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Eating insects: too nutritious to be delicious?

An investigation on the effect of framing on the acceptance of insect-based food products in the Netherlands

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July 22, 2018
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Abstract

The multiple benefits of the consumption of insects, among which high levels of nutrients (such as proteins and amino acids) and a low impact on the environment, have not been recognized yet by the western society. Emotional aversion, disgust, rejection of novel foods and lack of familiarity are the most important factors to form an obstacle from the acceptance of the consumption of insects, also referred to as entomophagy. The current research investigated the potential effects of language, specifically, framing of texts and types of insect-based food products on the attitude towards insect-based food products, the intention to try these products and the intention to eat insect-based food products regularly. As marketing offers great opportunities for repeated exposure of insect-based food products, this might enhance the familiarity with these types of products and therefore lead to acceptance in western society. Appropriate marketing will help to overcome negative associations with entomophagy, facilitate diffusion of insect-based food products and consequently the willingness to eat. To investigate these effects, 99 Dutch young adults filled out a questionnaire, in which they were exposed to four kinds of insect-based food products. Two of them represented meat substitutes (deep-fried meatballs and hamburger) and the other two represented non-meat substitutes (nachos and pasta). According to the results, non-meat substitute insect-based food products led to a higher intention to try than meat substitute insect-based food product for female respondents. For male respondents, the opposite result was found. The effect of framing on either of the three dependent variables, did not show any no significant results. To conclude, the manipulation of framing was not effective in the current study, but the type of insect-based food product did make a difference. Further research is needed to define which types of insect-based food products have the highest opportunity of being accepted in western society.

Key words

Insect-based food products, entomophagy, acceptance, framing, type of product, western society

Introduction

Food plays an essential role in our daily life. Not only is it a primary human need to survive, it also shapes cultures and traditions. However, not all types of food are equally healthy and for some food types it is even argued that they harm the environment. For this reason, it is very important to focus on sustainable eating. However, western Europe, henceforth referred to as western society, does not have an urgent need to change their diet as it consists of an overflowing dinner menu which is not in need of supplements (Looy, Dunkel & Wood, 2014). Moreover, westerners consume high amounts of meat which has some negative outcomes. The high consumption of meat comes along with several negative effects for both our personal health and the environment. An example of a negative effect is the fact that diets rich in meat and dairy foods are greenhouse gas-intensive (Garnett, 2011). This makes the meat industry harmful to the environment, as it causes high levels of CO^2 production and consumes lots of water, energy and space (Hartmann & Siegrist, 2017b). Therefore, the meat industry is in high need of appropriate substitutes.

However, the consumption of meat provides human beings with essential animal proteins which are indispensable in a human diet (Hartmann, Shi, Giusto & Siegrist, 2015). Insects offer an interesting solution for this issue as they are both nutritious and environmentally sustainable (Verneau et al, 2016). The superfluous availability and consumption of meat in western society causes a blind spot towards the healthier and more sustainable substitutes for meat, such as insects (Looy et al., 2014). Many other cultures found in Latin American, Asian and African countries have included insects in their traditional daily diet (Deroy, Reade & Spence, 2015). As they are familiar with the idea of eating insects, also known as entomophagy, they do not experience the same aversion towards the consumption of insects as western society (Deroy et al., 2015).

Familiarity with consuming insects is not the only factor in the process of acceptance, however. The awareness of the negative effects of the meat industries of European consumers of meat is relatively low (Hartmann & Siegrist, 2017a). Furthermore, the lack of need to change the current western diet and the bad image of consuming insects are other factors influencing the aversion towards the consumption of insects from the western society (Looy et al., 2014).

The current study will focus on the effects of communication on changing behaviour regarding the consumption of insect-based food products. The outcomes of this study are helpful in designing appropriate marketing strategies concerning insect-based food products and can help achieve acceptance of these food types in Dutch society.

Theoretical framework

Over the past years, multiple advantages of entomophagy have been explored and investigated. Insects have not only been proven to contain high amounts of proteins, essential amino acids and have low cholesterol levels compared to meat products, but they also have low production requirements (Hartmann et al., 2015; Hartmann & Siegrist, 2017b). Insect farming requires very little space and water, and the biomass conversion rate is much higher compared to the meat production of animals (Van Huis, 2013).

Although the benefits clearly rule out any possible disadvantages, Verbeke (2015) suggests that people are not yet convinced of the possible health benefits of insect consumption as opposed to meat consumption. Introducing edible insects in western society, however, is not easy as several barriers hinder the acceptance of insects as part of a diet. These barriers will be discussed separately in the following paragraphs.

Firstly, emotional aversion towards the consumption of insects was investigated by Gmuer, Guth, Hartmann and Siegrist (2016). According to their results, negative emotional expectations were evoked by insect snacks, as opposed to positive emotional expectations. Examples of the negative expectations are disgust, dissatisfaction and uneasiness. These negative emotional expectations caused a lower willingness to eat insect-based product.

Secondly, disgust also contributes to the strong aversion towards entomophagy by westerners. Haidt, McCauley and Rozin (1994) defined disgust as the rejection of food, which is not necessarily based on the bad taste of food, but rather on the knowledge of the origin of the food. Disgust is caused by several factors which might vary cross-culturally (Haidt et al., 1994). The rather unattractive appearance of insects might partially explain this negative attitude towards consuming them (Deroy et al., 2015). Furthermore, westerners tend to associate some insects with decaying matter and faeces and therefore consider insects to be disgusting (Looy et al., 2014). The association of insects with both dirtiness and diseases also leads to fear (Looy et al., 2014). Disgust belongs to the basic emotions, which all contribute to the well-being and survival mechanisms of human-beings (Matsumoto & Ekman, 2009). This might explain why disgust leads to such a strong negative attitude and aversion towards entomophagy (Hartmann & Siegrist, 2017b).

In addition, rejection and avoidance of novel food, such as insects, can also be caused by different cultural norms (Hartmann et al., 2015). Most western cultures, in contrast to many other cultures, consider the consumption of insects inappropriate (Kourimska & Adamkova, 2016).

According to Hartmann and Siegrist (2017b), the cultural environment in which we grow up partially determines what we accept and what we do not accept as food. Westerners are clearly not familiar with the idea of eating insects. Therefore, it is clear that the attitude towards eating insects varies cross-culturally (Deroy et al., 2015). The rejection of novel foods may also be caused by the fact that westerners do not feel any need to change their diet (Looy et al., 2014).

Lastly, familiarity also forms an important part in the process of acceptance (Hartmann et al., 2015). Food neophobia, which is the fear of new foods and can be caused by unfamiliarity, is the most important factor for determining the acceptance of insects as a substitute for meat (Verbeke, 2015). The fear towards novel foods often comes along with a negative attitude. According to Tan et al. (2015), a negative attitude is one the most important reasons for rejection of novel food. Appropriate preparation of novel food, combined with a safe situation, might encourage the consumption of novel foods, as this takes away some of the possible fear from the subject regarding badly and unhygienically prepared food products (Tan et al., 2015). Products that are familiar in form or taste and processed, such as tortilla nachos made of cricket flour, are preferred over unprocessed food products containing whole, visible insects (Gmuer et al., 2016; Hartmann & Siegrist, 2016; Hartmann et al., 2015).

The current negative attitude and associations of westerners with entomophagy does not mean that there is no possibility of achieving acceptance from westerners. The contrary was proven by investigating the process of acceptance of novel foods by House (2016). Repeated consumption of a novel food and an integration in the daily eating habits are required for acceptance (House, 2016). According to House (2016), a successful cooperation between price, taste, availability, the degree of fit with the currently established diet and environmental and animal welfare reasons should interplay in a well-balanced way in order to achieve repeated consumption of insect foods. High prices and lack of availability are most likely to cause so-called passive rejection (House, 2016).

Nowadays, insects are seen as a novel food product and therefore are still far from being considered a familiar food product (Gmuer et al., 2016). However, there are ways to increase the familiarity of insect-based food products. Successful marketing strategies, for example, offer great opportunities for repeated exposure of insect-based food products, which will help in the process of making it more familiar and could eventually lead to the acceptance of insect-based food products in western society. (Looy et al., 2014). In addition, the negative associations with the

consumption of insect-based food products can be overcome by the use of marketing, as it can try to create positive associations, such as health and tastiness (Gmuer et al, 2016; Hartmann & Siegrist, 2017b; Looy et al., 2014). In addition, Shelomi (2015) argues that marketing insect-based food products appropriately will facilitate the diffusion and consequently the willingness to eat these types of products.

The use of framing

Framing is commonly used as a marketing strategy in advertising. Chong and Druckman (2007) describe the effects of framing as small adaptations in the way of presenting an issue or event which often influences the opinion of an individual concerning this certain issue or event. The variety of perspectives on a certain phenomenon offers multiple ways of presenting it. Therefore, framing can be defined as "The process by which people develop a particular conceptualization of an issue or reorient their thinking about an issue" (Chong & Druckman, 2007, p.104). Framing is often presented from either a positive or negative perspective, which is also often referred to as gain (positive) and loss (negative) framing, in which the aim is to manipulate the attitude of an individual towards a certain concept (Chong & Druckmann, 2007). Framing is often mixed up with persuasion, but the two are distinct concepts. Framing is instead focused on changing the weight assigned to an attitude, whereas persuasion causes a change in the evaluation. As the willingness to try insect-based food products and the acceptance of entomophagy are strongly related to attitude rather than evaluation, framing seems to be an effective way of achieving those two goals. Although the effectiveness of both positive and negative framing has been widely investigated in different contexts, it is not clear yet which of the two is most effective.

Verneau et al. (2016) investigated the effect of communicating information about the benefits of entomophagy on both the intention to eat insects and the actual behavior of doing so in Denmark and Italy. Intention was measured by three items in a questionnaire, whereas behavior was measured by giving out chocolate bars containing cricket protein after the experiment and post-testing if these bars were actually eaten by the participants. The respondents were informed about either individual benefits or societal benefits. Results showed that providing information about the benefits of consuming insects positively influenced the intention to eat insects and the behavior of doing so. Both conditions showed a similar effect on intention to eat insect-based food, but the effect of societal information appeared to be more stable over time.

Furthermore, marketing can help alleviate emotional reactions, such as sensory reactions regarding the tastiness of insect-based food product. Van Huis (2013) even claims sensory-liking to be crucial when presenting insect-based food products as an alternative to meat. Sensory-liking is essential for repeated consumption of novel foods (Tan, Fischer, van Trijp & Stieger, 2016). In addition, not only sensory-liking might influence acceptance. Indulgent descriptions describing food products as tasty, exciting and flavourful can also potentially help to change attitude towards novel food products, such as insects, and make them more attractive. Turnwald, Boles and Crum (2017) investigated the effect of indulgent food labelling of vegetables and found that these types of descriptors caused participants to choose vegetables with indulgent descriptors over both healthy and basic descriptions. This result implies that the use of indulgent language could also play an important role in the persuasion process regarding the acceptance of entomophagy.

Dutch (food) culture

The current study investigated the effect of communication and marketing strategies on the acceptance of westerners, in this case people residing in the Netherlands. Positive framing was used in order to convince westerners of the benefits of eating insects. This positive approach is used to take away the barrier of negative associations with entomophagy. Instead of studying the effects of only individual benefits or societal benefits, a third type of benefit was included, being the sensory-liking benefit. This type of benefit was used to test the effect of labelling the insect-based food products as tasty rather than healthy, as sensory-liking also appears to play an important role in accepting novel foods (Tan, Fischer, van Trijp & Stieger, 2016).

Dutch people, as a consequence of their openness to new experiences, are very curious to try novel foods, such as insects Tan et al (2015). Openness to trying novel foods is very important for the acceptance of entomophagy (Verbeke, 2015). However, curiosity and openness towards novel foods is not sufficient to persuade them to accept and integrate insects as a food product for daily consumption (House, 2016; Tan, van den Berg & Stieger, 2016). One of the reasons for this lack of acceptance and willingness to integrate insect-based food products in a daily diet is the possibility that Dutch consumers might not yet be aware of the benefits of eating insect proteins (Lensvelt & Steenbekker, 2014). The effect of communicating benefits of eating insect-based food products on the attitude towards these products, and on both the intention to try the products and the intention to eat the products on a regular basis has not been investigated for Dutch culture so

far. The current research will investigate the communication of different types of advantages in the shape of gain-framed messages.

As described by Verneau et al. (2016), cultures with a low food culture, which suggests openness to food from other cultures and less established food patterns, are more likely to accept novel foods. Cultures undergo a constant change as they evolve over time (Fieldhouse, 2013). The same holds for food cultures: food habits change over time as they are adapted to ecological and economic factors (Fieldhouse, 2013). Moreover, significant changes in cultural food habits are not impossible, as sushi, quinoa and the so-called 'superfoods' such as acai juice and goji berries have won over many western people during the past decade (Shelomi, 2015). Dutch food culture can also be considered as a relatively weak food culture. One of the reasons for this is its relatively high score on Hofstede's dimension of long-term orientation, which represents a pragmatic approach and encourages changes for a better future (Hofstede, 1983). Furthermore, the high level of openness to new food products also contributes to the weak food culture of the Dutch (Tan et al., 2015). Less traditional framings of masculinity and the interest in healthier substitutes for meat products suggest a sustainable perspective for the Dutch food culture (Schösler, de Boer, Boersema & Aiking, 2015). In short, Dutch culture seems to be promising with regard to investigating the acceptance of insect-based food products.

A study by Verbeke (2015) showed that younger males with a weak attitude towards the consumption of meat are most likely to be the early adopters of entomophagy in western society. Openness to novel food products and low levels of neophobia are factors that play an important role in the likeliness of adopting insect-based food products as well (Verbeke, 2015). Furthermore, people who are convinced of meat being a nutritious and healthy type of food are less likely to accept and adopt insect-based food products. They therefore need more convincing of the need of a substitute for meat products. Vegetarian and vegan people have already realized and understood this need and are not in need for a substitute in the form of insect-based food products, as they have already adapted their diet to a more sustainable food pattern. Only consumers of meat will therefore be included in this study.

As several prior investigations have shown that processed insect food products are more likely to be accepted than unprocessed food products based on insects (Gmuer et al., 2016; Hartmann & Siegrist, 2016; Hartmann et al., 2015), the current research will be focused only on processed insect food products. Therefore, this research proposes the following research question:

> **RQ:** To what extent does the type of framing, focusing on either the environmental, personal health or sensory benefits, influence the attitude towards insect-based food products, the intention to try insect-based food products and the intention to eat these products on a regular basis?

By informing respondents about either the personal health benefits, environmental benefits or the sensory affective benefits, the outcomes of the current research gave insight into which reasons are most likely to convince Dutch people to accept insects as a food product. These outcomes will be helpful in designing appropriate marketing strategies for insect-based food products and could help achieve acceptance of these food types in Dutch society.

Verneau et al. (2016) found that individual (personal health) and societal (environmental) benefits had similar effects on intention when it was directly measured after the exposure to these benefits. These results were based on a cross-cultural comparison between Denmark and Italy. The Netherlands have a higher score on long term orientation compared to both Denmark and Italy, according to the cultural dimensions of Hofstede (Hofstede, 1983). Cultures which are more short-term oriented are more likely to stick to traditions, whereas cultures that score higher on this dimension are more prepared to adapt themselves for a better future and take a more pragmatic approach. The high score on this dimension of Dutch culture indicates that they would be willing to change habits in order to be assured of a better future. Sustainable alternatives, such as eating insects, that contribute to a better future for the environment would be more likely to be accepted in Dutch culture. Tan et al. (2015) found similar results when comparing Dutch and Thai participants. They found that Dutch people were more likely to consider insects as food for sustainable reasons, whereas the Thai participants indicated taste and familiarity to be the major reasons for consuming insects. Therefore, the following hypothesis was formed:

> **H1**: Environmental benefits will have a more positive impact for Dutch people on the attitude towards insect-based food products, the intention to try the products and the intention to eat the products on a regular basis than personal health benefits or sensory benefits.

Raghunathan, Walker Naylor, & Hoyer (2006) found that food products that are perceived as less healthy are associated with a better taste and are enjoyed more during consumption. This would mean that communicating the health benefits of consuming insects would not have a less positive effect on the intention to eat these type of food products. In addition, Turnwald, Boles and Crum (2017) concluded that food labeled with indulgent descriptors is preferred over food that is described as healthy, which would mean that communicating sensory-liking benefits can be expected to have a positive effect on the expectations of a food product. This is in accordance with findings of Turnwald, Jurafsky, Conner and Crum (2017), who concluded that nutritious restaurant menu options are perceived to be less indulgent and appealing and therefore may undermine the customer's choice of healthier options. Based on this information, the following hypothesis is formulated:

> **H2**: Sensory-liking benefits will have a more positive impact on the attitude towards insect-based food products, the intention to try the products and the intention to eat the products on a regular basis of Dutch people than personal health benefits.

The vast majority of earlier research has focused on insect-based food products that were not substitutes for meat. The current research will therefore take two types of products into account, which are either meat substitutes or non-meat substitutes. Each product contains a certain percentage of insect flour. The possible effect of the different products will also be investigated, which leads to the following sub question:

> **Sub question**: To what extent does the type of insect-based food product, being either a meat substitute or a non-meat substitute, influence the attitude towards these products, the intention to try the products and the intention to eat the products on a regular basis?

Familiarity with the substitution of meat appeared to be important for the appreciation of the substitute (Schösler, De Boer & Boersema, 2012). Many processed insect food products are not considered to be a substitute for meat (Hartmann & Siegrist, 2017b). The earlier mentioned tortilla chips made out of cricket flower used by Gmuer et al. (2016) were not considered to substitute for a piece of meat, as they were not perceived to be appropriate in terms of flavour, structure and food type (Tan, van den Berg & Stieger, 2016). Dutch participants were invited to try several insect food products during a qualitative study by Tan et al. (2015). During the experiments, the participants indicated that grasshoppers given a savoury taste with chili and salt were more appropriate than grasshoppers flavoured with chocolate. This was probably due to the fact that insects were presented as meat substitutes in this qualitative study, which caused a mismatch between the expectation and a sweet taste caused by the chocolate. In short, appropriateness can also be about matching the expectations of the subject in terms of sensory properties, which might affect the willingness to eat significantly. Accordingly, the third and last hypothesis was formulated:

> **H3:** The insect-based food products that are meat substitutes will influence the attitude towards these products, the intention to try the products and the intention to eat the products on a regular basis of Dutch people more positively than the insect-based food products that are not meat substitutes.

Method

Materials

Dutch participants were exposed to two types of insect-based food products (meat-substitute products and non-meat-substitute products). The two types consisted of two items each. In order to increase the probability of acceptance, the insect-based food products were presented as familiar products rather than novel products (Looy et al., 2014). The meat substitute products were an insect burger and deep-fried crunchy meatballs. The non-meat substitute products were pasta and tortilla chips. Each product contained a certain percentage of processed insects. To exclude the possible effect of percentage of insect-based ingredients, the participants were told all insect-based food products consist the same percentage of insect-based ingredients. Also, the participants were not informed about which type of insects the products contain, in order to prevent possible effects caused by this variable. *Table 1* shows an overview of the four different products, with the percentage of insect-based ingredients and a corresponding image. The Type of Product was the first independent variable of this experimental design.

Before being exposed the different products, the participant read a small text about either the environmental benefits of eating insects, personal health benefits, or sensory benefits. The text about environmental benefits focused on the fact that insect farming requires very little space and water, as well as the biomass conversion rate is much higher compared to the meat production of animals, whereas the meat industry causes high levels of CO^2 production and consumes lots of water, energy and space. The text about the personal health benefits was focused on the nutritious characteristics of insects, such as high levels of protein, essential amino acids and lower concentrations of cholesterol compared to some meat products. Lastly, the text about sensory benefits was focused on the taste of the products, stressing that each of the insect-based food product used in the experiment is a delicious and flavourful product. The Type of Framing was the second independent variable of this experiment. The three framed texts have the same length and the same amount of arguments in order to control for confounding variables. Between the second and third insect-based product in the questionnaire, the respondents were shown a small summary of the benefits of the condition they were assigned to. Both the framed texts and the summary can be found in *Appendix 1*.

Table 1: Overview of the types of insect-based food products

Food category	Type of Product	% of insect-based ingredient	Image
Meat substitute	Insect burger	15%	
	Crunchy deep-fried meatballs	15%	
Non-meat substitute	Tortilla chips	15%	
	Pasta	15%	

Subjects

A total of 125 respondents participated in this experiment, of which 112 of these respondents completed the test and 108 of those respondents indicated they were Dutch. The research was based on participants who eat meat on a regular basis, as insect-based food products are an alternative food product for meat. Therefore, vegetarian and vegan participants, which were 9 respondents in total, were not included in the results. Therefore, the total number of respondents that were analysed is 99. In the questionnaire, the subjects were asked to respond to questions about their demographic information, such as age, gender, educational level, whether they consume meat or not and if yes, how often they consume meat per week. The average age of the participants was 24 years (*SD* = 6.07). A one-way ANOVA did not show a significant effect of Type of Framing on the age of the participants (F (15,83) = .81, p = .273). Therefore, there was an equal distribution of age over the three types of framed texts.

Furthermore, 35 respondents indicated they were male (35,4%) and 64 respondents were female (64.6%). A χ^2-test between Gender and Type of Framing showed there was no significant relationship between Gender and Type of Framing ($\chi^2(2) = .58$, $p = .748$). Thus, the overall distribution of Gender over the condition of Type of Framing was homogeneous

Most respondents indicated they had completed or currently completing a university degree (WO, 77.8%), followed by 19.2% of university of applied sciences (HBO), 1% vocational education (MBO) and 2% of pre-university secondary education (VWO). A χ^2-test between Educational level and the Type of Framing showed there was no significant relationship between Educational level and Type of Framing ($\chi^2(6) = 6.11$, $p = .411$). Thus, the overall distribution of education over the condition of Framing was homogeneous.

Also, the participants were asked about their familiarity with the possibility of eating insects and whether they have ever tried insect-based food products. Familiarity was measured with the use of an item which was administered from Verbeke (2015). The participants answered the question: ‘Have you ever heard of the eating of insects?’, where they could choose one of the three following answers: 1 = Yes, I have heard of the eating of insects and I know what it means; 2 = I have heard of the eating of insects but actually don’t know what it means; 3 = No, I have never heard of the eating of insects. The majority of the respondents indicated they were familiar with the consumption of insects (68.7%), opposed to 30.3% of the respondents who indicated to have

heard of entomophagy, but not being sure what it means and only 1% of the respondents had never heard of this phenomenon.

Table 2 shows an overview of the sociodemographic characteristics of the respondents.

Table 2: Sample sociodemographic characteristics (n = 99)

Socio-demographic characteristics and levels	
Gender	**%**
Male	35.4
Female	64.6
Age	***M* (*SD*)**
Age of respondents	24 (6.07)
Level of education	**%**
University (WO)	77.8
University of Applied Sciences (HBO)	19.2
Vocational education (MBO)	1
Pre-university secondary education (VWO)	2
Familiarity with entomophagy	**%**
Yes, I have heard of the eating of insects and I know what it means	68.7
I have heard of the eating of insects but actually don't know what it means	30.3
No, I have never heard of the eating of insects	1

Lastly, the respondents were equally distributed over the between-subjects factor, being the Type of Framing (see *Table 3*).

Table 3: Distribution of type of framed text over respondents

Type of Framing	N
Personal health benefits	32
Environmental benefits	32
Sensory benefits	35

Design

This experiment had a 2x3 repeated measures mixed design with the following structure. The independent variables consisted of a within-subjects variable, the Type of Product (two levels: meat substitute versus no meat substitute), and a between-subjects variable, which is the Type of Framing (three levels: focus on environmental benefits, focus on health benefits or focus on sensory benefits). The attitude towards the products, the intention to try the product and the intention to eat the product on a regular basis were the dependent variables.

Instruments

The dependent variables were the attitude towards the product, the intention to try the product and the intention to eat the product on a regular basis. The following scales were used for measuring each dependent variable.

1. *The attitude towards the insect-based food product*

The attitude towards each of the insect-based food products was measured with the help of the semantic scale designed by Menozzi et al. (2017). The participants had to answer the following question: 'Eating products containing insect flour in the next month is:'. The respondents rated four different items, being pleasant/unpleasant, irrelevant/relevant, not tasty/tasty, useless/useful, on a 7-point Likert scale. The reliability of 'Attitude towards the insect-based food product' compromising 16 items (four items x four products) was good ($\alpha = .87$).

An example of one of these scales is:

	1	2	3	4	5	6	7	
Very unpleasant								Very pleasant

2. The intention to try the insect-based food product

The willingness to try the insect-based food product were tested with the question: 'Imagine that there is a free tasting session, how willing are you to try product X?', which is adapted from Han, Van Den Berg and Stieger (2016). As a control question, the participants were asked whether and if yes, how often they consume each type of food (without insect-based ingredients) in their daily lives. First, the respondents were asked whether they had tasted this product without insect-based ingredients. Most respondents indicated to have tried the respective product (See *Table 4*).

Table 4: Overview of familiarity with the products *(n* = 99)

Type of Product		% of respondents that have tried the product (without insect-based ingredients)
Meat substitute		
	Hamburger	72.7
	Deep-fried meatballs	74.7
Non-meat substitute		
	Nachos	73.7
	Pasta	73.7

The question 'How often do you consume [substituted product]?' is adapted from Gmuer et al. (2016). The participants answered this question choosing one of the following options: Daily, 4-6 times per week, 1-3 times per week, 1-3 times per month, rarely, never but I have already tasted [product X]. The respondents indicated that none of the products were eaten on a daily basis. Pasta is eaten more often than all of the other products, as 71.2% of the respondents indicated to eat pasta 1-3 per week (See *Table 5*).

Table 5: Frequency of consumptions of the food products without insect-based ingredients

Type of Product		How often do you consume this product?					
		Daily	4-6 times per week	1-3 times per week	1-3 times per month	Rarely	Never but I have tasted product X
Meat substitute							
	Hamburger	0	0	6.9	75	16.7	1.4
	Deep-fried meatballs	0	0	4.1	51.4	40.5	1.4
Non-meat substitute							
	Nachos	0	0	6.8	68.5	23.3	1.4
	Pasta	0	1.4	71.2	27.4	0	0

3. The intention to eat the insect-based food products on a regular basis

The intention to eat insect-based food products on a regular basis was tested with three items adapted from the questionnaire designed by Balderjahn, Peyer and Paulssen (2013). The participants will be asked about their intention to: 1) to introduce insect proteins in their diet; 2) to suggest this to friends and relatives; and 3) to buy products with insect proteins rather than traditional protein sources, such as meat, if available on the market. A 7-point Likert scale was used to answer to each of these three questions (1 = totally disagree, 7 = totally agree). The reliability of 'Intention to eat the insect-based food products on a regular basis' compromising 12 items (three items x four products) was very good ($\alpha = .95$).

Procedure

Participants completed an online questionnaire in Qualtrics, in which they were shown four insect-based food products. Before seeing these insect-based food products, the participant had to read a small text explaining either the environmental benefits, personal health benefits or sensory benefits. For each insect-based food product, the participants had to answer a few questions, concerning their attitude towards the product, the intention to try the product and the intention to eat the product on a regular basis. The questionnaire was distributed by use of social media. The participants were randomly assigned to one of the types of framing. A small summary of the benefits of the condition that the respondents were assigned to was shown between product 2 and 3, in order to make sure the respondents were still aware of these benefits. The summary existed of three bullet points, summarizing the main points of each type of benefit. Also, the order of the four insect-based food products was counterbalanced, in order to exclude possible effects from the order of being exposed to each of the insect-based food products. The questionnaire can be found in *Appendix 2*.

Statistical analysis

IBM SPSS Statistics (version 25) was used to run the statistical analyses. A two-way univariate analysis of variance (repeated measured ANOVA) was performed with the Type of Framing (three levels: environmental benefits, health benefits and sensory benefits) as between-subjects factors and the Type of Product (two levels: meat substitute versus non-meat substitute insect-based food products) as within-subjects factor. The dependent variables are the attitude towards the product, the intention to try the product and the intention to eat the product on a regular basis.

Results

A repeated measures analysis for Attitude towards the insect-based food products with Type of Product as within-subject factor and Type of Framing as between-subject factor did not show a significant main effect of Type of Product (F (1,96) < 1) nor did it show a significant main effect of Type of Framing (F (1,96) < 1). The interaction effect between Type of Product and Type of Framing also did not show a significant result (F (2,96) < 1). Contrary to the prediction, there was no effect of Type of Framing and Type of Product on the Attitude towards insect-based food products.

A repeated measures analysis for Intention to try insect-based food products with Type of Product as within-subject factor and Type of Framing as between-subject factor did not show a significant main effect of Type of Product (F (1,96) = 1.16, p = .285), nor did it show a significant main effect of Type of Framing (F (1,96) < 1). The interaction effect between Type of Product and Type of Framing was also not significant (F (2,96) < 1). Contrary to the prediction, there was no effect of both Type of Framing and Type of Product on the Intention to try insect-based food products.

A repeated measures analysis for Intention to eat insect-based food products on a regular basis with Type of Product as within-subject factor and Type of Framing as between-subject factor showed a significant main effect of Type of Product (F (1,96) = 11.32, p = .001, η^2 = .106), but there was no significant main effect found for Type of Framing (F (1,96) < 1). The interaction effect between Type of Product and Type of Framing was not significant (F (2,96) < 1).

The Intention to eat insect-based food products on a regular basis was greater for non-meat substitute insect-based food products (M = 3.40, SD = 1.49) than for meat substitute insect-based food products (M = 3.17, SD = 1.33). This result is contrary to the predicted outcomes concerning the Intention to eat insect-based food products on a regular basis.

An additional post-hoc repeated measures ANOVA was performed in order to see whether gender influenced the attitude towards insect-based food products. Prior research showed that younger males who are open to try novel foods and have a weak attitude towards meat have the highest potential to accept the eating of insects (Verbeke, 2013). However, these results are only applicable to Flanders (Belgium) and cannot be generalized to western society. Therefore, it would be interesting to see whether Dutch male respondents also show higher scores for Attitude towards insect-based food products, Intention to try insect-based food products and Intention to try those products on a regular basis than Dutch females. Furthermore, it would be interesting to take a look at the potential difference in gender concerning preferences for different types of insect-based food products, either meat substitutes or non-meat substitutes, differ. According to Schösler et al. (2015), native Dutch men consume more meat on a weekly basis than women and prefer larger portions of meat. The familiarity with meat replacers and the potential willingness to reduce meat consumption were almost equal for both native Dutch men and women (Schösler et al., 2015). Therefore, it can be expected that Dutch men would prefer meat substitutes over non-meat substitutes, caused by their preferences for eating meat more frequently and in larger portions. Concerning the Type of Framing, it would also be interesting to see whether there are differences between male and female respondents. In general, the environmental benefits were expected to be most effective, followed by sensory-liking benefits and personal benefits. According to Tobler, Visschers and Siegrist (2011), Swiss women are more willing to adopt a 'green' eating pattern, which means environmental benefits cause them to change eating habits. However, it is not clear whether this also holds for Dutch females. Therefore, it would be interesting to see whether there are differences between gender for the effectiveness of Types for Framing.

A repeated measures analysis for Attitude towards the insect-based food products with Type of Product as within-subject factor, and Type of Framing and Gender as between-subject factors did not show a significant main effect of Gender (F (1,93) = 1.88, p = .173). The interaction effect between Type of Product and Gender also did not show a significant result (F (1,93) = 1.37, p = .244). The interaction effect between Type of Framing and Gender also did not show a significant result (F (2,93) < 1). The three-way interaction effect between Type of Framing, Gender and Type of Product did not show a significant result (F (1,93) < 1).

The same post-hoc analysis was performed to see whether Gender influenced the Intention to try insect-based food products. The interaction effect between Type of Product and Gender showed a significant result (F (1,97) = 13.42, $p < .001$, $\eta^2 = .126$). The difference between for Type of Product was found among both females (F (1, 63) = 9.71, $p = .003$, $\eta^2 = .134$) and males (F (1, 34) = 5.12, $p = .030$, $\eta^2 = .131$). The Intention to try insect-based food products for female respondents was higher for non-meat substitutes (M = 4.84, SD = 1.87) than for meat substitutes (M = 5.43, SD = 1.78). For male respondents, the Intention to try insect-based food products was higher for meat substitutes (M = 5.10, SD = 1.84) than for non-meat substitutes. The interaction effect between Type of Framing and Gender did not show a significant result (F (2,93) = 2.13, $p = .124$). The three-way interaction effect between Type of Framing, Gender and Type of product did not show a significant result (F (1,93) < 1).

The same post-hoc analysis was performed to see whether type of Gender influenced the Intention to try insect-based food products on a regular basis. A repeated measures analysis for Intention to eat insect-based food products on a regular basis with Type of Product as within-subject factor, and Type of Framing and Gender as between-subject factors did not show a significant main effect for Gender (F (1,93) = 2.21, $p = .140$). The interaction effect between Type of Product and Gender did not show a significant result (F (1,93) < 1). The interaction effect between Type of Framing and Gender did also not show a significant result (F (2,93) = 1.33, $p = .270$).

The three-way interaction effect between Gender, Type of Framing, and Type of Product showed a significant result for the Intention to eat insect-based food products on a regular basis (F (1,93) = 3.77, $p = .027$, $\eta^2 = .075$). To analyse this three-way interaction effect, separate repeated measures analyses were conducted for Gender. The repeated measure analysis for female participants with Type of Product as within-subject factor and Type of Framing as between-subject factor did not show a significant interaction effect for the Intention to eat insect-based food products on a regular basis (F (2,61) < 1). The repeated measure analysis for male participants with Type of Product as within-subject factor and Type of Framing as between-subject factor showed a significant interaction effect for the Intention to eat insect-based food products on a regular basis (F (2,32) = 3.45, $p = .044$, $\eta^2 = .177$). When splitting the data file on Type of Framing, the test of Within-Subjects Effects shows that the Type of Product did not have a significant effect on the Intention to eat insect-based food products on a regular basis for the Type of Framing concerning

Environmental (F (1,9) < 1) and Sensory-liking benefits (F (1,13) < 1). The Type of Product showed a significant effect on the Intention to eat insect-based food products on a regular basis for the Type of Framing concerning Personal health benefits (F (1,10) = 10,59, p = .009). When looking at the Descriptive Statistics, it shows us that the Intention to eat insect-based food products combined with the Type of Framing concerning Personal benefits is higher for non-meat substitutes (M = 4.20, SD = 1.67) than for meat substitutes (M = 3.50, SD = 1.31). Since this was not predicted, this was not investigated further.

Discussion

The research question of this investigation was: To what extent does the type of framing, focusing on either the environmental, personal health or sensory benefits, influence attitude towards insect-based food products, the intention to try insect-based food products and the intention to eat these products on a regular basis? According to the results, no significant effects of framing on either the attitude towards insect-based food products, the intention to try insect-based food products or the intention to eat these products on a regular basis were found. This means both hypotheses 1 and 2 are rejected, as environmental benefits did not have a more positive impact on the attitude towards insect-based food products, the intention to try the products and the intention to eat the products on a regular basis than personal health benefits or sensory benefits, nor did sensory benefits have a more positive impact than personal health benefits.

This result is not completely in accordance with earlier findings of Verneau et al. (2016), as they found that individual health and environmental benefits had similar effects on the intention to eat insect-based food products. Their study concluded that there was a difference between no framing and presenting environmental and personal health benefits, as the framed benefits were proven to be equally effective. The current student did not include a control group and therefore a similar conclusion cannot be drawn from the results.

The framed texts used in the study of Verneau et al. (2016) were longer than the framed texts used in the current study. Also, an expert opinion was included in the framed texts used by Verneau et al. (2016), as they refer to a certain professor (with either an Italian or Danish surname) in order to include an expert opinion. The current study used framed texts that had a neutral origin, as no source or reference to an expert was included. This might explain the differences in the

findings, as people tend to be persuaded more easily by authority, such as credible and knowledgeable experts (Cialdini, 1984).

Additionally, when comparing the framed texts of the current studies with the indulgent descriptors used by Turnwald et al. (2017), the framed text of sensory-liking of the current study seems to be more simplified. The indulgent descriptors used by Turnwald et al. (2017) are more specific and elaborate, which possibly makes it easier to imagine to tastefulness of the food product. Labels such as 'Dynamite chili' and 'Sweet sizzlin' green beans' might be more appealing due to their originality and therefore be more appealing to one's imagination. This might explain why the framed text about sensory-liking was not considered to be more effective than the other two framed texts.

Furthermore, the cultural differences between the Danish, Dutch and Italian culture might have influenced the results. Although the Dutch culture has a higher score on the dimension of long-term orientation than both the Danish and Italian culture, no significant effect of environmental benefits was found. This is contrary to the expectations, as long-term orientation is related to a pragmatic approach and readiness for change in order to create a better future.

When comparing the cultures according to Hofstede's cultural dimensions, it can be concluded that the Dutch and Danish culture are more alike than the Italian culture (Hofstede, 1983). All three countries have a similar high score on the dimension of individualism, which indicates that individuals are expected to take care of themselves in society. This might mean that these cultures do not feel the necessity to change habits or food patterns for a better society, as they are focused on their individuality and independence. For the dimension of masculinity, both the Netherlands and Denmark appear to be more feminine than Italy. A feminine culture is mostly focused on the quality of life than a masculine culture, in which competition, achievement and success are considered as important. Quality of life can also be translated in terms of food, which would mean feminine cultures would be more likely to want to enjoy good food without thinking of the consequences. Furthermore, the Italian culture has a significant higher score on uncertainty avoidance than both the Netherlands and Denmark. A high score on uncertainty avoidance means high levels of structure and secure situations are preferred. A lower score on this cultural dimension comes along with curiosity to new things, which might indicate that both the Dutch and Danish culture would be more open-minded concerning new food types, such as insects. However, this is not supported by the results found in the current research. In short, it is hard to explain the results

using the cultural dimensions of Hofstede, as the expectations based on these dimensions do not match the results. Individualism and femininity could possibly explain the unexpected results, but those dimensions are not too likely to have such strong influence on the acceptance of entomophagy.

Another difference between the current study and the study of Verneau et al. (2016) that could explain the inconsistencies in the findings is the design of the study. The current study used an online questionnaire, whereas Verneau et al. (2016) used a questionnaire combined with an analysis of behavior. The framed texts of Verneau et al. (2016) were presented by videos instead of the texts used in the current design. The difference in presentation of the framed text might also explain the differences, as the medium used to distribute the information can also affect the persuasion of respondents to be more engaged with eating insects. Visual communication is often used nowadays for advertising instead of written texts, as it has a positive effect on the persuasive effects of the message, which make people find themselves forced to be more engaged to the topic (Joffe, 2008).

The sub question of the current research was: To what extent does the type of insect-based food product, being either a meat substitute or a non-meat substitute, influence the attitude towards these products, the intention to try the products and the intention to eat the products on a regular basis? According to the results, the type of product only showed a significant effect for Intention to try insect-based food products. Non-meat substitute insect-based food products appeared to lead to a higher intention to eat the product on a regular base than meat substitute insect-based food products. For both the attitude towards insect-based food products and the intention to try insect-based food products no significant differences concerning the type of product were found.

This means hypothesis 3, in which the insect-based food products that are meat substitutes were expected to influence the attitude towards these products, the intention to try the products and the intention to eat the products on a regular basis more positively than the insect-based food products that are not meat substitutes, was not confirmed. The significant results of type of product on the intention to eat the insect-based food products on a regular basis showed a slight preference for the non-meat substitute insect-based products. This result is rather unexpected, as this is not in line with the earlier findings on the perceived appropriateness in terms of flavour, structure and food type combined with the willingness to eat insect-based food products (Gmuer et al., 2016; Tan, van den Berg & Stieger, 2016). However, the result could be explained by the fact that

respondents indicated they consume pasta more often when compared to the other three products. This non-meat substitute might have been evaluated as more familiar and tasty in general and might therefore score higher on the Intention to eat the insect-based food product on a regular basis, irrespective of the fact that it contained insect-based ingredients.

Additional analyses took the potential differences in gender into account. No significant results were found for both the attitude towards insect-based food products and the intention to eat those products on regular basis. This is not in line with the expectations, as the profile of the potential consumer designed by Verbeke (2013) indicated males are willing to adopt insects than females. However, the types of product used in the current investigation were not pre-tested and not all types of products (without insect-based ingredients) were not consumed with the same frequency in daily life. This might have influenced the attitude and intention towards trying these products on a regular basis with insect-based ingredients.

The significant interaction showed that female respondents had a higher Intention to try insect-based food products for non-meat substitute insect-based food products than for meat substitutes. On the contrary, male respondents showed a higher Intention to try insect-based food products for meat substitutes than for non-meat substitutes. This is contrary to the predicted outcomes, as it was expected that males would be more willing to try insect-based food products in general than female subjects. This difference was not present in the current study, but the result showing a different preference for the kind of insect-based food product (either meat substitutes or non-meat substitutes) is in line with the expectations. This result could be interesting for future projects in trying to convince Dutch people to eat (more) insect-based food products as a replacement for meat products.

As insect-based food products are initially destined to replace meat products, westerners need to understand the need to substitute meat products and not use the insect-based food products as a complementary food product. Therefore, the type of product might be investigated in more detail in the future, as there is no clarity in what types of insect-based food products are preferred by westerners. Earlier research has shown that processed insect-based food products are preferred over non-processed products (Gmuer et al., 2016; Hartmann & Siegrist, 2016; Hartmann et al., 2015). Familiarity is also proven to be important in order to encourage westerners to try and eat insect-based food products on a regular basis (Hartmann et al., 2015).

Lastly, the appropriateness of the insect-based food product also appeared to influence the acceptability ratings (Tan et al., 2016). According to this study, savoury insect-based food products were evaluated as more appropriate than sweet insect-based food products. However, the exact type of insect-based food products has not been investigated so far and could be very helpful when introducing insect-based food products in for example supermarkets and restaurants, as this will probably enhance the willingness to try these products and possibly even the willingness to eat these insect-based food products on a regular basis. Future research might look into different product categories, such as the difference between meat substitutes versus non-meat substitutes that has been studied in the current investigation. Food categories of interest may depend on the type of meal (hot versus cold meals), basic food products versus luxury food products or substitutes for harmful food types versus non-substitutes.

Limitations

Neither the framed texts nor the insect-based food products in the experiment were pre-tested. Therefore, the effectiveness of the framed texts cannot be guaranteed. As mentioned earlier, the framed texts used by Verneau et al. (2016) differed from the framed texts used in the current study. More information or an expert opinion might have influenced the results found by Verneau et al. (2016). In short, future research could include pre-tests in order to make sure the variables are tested in an effective way. This could also help to define which types of food products are preferred in general. Including a control group could also be helpful, as this would help to determine whether framed texts have a significant effect on the attitude, intention to try and intention to eat insect-based food products on a regular basis. Consequently, when framing appears to have a significant effect on these variables, the type of framed text can be tested. Additionally, negative framing could also offer great opportunity for future research. Until now, only positive framing has been tested in relationship to intention, attitude and behavior regarding entomophagy (Verneau et al., 2016). Negative framing might be more effective for marketing this specific type of food product, as westerners become more aware of the negative effects of our daily meat consumption (Hartmann & Siegrist, 2017a). However, further research is needed to investigate whether positive or negative framing would be more effective in order to convince westerners to replace meat products by insect-based food products.

Furthermore, the circumstances for testing the effects of framing might not have been optimal in the current study. Testing the effects of framing in an artificial environment, which refers to taking questionnaires in order to measure intention and behavior, can often not be considered to be predictive of behavior in a natural environment (Ganzach, Weber & Ben Or, 1997). The study of Ganzach et al. (1997) revealed that responses recorded in an artificial environment may even be opposite to the responses given in a natural environment. This could mean that the results of the current research would have been totally different when the experiment was conducted in a natural environment. This offers great opportunities for future research, as both the type of framing and the type of product can be tested within a realistic, natural situation in order to test their effects on the attitude towards insect-based food products, the intention to try and the intention to eat them regularly. The framing of sensory benefits of eating insect-based product was a unique component in this study. According to Deroy et al. (2015), focusing on the gastronomic science is a very promising approach concerning the acceptance of the consumption of insects in western society. They suggest focusing on both exposure of the insect-based food product and taste preferences of the westerners. In short, appropriateness of both taste (Van Huis, 2013) and presentation is again proven to be very important to achieve acceptance of entomophagy.

Another limitation of the current study is the fact that behaviour was not included. The design used by Verneau et al. (2016) differed from the current study in such way that it was combined with an analysis of the behavior of participants. The current study only investigated the intention to both trying insect-based food products and eating these products on a regular basis. Intention and attitude nevertheless do not always necessarily predict behavior, as it depends on multiple other factors alongside intention and attitude, such as subjective norms and perceived behavioral control (Menozzi et al., 2017). The significant effect of product type on the intention to eat insect-based food products on a regular basis therefore does not imply that respondents will do so in reality. This illustrates one of the shortcomings of the current investigation, as the study was focused on intention and attitude rather than behavior. Future research therefore could focus on quantitative research in order to observe and investigate the behavior of people in situations where they are confronted with consuming insect-based food products. Combining this with the manipulation of different types of framed texts could lead to different results, which may be useful for marketing of insect-based food products to the western food market.

With respect to future research concerning the acceptance of entomophagy in western society, cultural differences may need to be taken into account. Most researches on the willingness of westerners to eat insect-based food products so far have considered different European cultures to be western. However, these cultures differ from each other regarding different aspects and can therefore not be generalized into one culture or society, such as the western society. European cultures differ significantly from each when compared according to Hofstede's cultural dimensions (Hofstede, 1983). These cultural differences are important to take into account when designing appropriate marketing strategies to enhance the acceptance and willingness to eat insect-based food products. The same holds for the current study, as the results only account for the attitude and intentions of Dutch people. Therefore, the results cannot be generalized to all of western society, which means the results of this experiment are limited. Future research might look into the differences between various European cultures or focus on specific European countries without generalizing the results for the entire western society. Each type of western culture might need its own approach in order to achieve acceptance of entomophagy and different cultures might have different preferences for product types.

Conclusion

This study provides insights into the effects of framing and different types of insect-based food products on the acceptance of entomophagy of Dutch people. Although the current investigation did not find any significant results regarding the type of framing, future research still might look into this as indulgent food-labelling has been proven to be a successful marketing strategy for other food types, such as vegetables. Therefore, this could still be a promising marketing strategy for future investigations concerning the acceptance of insect-based food products. The findings only included one significant result, which concerned the eating of insect-based food products on a regular basis. Non-meat substitute insect-based food products scored slightly higher on the intention to eat insect-based food products on a regular basis than meat substitute insect-based food products. A post-hoc analysis on the effect of gender showed that this result was caused by female respondents. Male respondents showed a contrary result: they showed a higher Intention to try for meat-substitutes than for non-meat substitutes. This is only partially in accordance with the hypothesis, as it was expected that meat-substitutes would influence the Intention to try more positively than non-meat substitutes. The same hypothesis was formulated for Attitude towards insect-based food products and the Intention to try insect-based food products but was not confirmed. Future research might investigate other food types, different types of framing, or perform a similar study using a qualitative study design. Also, behaviour could be included in the design in order to test whether the intention and attitude towards consuming insect-based products actually matched the performed behaviour.

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Appendix 1: Framed texts

1.1 Individual benefits

Er komen steeds meer voedselproducten op basis van insecten op de markt. De meeste eetbare insecten bevatten belangrijke eiwitten, zijn rijk aan calcium, vitamine B12, Omega 3, ijzer en bevatten alle negen essentiële aminozuren. Daarnaast bevatten ze over het algemeen meer ijzer dan vlees en zijn insecten een goede bron van zink. Kortom, insecten vormen een goede dagelijkse bron van belangrijke voedingsstoffen.

1.1.1 Repetition of individual benefits

Even een korte herhaling van de voordelen van het eten van insecten

- Veel insecten bevatten belangrijke eiwitten, zijn rijk in calcium, vitamine B12, Omega 3, ijzer en zink;
- Ze bevatten alle negen essentiële aminozuren;
- Insecten bevatten over het algemeen meer ijzer dan vlees.

1.2 Environmental benefits

Er komen steeds meer voedselproducten op basis van insecten op de markt. De teelt van insecten heeft, in tegenstelling tot veeteelt, weinig fossiele gassen nodig en zorgt voor een zeer beperkte vervuiling van het milieu. Hierdoor draagt de teelt van insecten veel minder bij aan het broeikaseffect. Daarnaast is er veel minder water nodig. Kortom, insecten hebben minder negatieve effecten op het milieu dan vlees.

1.2.1 Repetition of environmental benefits

Even een korte herhaling van de voordelen van het eten van insecten

- Er zijn weinig fossiele gassen nodig bij de teelt van insecten;
- Dit zorgt voor een beperkte vervuiling van het milieu in vergelijking met veeteelt;
- Er is minder water nodig voor de teelt van insecten dan bij veeteelt.

1.3 Sensory-liking benefits

Er komen steeds meer voedselproducten op basis van insecten op de markt. Dankzij de rijke, volle smaak vormen insecten een waardevolle toevoeging aan ieder voedselproduct. Een karakteristieke, nootachtige smaak kenmerkt producten die op basis van insecten worden gemaakt. Deze nootachtige smaak komt nog beter naar voren als de insecten geroosterd zijn voordat ze verwerkt worden in een product. Dit zorgt voor een nog rijkere smaakervaring.

1.3.1 Repetition of sensory-liking benefits

Even een korte herhaling van de voordelen van het eten van insecten

- Insecten hebben een rijke, volle smaak;
- De karakteristieke nootachtige smaak geeft een unieke toevoeging aan je maaltijd;
- Vooral producten met geroosterde insecten zijn erg smaakvol.

Appendix 2: Questionnaire

Start of Block: Introductie

Beste deelnemer,

Bedankt dat je wilt deelnemen aan deze vragenlijst. De vragenlijst maakt deel uit van mijn scriptie voor de master International Business Communication aan de Radboud Universiteit Nijmegen. Je zult zo meteen een korte tekst te lezen krijgen, waarna je vier verschillende producten te zien krijgt. Over alle vier de producten ga je enkele vragen beantwoorden. Ga hier vooral uit van je eerste ingeving, er zijn geen foute antwoorden. Het invullen van de vragenlijst zal ongeveer 5-10 minuten duren.

De antwoorden van deze vragenlijst zullen zorgvuldig worden geanalyseerd en alleen voor dit onderzoek worden gebruikt. Natuurlijk maken we deze gegevens volledig anoniem en bewaren we ze volgens aan de Radboud Universiteit geldende regels.

Nogmaals hartelijk dank dat je mij wilt helpen! Mocht je vragen of opmerkingen hebben, dan kun je contact op met mij nemen via adi.bucchianico@student.ru.nl.

Met vriendelijke groet,
Annefleur Di Bucchianico

Toestemming: Geef hieronder jouw keuze aan
Door te klikken op de knop 'Ik ga akkoord' geef je aan dat je:
- bovenstaande informatie hebt gelezen
- vrijwillig meedoet aan het onderzoek
- 18 jaar of ouder bent

○ Ik ga akkoord (1)

Page Break

End of Block: Tekst 3: smaakvoordelen

Start of Block: Insect product 1 (nachos)

Q36 Deze nacho chips bestaan voor 15% uit meel op basis van meelwormen

Page Break

Q9 Het eten van dit product, met ingrediënten op basis van insecten, in de komende maand vind ik

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Zeer onplezierig	○	○	○	○	○	○	○	Zeer plezierig
Zeer irrelevant	○	○	○	○	○	○	○	Zeer relevant
Smaakvol	○	○	○	○	○	○	○	Niet smaakvol
Nutteloos	○	○	○	○	○	○	○	Nuttig

Q8 Stel je voor dat je het product gratis mag proeven, in hoeverre zou jij dit product dan willen proeven?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Totaal niet graag	○	○	○	○	○	○	○	Zeer graag

Q12 Ik overweeg dit product op te nemen in mijn dagelijkse dieet

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Zeer mee oneens	○	○	○	○	○	○	○	Zeer mee eens

Q13 Ik zou dit product aan mijn vrienden of familie aanraden

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Zeer mee oneens	○	○	○	○	○	○	○	Zeer mee eens

Q14 Ik zou dit product eerder kopen dan traditionele bronnen van eiwitten, zoals vlees, als dit verkrijgbaar zou zijn in de supermarkt

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Zeer mee oneens	○	○	○	○	○	○	○	Zeer mee eens

Page Break

Q10 Heb je wel eens nachos chips (zonder ingrediënten op basis van insecten) geproefd?

- Ja (1)
- Nee (2)

Q11 Hoe vaak eet je nachos?

- Dagelijks (1)
- 4-6 keer per week (2)
- 1-3 keer per week (3)
- 1-3 keer per maand (4)
- Vrijwel nooit (5)
- Nooit, maar ik heb het wel eens geproefd (6)

Page Break

End of Block: Insect product 1 (nachos)

Start of Block: Insect product 2 (pasta)

Q48 Deze pasta bestaat voor 15% uit meel op basis van meelwormen

Page Break

Het eten van dit product, met ingrediënten op basis van insecten, in de komende maand vind ik

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Zeer onplezierig	○	○	○	○	○	○	○	Zeer plezierig
Zeer irrelevant	○	○	○	○	○	○	○	Zeer relevant
Smaakvol	○	○	○	○	○	○	○	Niet smaakvol
Nutteloos	○	○	○	○	○	○	○	Nuttig

Page Break

Q18 Stel je voor dat je het product gratis mag proeven, in hoeverre zou jij dit product dan willen proeven?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Totaal niet graag	○	○	○	○	○	○	○	Zeer graag

Q19 Ik overweeg dit product op te nemen in mijn dagelijkse dieet

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Zeer mee oneens	○	○	○	○	○	○	○	Zeer mee eens

Q20 Ik zou dit product aan mijn vrienden of familie aanraden

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Zeer mee oneens	○	○	○	○	○	○	○	Zeer mee eens

Q21 Ik zou dit product eerder kopen dan traditionele bronnen van eiwitten, zoals vlees, als dit verkrijgbaar zou zijn in de supermarkt

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Zeer mee oneens	○	○	○	○	○	○	○	Zeer mee eens

Page Break

Q22 Heb je wel eens pasta (zonder ingrediënten op basis van insecten) geproefd?

- Ja (1)
- Nee (2)

Q23 Hoe vaak eet je pasta?

- Dagelijks (1)
- 4-6 keer per week (2)
- 1-3 keer per week (3)
- 1-3 keer per maand (4)
- Vrijwel nooit (5)
- Nooit, maar ik heb het wel eens geproefd (6)

End of Block: Insect product 2 (pasta)

Start of Block: Teksten herhaling

End of Block: Teksten herhaling

Start of Block: Insect product 3 (bitterballen)

Q35 Deze bitterballen bestaan voor 15% uit meel op basis van meelwormen

Page Break

Q25 Het eten van dit product, met ingrediënten op basis van insecten, in de komende maand vind ik

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Zeer onplezierig	○	○	○	○	○	○	○	Zeer plezierig
Zeer irrelevant	○	○	○	○	○	○	○	Zeer relevant
Smaakvol	○	○	○	○	○	○	○	Niet smaakvol
Nutteloos	○	○	○	○	○	○	○	Nuttig

Page Break

Q26 Stel je voor dat je het product gratis mag proeven, in hoeverre zou jij dit product dan willen proeven?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Totaal niet graag	○	○	○	○	○	○	○	Zeer graag

Q27 Ik overweeg dit product op te nemen in mijn dagelijkse dieet

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Zeer mee oneens	○	○	○	○	○	○	○	Zeer mee eens

Q28 Ik zou dit product aan mijn vrienden of familie aanraden

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Zeer mee oneens	○	○	○	○	○	○	○	Zeer mee eens

Q29 Ik zou dit product eerder kopen dan traditionele bronnen van eiwitten, zoals vlees, als dit verkrijgbaar zou zijn in de supermarkt

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Zeer mee oneens	○	○	○	○	○	○	○	Zeer mee eens

Page Break

Q30 Heb je wel eens bitterballen (zonder ingrediënten op basis van insecten) geproefd?

- Ja (1)
- Nee (2)

Q31 Hoe vaak eet je bitterballen?

- Dagelijks (1)
- 4-6 keer per week (2)
- 1-3 keer per week (3)
- 1-3 keer per maand (4)
- Vrijwel nooit (5)
- Nooit, maar ik heb het wel eens geproefd (6)

End of Block: Insect product 3 (bitterballen)

Start of Block: Insect product 4 (hamburger)

Q50 Deze hamburger bestaat voor 15% uit meel op basis van meelwormen

Page Break

Q51 Het eten van dit product, met ingrediënten op basis van insecten, in de komende maand vind ik

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Zeer onplezierig	○	○	○	○	○	○	○	Zeer plezierig
Zeer irrelevant	○	○	○	○	○	○	○	Zeer relevant
Smaakvol	○	○	○	○	○	○	○	Niet smaakvol
Nutteloos	○	○	○	○	○	○	○	Nuttig

Page Break

Q52 Stel je voor dat je het product gratis mag proeven, in hoeverre zou jij dit product dan willen proeven?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Totaal niet graag	○	○	○	○	○	○	○	Zeer graag

Q53 Ik overweeg dit product op te nemen in mijn dagelijkse dieet

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Zeer mee oneens	○	○	○	○	○	○	○	Zeer mee eens

Q54 Ik zou dit product aan mijn vrienden of familie aanraden

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Zeer mee oneens	○	○	○	○	○	○	○	Zeer mee eens

Q55 Ik zou dit product eerder kopen dan traditionele bronnen van eiwitten, zoals vlees, als dit verkrijgbaar zou zijn in de supermarkt

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Zeer mee oneens	○	○	○	○	○	○	○	Zeer mee eens

Page Break

Q56 Heb je wel eens een hamburger (zonder ingrediënten op basis van insecten) geproefd?

- Ja (1)
- Nee (2)

Q57 Hoe vaak eet je hamburgers?

- Dagelijks (1)
- 4-6 keer per week (2)
- 1-3 keer per week (3)
- 1-3 keer per maand (4)
- Vrijwel nooit (5)
- Nooit, maar ik heb het wel eens geproefd (6)

End of Block: Insect product 4 (hamburger)

Start of Block: Demografische gegevens

Q46 Wat is je nationaliteit?

- Nederlands (1)
- Anders (2)

Q49 Wat is je leeftijd? (in cijfers)

_____

Q3 Wat is je hoogst genoten opleiding? Indien je op dit moment bezig met een opleiding, kies dan voor het bijbehorende niveau hiervan.

- MAVO (1)
- HAVO (2)
- VWO (3)
- MBO (4)
- HBO (5)
- WO (6)

Q4 Wat is je geslacht?

- Man (1)
- Vrouw (2)
- Anders (3)

Q5 Ben je bekend met de consumptie van insecten?

- ○ Ja, ik heb hier eerder van gehoord en ik weet wat het betekent (1)
- ○ Ik heb hier eerder van gehoord, maar ik weet niet precies wat het betekent (2)
- ○ Nee, ik heb hier nog nooit van gehoord (3)

Q6 Hoe vaak eet je vlees per week?

- ○ Nooit, ik eet geen vlees (1)
- ○ Ik eet 1-2 per week vlees (2)
- ○ Ik eet 3-4 per week vlees (3)
- ○ Ik eet 5-6 per week vlees (4)
- ○ Ik eet iedere dag vlees (5)

Q15 Ik zou mijzelf omschrijven als

- ○ Vegetariër (1)
- ○ Veganist (2)

End of Block: Demografische gegevens