO score was .828 and Bartlett's test of sphericity was significant. Therefore it was allowed to conduct a factor analysis (Hair et al., 2010). The communality of the item 'Food that is unhealthy, generally taste better' was extremely low (.201). Therefore, this item was deleted from the factor analysis. After a factor rotation (Varimax), the factor analysis revealed two factors, and all predetermined items loaded highly on the expected factor. In addition, all factor loadings were above .4, and therefore were seen as acceptable (Hair et al., 2010). Participants did not agree with the statements related to the 'unhealthy-is-tasty' intuition ($M = 3.39$, $SD = 1.48$). In addition, participants did also not explicitly agree to the 'healthy-is-less' filling intuition ($M = 3.17$, $SD = 1.22$). Participants only confidentially agreed with the statement that unhealthy food is cheaper compared to healthy foods ($M = 4.81$, $SD = 1.66$).

4.2.8 Within-subject analysis

Although there was no hypothesis formulated relating to the effect of food types on the strength of the implicit intuitions of food, the descriptive statistics of the three implicit intuitions per food item seemed to show that the strength of intuitions depend on the sort of food. In addition, Suher et al. (2015) found that food categories influenced the strength of the

implicit intuitions. Therefore, a within-subject MANCOVA was executed for all the four conditions, to check if the strength of the three implicit intuitions depends on the food item and if the mitigation of the strength of the implicit intuitions also could depend on the food item.

First, the different healthy foods (salad, low-fat quark and apple) in the fluent condition, had a strong effect on both the perceived fillingness, $F(1, 148) = 4.973, p < .001, \eta^2 = .16$ and the perceived expensiveness of food; $F(1, 148) = 4.973, p < .001, \eta^2 = .14$. The post hoc analysis (LSD) showed that participants perceived the low-fat quark as more filling compared to the salad (MDifference = 1.114, $p < .001$) and the apple (MDifference = 1.433, $p < .001$). In addition, participants perceived the salad as more expensive compared to the low-fat quark (MDifference = .177, $p < .001$) and the apple (MDifference = .173, $p < .001$).

Second, the healthy foods (salad, low-fat quark and apple) in the disfluent condition had a significant effect on all the three intuitions. The different foods had a significant, weak effect on the perceived tastiness of healthy food; $F(1, 172) = 4.924, p < .01, \eta^2 = .05$. The post hoc analysis (LSD) showed that participants perceived the low-fat quark as less tasty compared to the salad (MDifference = -.083, $p < .01$) and the apple (MDifference = -.072, $p < .05$). In addition, the food type also had a strong significant effect on the perceived fillingness, $F(1, 172) = 11.585, p < .001, \eta^2 = .12$, even as on the perceived expensiveness of food, $F(1, 172) = 9.649, p < .001, \eta^2 = .10$. Participants perceived the low-fat quark again as more filling compared to the salad (MDifference = .596, $p < .05$) and the apple (MDifference = 1.117, $p < .001$). Moreover, participants perceived the salad as more expensive compared to the low-fat quark (MDifference = .090, $p < .05$) and apple (MDifference = .172, $p < .001$).

Third, the different unhealthy foods (hamburger, donut and fries) in the fluent condition had also a strong significant effect on the perceived fillingness of food, $F(1, 211) = 26.232, p < .001, \eta^2 = .20$. The post hoc test (LSD) shown that participants perceived the donut as less filling compared to the hamburger (MDifference = -1.544, $p < .001$) and the fries (MDifference = -1.400, $p < .000$). Furthermore, the food type had a moderate significant effect on the perceived expensiveness of food, $F(1, 211) = 9.063, p < .001, \eta^2 = .08$. The post hoc analysis revealed that participants perceived the hamburger significantly as more expensive compared to the donut (MDifference = .088, $p < .01$) and fries (MDifference = -.133, $p < .001$).

Finally, the different unhealthy foods (hamburger, donut and fries) in the disfluent condition had again a strong significant effect on the perceived fillingness of food, $F(1, 178)$

= 35.144, $p < .001$, $\eta^2 = .28$ and a moderate significant effect on the perceived expensiveness of food, $F(1, 178) = 8.774$, $p < .001$, $\eta^2 = .09$. The post hoc analysis shown that participants perceived the donut still as less filling compared to the hamburger (MDifference = -1.839, $p < .001$) and the fries (MDifference = -1.730, $p < .000$). In addition, participants perceived the hamburger also again as more expensive compared to the donut (MDifference = .108, $p < .01$) and fries (MDifference = .138, $p < .001$).

Chapter 5: Discussion and conclusion

This chapter will discuss the main insights of this study. The first paragraph explains the results of Chapter 4. In the next paragraph, an overall conclusion of the results will be given. In the third paragraph, both theoretical and managerial contributions will be mentioned. In the last paragraph, limitations in combination with suggestions for further research will be indicated.

5.1 General discussion of results

In general, it first needs to be mentioned that the covariates (the current level of hunger and the general liking of food) played an essential role in the direction of the three implicit intuitions. Especially, the perceived tastiness of food differed between the model with and without covariates. For example, when controlling for the covariates, the perceived tastiness of unhealthy food was significantly higher than healthy food, whereas this was not the case when there was no controlling for covariates. Furthermore, the inclusion of the covariates caused a high increase in the explained variance. Therefore, these results were interpreted as more useful.

The results of this study have shown that respondents perceived unhealthy food indeed tastier as healthy food in the fluent condition (normal situation), when controlling for the current hunger level and general liking of food, which is in line with prior research (Glanz et al., 1998; Luomala et al., 2015; Raghunathan et al., 2006). The disfluent presentation of nutrition information mitigated the strength of this intuition, and therefore respondents did not significantly perceived unhealthy food to be tastier than healthy food. Raghunathan et al. (2006) indicated that it is essential to reduce the impact of the ‘unhealthy-is-tasty’ intuition to stimulate healthy food consumption. The results of this study provide a new manner to stimulate the consumption of healthy food by providing evidence that a disfluent description of nutrition information can mitigate the strength of the implicit intuition about tastiness. Moreover, consumers tend to consume more of a food that is perceived as tasty (Raghunathan et al., 2006). Therefore, making healthy food at least as tasty as unhealthy food is an effective way to reduce the consumption of unhealthy food, and to increase the consumption of healthy food.

As expected, participants perceived the fillingness of unhealthy food higher than of healthy food, in the fluent condition. The disfluent presentation of the nutrition information indeed weakened the strength of this effect, although the perceived fillingness of unhealthy food remained higher. Suher et al. (2015) motivated, that highlighting the nourishing aspects

of food, could mitigate the overconsumption of healthy food. Insight of this study showed that disfluency increased the perceived saturating feeling of healthy food and decreases the saturating feeling of unhealthy food. This is positive for the stimulation of healthy food, because the satiation gap between healthy and unhealthy food was reduced by a disfluent presentation of the nutrition information. In addition, the increased feeling of satiation in the disfluent condition of healthy food should have a positive effect on the amount that somebody consumes, because people have to eat less quantities of healthy food to feel equally satiated, as consumers in the fluent condition (Suher et al., 2015). So, this study has shown that a disfluent presentation of nutrition information also could mitigate the overconsumption of healthy food.

The findings did not support the view that healthy food was seen as more expensive than unhealthy food (Dale & Söderhamn, 2015; Nikolaou et al., 2015; Page-Reeves et al., 2013; Stolberg, 2010). The perceived expensiveness of food in the fluent condition was not significantly different between healthy and unhealthy food. Moreover, disfluency did not have a mitigating effect on the strength of the perceived expensiveness for healthy food. This is explained by the absence of a significant difference in the fluent condition, thereby implying that a mitigation of the strength would not have been possible. So, the perceived expensiveness in this study did not differ between healthy and unhealthy food, regardless of whether the nutrition information is presented in a fluent or disfluent way. In addition, this study has shown that the intuition is not more salient for consumers with a low-income than for consumers with a high-income. This is positive for the stimulation of healthy food, since it was expected that healthy food would be less attractive due to its perceived expensiveness and therefore it would be an impediment for consumers to buy healthy food (Williams et al., 2009). One possible explanation for this contrary finding is that the ‘healthy-is-expensive’ intuition is more prevalent in countries where the access to healthy food is limited (Temple, Steyn, Fouri & de Villiers, 2011). However, healthy food is highly accessible in the Netherlands and therefore the perceived expensiveness of healthy food could have been decreased, compared with countries where healthy food is not highly accessible (CBL, 2017). In addition, the perceived expensiveness of food depends on the store where the food is bought. It has been shown that the type of food store (e.g. supermarket or local store) has an impact on food prices and therefore it has also an impact on the perceived expensiveness of food. However, this aspect has not been taken into account in this study. Further research could examine if this would have an effect on the perceived expensiveness of food (Williams, Hull & Kontos, 2009).

After examining the effect of the three implicit intuitions on food consumption decisions, the following insights were found. The results provided strong evidence that the perceived tastiness of food is the most important factor to influence food consumptions. The desire to eat and the purchase intention were both only positively coherent with the perceived tastiness of food. The perceived fullness and expensiveness of food did not seem to influence the desire to eat and the purchase intention. Moreover, the desire to eat and the purchase intention were positively related to each other.

This study also tested, if a fluent presentation of the nutrition information would have a positive effect on the intention to buy food. However, the results did not show a significant difference between the purchase intention in the fluent and disfluent condition, which implied that disfluency in itself does not adversely affect the purchase intention. This is in contradiction with the results by Gomez et al. (2015), who found that higher purchase intentions were related to a more fluent nutrition label. Their main argument was that, if consumers find it difficult to process information, the appraisal of the food product decreases (Gomez et al., 2015). In this study, participants, in the disfluent condition, perceived an increase in higher cognitive effort, compared to the fluent condition. However, disfluency activates the systematic processing style, which makes consumers consciously to think about their intuitions (Alter et al., 2007). This can give people a disapproving feeling when their behavior is in conflict with their attitude and thereby they bring their behavior into line with their intuitions (Maio & Augoustinos, 2005). The increased cognitive effort could cause a positive effect on the purchase intention, because it is directly influenced by the implicit intuitions towards food and therefore also indirectly towards the purchase intention.

It is interesting that respondents in this study seemed to explicitly belief that healthy food is more expensive, whereas consumers did not explicitly believed that unhealthy food was more tasty or filling. This is in contrast with the expectation that implicit intuitions are shaping explicit beliefs, because the implicit beliefs are all contradicting to the explicit belief (Mai et al., 2014) Furthermore, the within-subject analysis showed that the perceived fullness and expensiveness depend on the sort of food product. The perceived fullness of the low-fat quark was significantly higher than the perceived fullness of the salad and the apple. This could be the result of perceiving the low-fat quark as a substitute of a more unhealthy form of quark (Luomala et al., 2015). In addition, the perceived fullness of the donut was significantly lower compared to the hamburger and the salad. One possible explanation for this finding is that a donut cannot be seen as meal, whereas a hamburger or fries could be seen as a meal. However, it was the intention of this study to use all the food

items as a snack instead of a whole meal. The perceived expensiveness of the salad was significantly higher than the low-fat quark and the apple. Furthermore, the perceived expensiveness of the hamburger was significantly higher than the donut and the fries. This may be caused by an increase in the necessary ingredients to make the food item, which makes the food item perceived as more expensive. So, the results also suggest the perceived expensiveness depends on the food type.

5.2 Conclusion

The problems of obesity and obesity-related diseases are still growing and, due to the high burden on society, the need for a solution is more urgent than ever (Orehek & Vazeou-Nieuwenhuis, 2016). The excessive consumption of food is the major cause of obesity and therefore much research is focused on changing the food pattern of consumers (Orehek & Vazeou-Nieuwenhuis 2016). Prior studies have shown that consumer's decisions about food were determined by explicit beliefs (Larkin & Martin, 2016; Mai et al., 2015). However, current studies have proven that food consumption is more often determined by the implicit intuitions (Mai et al, 2015; Raghunathan, et al., 2006; Suher et al., 2015). Unfortunately, these implicit intuitions towards food are not in favor of healthy food. Healthy food has been perceived as less tasty, less filling and more expensive, compared with unhealthy food, thereby it is decreasing the attractiveness of healthy food and it is increasing the obesity problem (Raghunathan et al., 2006; Rao et al., 2013; Suher et al., 2015). Marketers could help the public policy by stimulating healthy food consumption, but they are still struggling to come up with actions that contribute to the solution of this diet-related problem.

This paper takes a step towards addressing this issue, by investigating the effect of fluency on the implicit intuitions about food, and thereby studying the following research question: 'To which extent could fluency affect the three implicit intuitions of taste, fillingness and expensiveness regarding food?' It was expected that a disfluent presentation of nutrition information mitigated the strength of the implicit intuitions for the perceived tastiness, fillingness and expensiveness in the fluent condition when controlling for the current hunger level and the general liking of food. The results should offer food marketers insights that could contribute to the stimulation of healthy food consumption.

It can be concluded that a disfluent presentation of nutrition information indeed mitigates the strength of implicit beliefs and thus could be a useful tool for food marketers to stimulate healthy food consumption. The strength of the perceived tastiness and fillingness of food weakens in the disfluent condition, although the fillingness stays in favor of unhealthy

food. However, it has to be considered, that the implicit intuitions regarding food in the normal situation (fluent), should be beneficial for unhealthy food, in order to exert a positive effect on the stimulation of healthy food. Further, the perceived tastiness of food is the most important factor to influence the desire to eat and the purchase intention and therefore it is essential for the stimulation of healthy food. Healthy food needs to be made more attractive by food marketers. This implies that when the ‘unhealthy-is-tasty’ intuition dominates, it becomes essential to alter the intuition in order to make healthy food more attractive. It would be less essential to change the perceived fillingness of food in the favor of healthy food, because it does not influence actual food consumption behavior, and therefore a change would have minor impact on the stimulation of healthy food consumption. However, the perceived filling of food is an important factor for the quantity of consumption. Turning the perceived filling of food into the favor of healthy food is therefore still important (Suher et al., 2015). The perceived expensiveness of food did not influence the desire to eat or the purchase intention and therefore it is seen as less crucial for the stimulation of healthy food consumption. This can be explained by the idea that people who believe in the ‘healthy-is-tasty’ intuition, are less focusing on the price of food and more focusing on the nutrition information (Mai & Hoffman, 2012). Since the ‘healthy-is-tasty’ intuition predominates in this study, it would be logical to conclude that the price of food indeed would be less relevant for food consumption decisions (Luomala et al., 2015). In addition, a higher desire of eating food indeed leads to a higher intent to buy the food and vice versa. So, it could be concluded that it is important for food marketers to make food attractive in terms of its tastiness, to increase both the desire to eat and the purchase intention. Additionally, disfluency did not exert a negative effect food consumption decision and therefore it is a useful way to make healthy food more attractive. The increased cognitive effort caused by disfluency gained a positive effect on the purchase intention, because it is directly influenced by the implicit intuitions to food and therefore it is indirectly also influenced by the purchase intention (Maio & Augoustinos, 2005).

5.3 Implications

5.3.1 Theoretical implications

The findings add to the existing research in several important ways. First, this work contributes to literature on the effect of metacognitive difficulty on the stimulation of healthy food consumption (Alter et al., 2007; Gomez et al., 2015). The most important theoretical contribution of this study is the empirical evidence that disfluency indeed could be used to interrupt the implicit intuitions about food. The results of this study confirmed that the manipulation of the readability of nutrition information reduces the chance that the intuitions of a consumer are being confirmed as well, which reduces the strength of the intuitions (Hernandez & Preston, 2013). The results of this study proved that the strength of both the perceived tastiness and fillingness of food have decreased when the nutrition information was difficult-to-read (disfluent), thereby implying that the consumption of unhealthy food became less attractive. However, results of this study also suggest that the strength of the intuitions differs between the different food products. For example, the perceived fillingness of the low-fat quark was significantly higher than both the salad and the apple. Therefore, also the effect of disfluency on the implicit intuitions varies among the food products.

Second, this work contributes to a more deeply understanding of the implicit intuitions about food. This study has confirmed that consumers perceived the tastiness and the fillingness of unhealthy food higher than healthy food (Raghunathan et al., 2006; Suher et al., 2015). However, in contrast with prior research, this study did not confirm that healthy food was perceived as more expensive compared with unhealthy food. It was also not confirmed that this intuition normally was more salient for consumers with a low-income (Dale & Söderhamn, 2015; Nikolaou, Hankey & Lean, 2015; Page-Reeves et al., 2013; Stolberg, 2010). As said before, the results of this study offer evidence that the strength of the implicit intuitions indeed differs between the different food products (Suher et al., 2015).

Third, this research advances the knowledge concerning the effect of implicit intuitions on the decisions regarding food consumption (Haws et al., 2016; Raghunathan et al., 2006; Suher et al., 2015). Before this study, it was still not clear how food consumption decisions were influenced by the implicit intuitions of food all together. This study has shown that the perceived tastiness of food is the crucial factor that influences the desire to eat and purchase intention, while it was expected that the perceived fillingness and expensiveness would also have a significant effect (Page-Reeves et al., 2013; Suher et al., 2015). That is why

this study emphasizes the importance of increasing the perceived tastiness of healthy food when the ‘unhealthy-is-tasty’ intuition is dominating.

Last, this paper contributes to the literature of investigating the role of fluency on purchase intention (Gomez et al., 2015). In contrast with prior research, which suggests that a fluent description positively affects the purchase intention of consumers, this study revealed that for the purchase intention it is irrelevant if the nutrition information is portrayed as fluent or disfluent (Gomez et al., 2015). Thus, a disfluent food presentation of nutrition information is an effective way to interrupt the implicit intuitions of food without directly decreasing with the purchase intention of food.

5.3.2 Practical implications

For food marketers, disfluency is an effective tool to interrupt the implicit intuitions about food. Disfluency can counteract the negative effect of the three implicit intuitions regarding healthy food decisions. Verbeke (2006) indicated that consumers are not willing to compromise on taste. Disfluency can exert a positive effect on the perceived tastiness of healthy food, and therefore indirectly also on the desire to eat and the intention to buy healthy food. So, when food products are market with a disfluent food description, the food choices regarding healthy food will be made more attractive. Furthermore, it already has been proven that simplified health information at the point-of-sale helps to increase the selection of healthy foods (Nikolova & Inman, 2015; Suher et al., 2015). Therefore, the combination of disfluency with simplified health information in food stores should have an extra positive effect on the stimulation of healthy food consumption. However, it should be reminded that this tool is only useful for the stimulation of healthy food consumption when the intuitions in the fluent condition are in favor of unhealthy food. Otherwise the already positive intuitions of healthy food will be interrupted and the consumption of healthy food will be impeded instead of stimulated. Additionally, careful consideration should be given to whether consumers are health conscious or not (Heiman & Lowengart, 2014; Luomala et al., 2015). Health conscious consumers tend to base their decision on nutrition information, whereas health unconscious consumers tend to base their decision on the price and packaging, instead of nutrition information (Luomala et al., 2015). Therefore, a disfluent presentation of nutrition information could be less effective to influence food consumption decision of the latter group of consumers. So, food marketers should remind that the effect of fluency might differ between consumers who are health conscious or not (Luomala et al., 2015). Nevertheless, disfluency stays an effective way to control the effect of intuitions and therefore marketers

can play an essential role in influencing diet patterns of people and contribute to the solution of the diet-related diseases.

This research is especially relevant for public policy makers, who want to stimulate healthy food consumption. Public policy makers aim to reduce diet-related diseases by stimulating healthier lifestyles, thereby implying that it is crucial to change food consumption patterns of consumers. The developed insights of a possible solution to stimulate healthy food consumption (disfluency), and therefore to decrease diet-related diseases, should thus initiate public policy makers to consider the implementation of this solution. This study provided empirical evidence that implicit intuitions of food can be controlled, in a subtle way, and leads to food choices in favor of healthy food.

In the end, the insights of this research are also relevant for consumers, because it can help them to combat their implicit intuitions and to perceive healthy food to be more attractive in terms of its tastiness and fillingness. This reduces the amount of necessary self-control to eat healthy, thereby implying that it will be less difficult to actually make healthy food choices.

In summary, food marketers, public policy and consumers can benefit from a disfluent presentation of nutrition information, because it is a tactic that operates at an unconscious level and therefore helps to control the implicit intuitions and stimulate healthy food decisions.

5.4 Limitations and suggestions for future research

This research also has certain limitations that offer avenues for future investigations. First, this study assumed that the three implicit intuitions operate on an implicit level instead of measuring it, because the IAT was not available. So, it cannot be concluded if the intuitions indeed operated at an implicit level. This reduces the internal validity of this study. Further research should measure the intuitions on an implicit level and, in addition, should measure if disfluency mitigates the strength of the implicit intuition. This could be done by exposing consumers to fluent or disfluent descriptions of nutrition information and let them afterwards assign words related to tastiness (e.g. delicious or flavorless), fillingness (e.g. heavy or hungry) and expensiveness of food (e.g. expensive or cheap) to either healthy or unhealthy food pictures.

Second, in this study the perceived tastiness, fillingness and expensiveness of food were measured with an online questionnaire. Nevertheless, it was not considered if participants would perceive the manipulation of the disfluent food description realistically.

This should have been measured in order to determine if respondents could actually imagine themselves in the proposed situation. In addition, the results would have been even more realistic if a real tasting experiment was executed. Further research should examine if a disfluent food presentation also mitigates the strength of implicit intuitions in realistic consumptions contexts. For example, this can be conducted in a supermarket by exposing the participants to food with fluent and disfluent nutrition information and measuring the difference in intuitions.

Third, the factor analysis showed that, even after rotating the factor loadings, the perceived tastiness and the desire to eat food were loading high on only one factor instead of two. This reduces the construct validity of the items in this study (Hair et al., 2010). Moreover, Levene's test of equal variances was significant for expensiveness in the comparison of the disfluent condition of the healthy and unhealthy food. The significant Levene's test in combination with unequal group sizes reduces the external validity of the research.

Fourth, the internal validity of the perceived expensiveness could have been improved by measuring the construct with multiple items, instead of just one. In addition, the perceived expensiveness of food could depend on the way in which 'expensiveness' is considered. For example, an apple could be seen as expensive compared to a donut, but could be seen as cheap compared with a car. Therefore, it would have been better if it was made more clear for the participants that they should evaluate the perceived expensiveness in comparison to other food, by letting them choose which of the two suggested foods (healthy versus unhealthy) is the most expensive. In addition, it should have been taken into account where people bought their groceries, in order to examine if the perceived expensiveness of food depends on the food store (Williams et al., 2009). Further research should examine if the 'healthy-is-expensive' intuition actually depends on the stores where people bought their groceries.

Fifth, the unequal distribution of men (36 per cent) and women (64 per cent) in this study decreases the generalizability of the results. Earlier studies have proven that women emphasize greater importance on their health and physical attributes and make other food choices than men (Heiman & Lowengart, 2014). So, a more equal distribution of males/females would have been better for the external validity of this research. Further research could examine if the effect of disfluency on the implicit intuitions and on food choices differ between men and women.

Sixth, this study did not take into account if people are health conscious or not, while it has been proven that health consciousness strongly effect the decision-making process for

food (Luomala et al., 2015). Health conscious people are focusing on nutrition information, whereas people who are health unconscious are more focusing on the price and packaging of nutrition information. So, the extent to whether someone is health consciousness could influence the effectiveness of a disfluent presentation of nutrition information. Future research should take this moderator into account to exert the effectiveness of a disfluent presentation of nutrition information.

Last, this survey was conducted in Dutch, thereby implying that only Dutch-speaking people were able to participate in the study. This limits the generalizability of the results. The perceived tastiness of food is reflected by the origin of the country of the consumers (Tiu Wright, Nancarrow & Kwok, 2001). This also leads to different perceptions of whether healthy food is tasty or not (Werle et al., 2013). Therefore, cross-national research would be useful to examine which characteristics influence the relationship between healthiness and tastiness. Identifying these characteristics could increase the predictability of which intuition dominates in which country and could help food marketers to decide whether it is useful to present nutrition information in a disfluent way.

As final remark, in this study, it has not been explicitly taken into account if the perceived tastiness, fillingness and expensiveness differ among types of food (salad, quark et cetera). The diversity of products in the real world makes it important to further research the effect of disfluency on different food types (Suher et al., 2015). Additionally, the within-subject analysis revealed that the perceived tastiness, fillingness and expensiveness between the food items significantly differ from each other. Moreover, the effect of disfluency also depends on food types. So, future research should examine more in-depth if food types moderate the effect of a disfluent presentation of nutrition information on the perceived tastiness, fillingness and expensiveness.

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Appendix

Appendix 1 – Fluency manipulation (English)



Food evaluation

Salad



This food has a NuVal score of 94, it is a healthy food.

* The NuVal system scores food on a scale of 1-100. The higher the NuVal score, the healthier the food. It's that simple.



Føød ev@lu@tîøn

\$@l@d



Thî\$ føød h@\$ @ NuV@l \$core øf 94, ît î\$ @ he@lthy føød

* The NuVal system scores food on a scale of 1-100. The higher the NuVal score, the healthier the food. It's that simple.



Food evaluation

Low-fat quark



This food has a NuVal score of 90, it is a healthy food.

* The NuVal system scores food on a scale of 1-100. The higher the NuVal score, the healthier the food. It's that simple



Føød ev@lu@tîøn

Løw-f@t qu@®k



This food has a NuVal score of 90, it is a healthy food.

* The NuVal system scores food on a scale of 1-100. The higher the NuVal score, the healthier the food. It's that simple



Food evaluation Apple



This food has a NuVal score of 96, it is a healthy food.

* The NuVal system scores food on a scale of 1-100. The higher the NuVal score, the healthier the food. It's that simple.



Føød ev@lu@tîøn @pple



Thî\$ føød h@\$ @ NuV@l \$core of 96, ît î\$ @ he@lthy føød

* The NuVal system scores food on a scale of 1-100. The higher the NuVal score, the healthier the food. It's that simple.

Food evaluation Hamburger



This food has a NuVal score of 24, it is an unhealthy food.

* The NuVal system scores food on a scale of 1-100. The higher the NuVal score, the healthier the food. It's that simple.

Føød ev@lu@tîøn H@mßu®ge®



**Thî\$ føød h@\$ @ NuV@l Score of 24, ît î\$ @n unhe@lthy
føød**

* The NuVal system scores food on a scale of 1-100. The higher the NuVal score, the healthier the food. It's that simple.



Food evaluation

Donut



This food has a NuVal score of 15, it is an unhealthy food.

* The NuVal system scores food on a scale of 1-100. The higher the NuVal score, the healthier the food. It's that simple.



Føød ev@lu@tîøn

Dønut

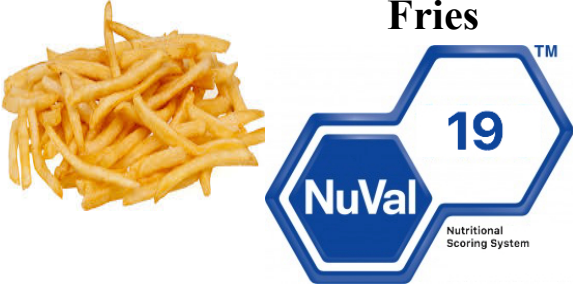


Thî\$ føød h@\$ @ NuV@l \$core of 15, ît î\$ @n unhe@lthy føød

* The NuVal system scores food on a scale of 1-100. The higher the NuVal score, the healthier the food. It's that simple.

Food evaluation

Fries

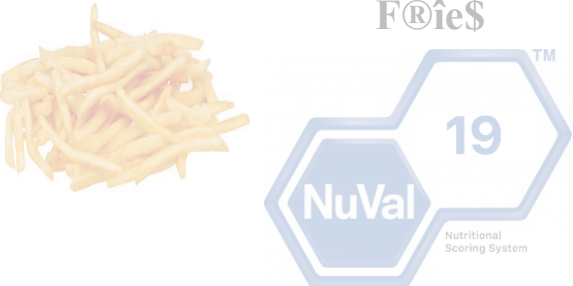


This food has a NuVal score of 19, it is an unhealthy food.

* The NuVal system scores food on a scale of 1-100. The higher the NuVal score, the healthier the food. It's that simple.

Føød ev@lu@tîøn

F®ië\$



Thî\$ føød h@\$ @ NuV@l \$core øf 19, ît î\$ @n unhe@lthy føød

* The NuVal system scores food on a scale of 1-100. The higher the NuVal score, the healthier the food. It's that simple.

Appendix 2 – Fluency manipulation (Dutch)



Voedsel evaluatie

Salade



Dit eten heeft een NuVal score van 94, het is een gezond etenswaar.

* Het NuVal systeem evalueert eten op een schaal van 1-100. Hoe hoger de NuVal score, des te gezonder het eten. Zo eenvoudig is het.



Voed\$el ev@lu@tîe

\$@l@de



Dît eten heeft een NuV@l \$core v@n 94, het î\$ een gezønd eten\$w@(@®.

* Het NuVal systeem evalueert eten op een schaal van 1-100. Hoe hoger de NuVal score, des te gezonder het eten. Zo eenvoudig is het.



Voedsel evaluatie Magere kwark



Dit eten heeft een NuVal score van 90, het is een gezond etenswaar.

* Het NuVal systeem evalueert eten op een schaal van 1-100. Hoe hoger de NuVal score, des te gezonder het eten. Zo eenvoudig is het.



Voed\$el ev@lu@tïe M@ge®e kw@®k



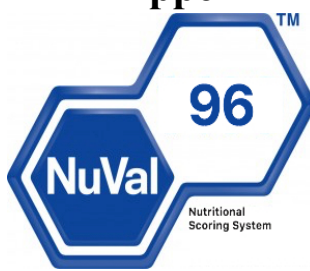
Dît eten heeft een NuV@l \$core v@n 90, het î\$ een gezond eten\$w@®®.

* Het NuVal systeem evalueert eten op een schaal van 1-100. Hoe hoger de NuVal score, des te gezonder het eten. Zo eenvoudig is het.



Voedsel evaluatie

Appel



Dit eten heeft een NuVal score van 96, het is een gezond etenswaar.

* Het NuVal systeem evalueert eten op een schaal van 1-100. Hoe hoger de NuVal score, des te gezonder het eten. Zo eenvoudig is het.



Voed\$el ev@lu@tïe

@ppel



Dît eten heeft een NuV@l \$core v@n 96, het î\$ een gezond eten\$w@(@®.

* Het NuVal systeem evalueert eten op een schaal van 1-100. Hoe hoger de NuVal score, des te gezonder het eten. Zo eenvoudig is het.



Voedsel evaluatie Hamburger



Dit eten heeft een NuVal score van 24, het is een ongezond etenswaar.

* Het NuVal systeem evalueert eten op een schaal van 1-100. Hoe hoger de NuVal score, des te gezonder het eten. Zo eenvoudig is het.



Voed\$el ev@lu@tïe H@mßu®ge®



Dît eten heeft een NuV@l Score v@n 24, het î\$ een øngezønd eten\$w@®®.

* Het NuVal systeem evalueert eten op een schaal van 1-100. Hoe hoger de NuVal score, des te gezonder het eten. Zo eenvoudig is het.



Voedsel evaluatie

Donut



Dit eten heeft een NuVal score van 15, het is een ongezond etenswaar.

* Het NuVal systeem evalueert eten op een schaal van 1-100. Hoe hoger de NuVal score, des te gezonder het eten. Zo eenvoudig is het.



Vøedsel ev@lu@tïe

Dønut



Dît eten heeft een NuV@l Score v@n 15, het î\$ een øngezønd eten\$w@@®.

* Het NuVal systeem evalueert eten op een schaal van 1-100. Hoe hoger de NuVal score, des te gezonder het eten. Zo eenvoudig is het.

Voedsel evaluatie

Friet



Dit eten heeft een NuVal score van 19, het is een ongezond etenswaar.

* Het NuVal systeem evalueert eten op een schaal van 1-100. Hoe hoger de NuVal score, des te gezonder het eten. Zo eenvoudig is het.

Voed\$el ev@lu@tîe

F®îet



Dît eten heeft een NuV@l \$core v@n 19, het î\$ een ongezønd eten\$w@®.

* Het NuVal systeem evalueert eten op een schaal van 1-100. Hoe hoger de NuVal score, des te gezonder het eten. Zo eenvoudig is het.

Appendix 3 – Questionnaire (English)

Welcome,

I am Caro, a female student at the Radboud University at Nijmegen. This survey is part of my master thesis and you would help me a lot if you would fill in my questionnaire. In this questionnaire, I am investigating your experience with food. The questions are related to three different foods. Filling in this questionnaire will maximal take ten minutes of your time and your answers are anonymous. Your answers will only be used for scientific purposes. You may enter your email address at the end of the questionnaire if you are interested in the results of my research.

I would like to thank you in advance for your participation.

(Question before the consumer is exposed to the food pictures)

1) How hungry are you right now?

Not hungry at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very Hungry

Now, three pictures of different foods will follow. After showing you an image about one food, you will be asked to answer a few questions. These questions are related to the food shown before. As soon as a new food is shown, the questions will be related to the new food.

It is important that you carefully read and look to the nutritional information and the image of the food in question before you are going to answer the belonging questions.

(Question per picture after being exposed to it)

2) I like this food

Dislike intensely ☐ ☐ ☐ ☐ ☐ ☐ ☐ Like very much

3) Regular consumption of this food would cause an increase in weight

Not at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very much

4) This food is perceived as tasty

Not tasty at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very tasty

5) How much would you enjoy eating this food?

No joy at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ A lot of joy

6) Eating this food would give me pleasure

No pleasure at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ A lot of pleasure

7) I would still feel hungry after consuming this food

Not hungry at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very Hungry

8) I would feel filled after consuming this food

Not filled at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very filled

9) I expect this food to be rather expensive

Not expensive at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very expensive

10) I would like to purchase this food

Very unlikely to buy ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very likely to buy

11) Buying this food would fit my financial groceries expenses

Not at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very much

12) How much did what you just saw, make, that you want to eat?"

Not at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very much

13) I would like to consume this food

Not at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very much

*These questions will be repeated three times (after every food picture)

These were the questions related to one specific image of the food. Now, a few more general questions related to ALL the shown foods are going to be asked.

(Manipulation check)

14) The pictures I have seen were examples of healthy foods

Not healthy at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very healthy

15) The nutrition information was clearly visible and readable

Strongly disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly agree

16) I found it difficult to process the nutrition information

Not difficult at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Extremely difficult

(Explicitly belief in the intuitions)

17) The more unhealthy the food, the better its taste

Strongly disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly agree

18) There is no way to make food healthier without sacrificing taste

Strongly disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly agree

19) Food that is unhealthy generally taste better

Strongly disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly agree

20) Unhealthy food is more filling compared to healthy food

Strongly disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly agree

21) Processed food is more filling compared to unprocessed food

Strongly disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly agree

22) High fat containing food is more filling compared to low fat containing food

Strongly disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly agree

23) High sugar containing food is more filling compared to low sugar containing food

Strongly disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly agree

24) Unhealthy food is cheaper than healthy food

Strongly disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly agree

(Control questions)

25) Are you on a diet at the present moment?

- ☐ Yes, always
- ☐ Yes, almost always
- ☐ Sometimes
- ☐ No, almost never
- ☐ No, never

26) How often do you in general exercise in a week?

- ☐ 7 days
- ☐ 6 days
- ☐ 5 days
- ☐ 4 days
- ☐ 3 days
- ☐ 2 days
- ☐ 1 day
- ☐ Never

27) Are you allergic for one of the foods that have been show to you?

- ☐ Yes, namely.....
- ☐ No

(Demographics)

28) What is your age?

.....

29) What is your gender?

- ☐ Male
- ☐ Female

30) What is your weight (kilogram)?

.....

31) What is your height (in centimeters)?

.....

32) What is your highest level of education?

- ☐ Primary education
- ☐ Primary vocational education, also: LTS/LAS/LHNO/VBO/LEAO
- ☐ Secondary education, also: VMBO/MAVO/ULO/MULO/VGLO
- ☐ Intermediate vocational education (MBO), also: MDGO/MAS/MTS/MEAO
- ☐ Tertiary education, also: HAVO/VWO/MMS/Athenaeum/HBS/Gymnasium
- ☐ Higher vocational education, also: HTS/PABO/HEAO/HAS
- ☐ College
- ☐ Otherwise, namely.....

33) What is the gross salary of your household per year?

- ☐ Less than 18.250 euro per year
- ☐ Between the 18.250 and 73.000 euro per year
- ☐ More than 73.000 euro per year

33) Do you have some additional thoughts/remarks to this online test?

.....

.....

.....

34) If you are curious to the results of this survey, please leave your email address below. The summarized results will then be sent afterwards

.....

This is the end of the online test. Thank you very much for your time, effort and participating to this survey.

Appendix 4 –Questionnaire (Dutch)

Welkom,

Ik ben Caro, een studente aan de Radboud Universiteit te Nijmegen. Deze vragenlijst is onderdeel van mijn masterthesis en u zou mij enorm helpen als u deze vragenlijst zou willen invullen. Via deze vragenlijst doe ik onderzoek naar uw ervaring met voedsel. De vragen hebben betrekking op drie verschillende etenswaren. Het invullen van deze vragenlijst zal maximaal 10 minuten van uw tijd in beslag nemen en uw antwoorden zijn anoniem. De antwoorden zullen alleen gebruikt worden voor wetenschappelijke doeleinden. U kunt eventueel aan het einde van de vragenlijst uw e-mailadres invoeren als u geïnteresseerd bent in de resultaten van mijn onderzoek.

Alvast bedankt voor uw tijd en moeite!

(Vraag voordat consumenten de afbeeldingen te zien krijgen)

1) Hoeveel trek heeft u op dit moment?

Totaal geen trek ☐ ☐ ☐ ☐ ☐ ☐ ☐ Heel veel trek

Nu volgen afbeeldingen van drie verschillende etenswaren. Na elke afbeelding zal u een aantal vragen worden voorgelegd. Deze vragen hebben betrekking op het etenswaar dat daarvoor getoond is. Zodra een nieuw etenswaar wordt getoond, hebben de vragen betrekking op het nieuwe etenswaar.

Het is belangrijk dat u de voedingswaarde-informatie en de afbeelding van het desbetreffende etenswaar zorgvuldig leest en bekijkt voordat u de vragen beantwoordt.

(Vragen per etenswaar nadat ze de afbeelding te zien hebben gekregen)

2) Ik lust dit eten

Helemaal niet ☐ ☐ ☐ ☐ ☐ ☐ ☐ Helemaal wel

3) Regelmatige consumptie van dit eten zou voor een toename in gewicht zorgen

Helemaal geen toename ☐ ☐ ☐ ☐ ☐ ☐ ☐ Een grote toename

4) Dit eten lijkt mij lekker

Helemaal niet lekker ☐ ☐ ☐ ☐ ☐ ☐ ☐ Heel erg lekker

5) Hoe erg zult u van dit eten genieten?

Helemaal niet ☐ ☐ ☐ ☐ ☐ ☐ ☐ Heel erg veel

6) Het eten van dit voedsel zou ik als aangenaam ervaren

Helemaal niet aangenaam ☐ ☐ ☐ ☐ ☐ ☐ ☐ Heel erg aangenaam

7) Ik zou mij nog steeds hongerig voelen nadat ik dit voedsel heb gegeten

Helemaal niet hongerig ☐ ☐ ☐ ☐ ☐ ☐ ☐ Heel erg hongerig

8) Ik zou mij vol (verzadigd) voelen nadat ik dit voedsel heb gegeten

Helemaal niet vol ☐ ☐ ☐ ☐ ☐ ☐ ☐ Heel erg vol

9) Ik verwacht dat dit eten vrij duur is

Helemaal niet duur ☐ ☐ ☐ ☐ ☐ ☐ ☐ Heel erg duur

10) Ik zou dit eten graag kopen

Helemaal niet graag ☐ ☐ ☐ ☐ ☐ ☐ ☐ Heel erg graag

11) Het kopen van dit eten valt binnen mijn huidige uitgaven aan boodschappen

Helemaal niet ☐ ☐ ☐ ☐ ☐ ☐ ☐ Heel erg

12) Hoe graag zou je dit product willen eten nu je het gezien hebt?

Helemaal niet graag ☐ ☐ ☐ ☐ ☐ ☐ ☐ Heel erg graag

13) Ik zou dit product graag eten

Helemaal niet graag ☐ ☐ ☐ ☐ ☐ ☐ ☐ Heel erg graag

*Deze vragen herhalen zich driemaal (voor ieder plaatje gelden dus dezelfde vragen).

Dit waren de vragen die betrekking hebben tot de specifieke afbeelding van het etenswaar. Nu volgen nog een aantal algemene vragen die betrekking hebben op ALLE etenswaren die u heeft gezien.

(Manipulatiecheck)

14) De afbeeldingen die u net heeft gezien zijn voorbeelden van gezond eten

Helemaal niet gezond ☐ ☐ ☐ ☐ ☐ ☐ ☐ Heel erg gezond

15) De informatie over het etenswaar was duidelijk zichtbaar en leesbaar

Helemaal mee oneens ☐ ☐ ☐ ☐ ☐ ☐ ☐ Helemaal mee eens

16) Ik had moeite met het verwerken van de voedingswaarde-informatie

Helemaal geen moeite ☐ ☐ ☐ ☐ ☐ ☐ ☐ Heel veel moeite

(Expliciet ook voldoen aan intuïties)

17) Hoe ongezonder het eten, des te lekkerder het smaakt

Helemaal mee oneens ☐ ☐ ☐ ☐ ☐ ☐ ☐ Helemaal mee eens

18) Er is geen manier om het eten gezonder te maken zonder smaak op te offeren

Helemaal mee oneens ☐ ☐ ☐ ☐ ☐ ☐ ☐ Helemaal mee eens

19) Ongezonder eten smaakt over het algemeen beter

Helemaal mee oneens ☐ ☐ ☐ ☐ ☐ ☐ ☐ Helemaal mee eens

20) Ongezonder eten vult beter dan gezond eten

Helemaal mee oneens ☐ ☐ ☐ ☐ ☐ ☐ ☐ Helemaal mee eens

21) Bewerkt eten vult beter dan onbewerkt eten

Helemaal mee oneens ☐ ☐ ☐ ☐ ☐ ☐ ☐ Helemaal mee eens

22) Eten dat veel vet bevat vult beter dan eten dat weinig vet bevat

Helemaal mee oneens ☐ ☐ ☐ ☐ ☐ ☐ ☐ Helemaal mee eens

23) Eten dat veel suiker bevat vult beter dan eten dat weinig suiker bevat

Helemaal mee oneens ☐ ☐ ☐ ☐ ☐ ☐ ☐ Helemaal mee eens

24) Ongezonder eten is goedkoper dan gezond eten

Helemaal mee oneens ☐ ☐ ☐ ☐ ☐ ☐ ☐ Helemaal mee eens

(Controle vragen)

25) Bent u op het huidige moment op dieet?

☐ Ja, altijd

☐ Ja, bijna altijd

☐ Soms

☐ Nee, bijna nooit

☐ Nee, nooit

26) Hoe vaak sport u over het algemeen per week?

☐ 7 dagen ☐ 3 dagen

☐ 6 dagen ☐ 2 dagen

☐ 5 dagen ☐ 1 dag

☐ 4 dagen ☐ Nooit

27) Heeft u een allergie voor één of meer van de getoonde etenswaren?

☐ Ja, namelijk

☐ Nee

(Demografische vragen)

28) Wat is uw leeftijd?

.....

29) Wat is uw geslacht?

☐ Man

☐ Vrouw

30) Wat is uw gewicht (in kilogram) ?

.....

31) Wat is uw lengte (in centimeters) ?

.....

32) Wat is uw hoogst genoten opleiding?

☐ Lager onderwijs (basisonderwijs)

☐ Lager beroepsonderwijs (LBO) , ook wel: LTS/LAS/LHNO/VBO/LEAO

☐ Middelbaar algemeen onderwijs, ook wel: VMBO/MAVO/ULO/MULO/VGLO

☐ Middelbaar beroepsonderwijs (MBO), ook wel: MDGO/MAS/MTS/MEAO

☐ Hoger voortgezet onderwijs , ook wel: HAVO/VWO/MMS/Atheneum/HBS/Gymnasium

☐ Hoger beroepsonderwijs (HBO), ook wel: HTS/PABO/HEAO/HAS

☐ Universiteit

☐ Anders, namelijk

33) Wat is het brutosalaris van uw huishouden per jaar?

☐ Minder dan 18.250 euro per jaar

☐ Meer dan 18.250 euro per jaar, maar minder dan 73.000 euro per jaar

☐ Meer dan 73.000 euro per jaar

34) Heeft u nog aanvullende gedachten/opmerkingen aan deze vragenlijst?

.....
.....
.....

34) Als u benieuwd bent naar de resultaten van deze online test naar voedselwaren kunt u hieronder uw e-mailadres achter laten. De samengevatte resultaten zullen dan achteraf toegezonden worden

.....

Dit is het einde van de vragenlijst. Hartelijk dank voor uw tijd en moeite voor het invullen van deze enquête!

Appendix 5 – Remarks of the pre-test

It was not for everyone clear if people need to answer the questions in the case if they do so (e.g. when they actually consume fries) or if they need to answer the questions in the case of their daily consumption patterns (e.g. related to how often they consume/buy fries).

This had lead to a more clear description in the introduction.

The word ‘prettig’ needs to be replaced by ‘aangenaam’, because this better fits with food consumption.

This has lead to a replacement of ‘prettig’ into ‘aangenaam’.

The meaning of the word ‘consumption expenses pattern’ is not clear for everyone. Some participants notify the following: Do you want to know if I normally would buy this food within my weekly groceries expenses, or do you want to know if I can afford it to pay the individual product?

This has lead to a change of ‘consumption expenses pattern’ into ‘weekly groceries expenses’.

Maybe it is an idea to insert the price per KG for every product, because this makes it easier to estimate if they product is expensive or not.

This has not lead to an improvement, because this study wants to measurement implicit intuitions and not wants to help participants with forming their meaning about price.

Some answer options of the statements are not completely in line with the questions. However, the answer options make it clear which answer means what. So, maybe it is better to change your questions.

This had lead to some small changes in questions, however it has not lead to major rephrases of questions.

Three respondents remarked the following: In the pictures of the foods is stated ‘de hoger, de beter’ but I think it needs to be ‘hoe hoger, hoe beter/des te beter’.

This has lead to a change into ‘hoe hoger, des te beter’.

People in the disfluent conditions also remarked that it was difficult to read and that they sometimes need to read the nutrition-information two or three times before they understand what is meant.

This is of course good, because this was the intentional goal of the manipulation.

One participant notified that the background (Radboud University picture) was a little bit repulsive

This has lead to an increase in the font size

One participant remarked that the font of the questions made the questionnaire boring

This has, together with the prior remark, lead to a new font type (changed from Times new roman to Arial).

Several participants also mentioned that it would been better to ask the gross salary per household instead of the brute-salary of one person, because this could influence the ability of people to buy products

This has lead to a change into the question of the gross salary per household

Some questions are relatively equal to each other, so maybe some questions are a little bit unnecessary

This is right, because some questions are closely related to each other or exist out of multiple similar items. Therefore, no questions are left out of the survey.

One respondent also remarked that it is maybe better to not force people to indicate their weight, because for some people this is extremely sensitive information

Therefore, it has been changed into a request of response instead of forcing people to fill in their weight.

One peer student says that I maybe should include a reverse question in order to improve the validity

This was already included in the survey with the statement of 'I would feel hungry' or 'I would feel filled'.

The pictures of the foods are relatively clearer than the text, so maybe you should make the picture less clear. Furthermore, it should be an option to leave out the name of the shown food, because you now easily known which foods it is (reduce the cognitive effort).

This had lead to a change in the greyness of the font (from 25% to 15% grey) and to more transparent food pictures (from 70 to 80 per cent). However, the name of a food item did not left out, because it still should be clear which food item is presented. Otherwise, differences could exist due to a misinterpretation of the food item.

Appendix 6 - Research Integrity Form - Master Thesis

Name: Caro Willems	Student number: S4216016
RU e-mail address: caro.willems@student.ru.nl	Master specialization: Marketing
Thesis title: It is all about taste: the crucial factor for the stimulation of healthy food consumption	
Brief description of the study: Consumers perceive healthy food as less tasty, less filling and more expensive compared to unhealthy food. This study examined if using a disfluent presentation of nutrition information could mitigate the strength of these implicit beliefs. This study showed that disfluency indeed could mitigate the strength of the implicit beliefs, and thereby making healthy food more attractive. In addition, this study has found that the perceived tastiness is the most important factor for influencing food decisions as the desire to eat and purchase intention. Therefore, it is crucial to alter the intuition regarding the perceived tastiness of healthy food in order to actually influence food decisions.	

It is my responsibility to follow the university's code of academic integrity and any relevant academic or professional guidelines in the conduct of my study. This includes:

- providing original work or proper use of references;
- providing appropriate information to all involved in my study; • requesting informed consent from participants;
- transparency in the way data is processed and represented;
- ensuring confidentiality in the storage and use of data;

If there is any significant change in the question, design or conduct over the course of the research, I will complete another Research Integrity Form.

Breaches of the code of conduct with respect to academic integrity (as described / referred to in the thesis handbook) should and will be forwarded to the examination board. Acting contrary to the code of conduct can result in declaring the thesis invalid

Student's Signature:

Date:

To be signed by supervisor

I have instructed the student about ethical issues related to their specific study. I hereby declare that I will challenge him / her on ethical aspects through their investigation and to act on any violations that I may encounter.

Supervisor's Signature:

Date: