

July 2015

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Different Approaches to Positioning Edible Insect Products on the Western Market

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Bachelor Thesis

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Wageningen, July 2015

Acknowledgements

First and foremost, I offer my sincerest gratitude to my thesis counsellor Arnout Fischer, from the Wageningen University, who has supported me throughout my research with his knowledge and expertise whilst allowing me the room to work in my own way. The guidance increased the quality of the research.

Secondly, I want to thank my girlfriend Christel van Eck and father Arjaan Wit, who were always there to discuss issues that came up during the research

Lastly, I like to thank everybody that filled in the survey.

Executive Summary

The world population is growing, which consequently means that more people need to eat. One sustainable solution to feeding the Western population is introducing entomophagy. However, it remains unknown what the most effective approach is to increasing edible insect consumption in terms of visual appearance and product designation in Western society. The current study focused on finding the most appropriate approach of product positioning in order to elicit a positive consumer attitude on the Western market. The main research question read as follows: “What product designation and visual appearance is congruently the most effective approach to increasing positive attitudes on insect consumption in the Netherlands?”

Guided by a literature review, the following hypotheses were formulated and tested:

H1: Main effect of visual appearance: Presenting insects as a whole recognizable animal will elicit a higher level of disgust than hiding insect features.

H2: Main effect of product designation: Presenting edible insects, irrespective of their appearance (whole recognizable animal vs hidden insects features), will elicit a less positive consumer attitude in the vegetarian department than in the meat department.

H3: Interaction effect: Product designation is a moderator in the relation between disgust and consumers' attitudes. The effect of visual appearance as predicted in hypothesis 1, will be less strong in the meat department than in the vegetarian department.

The results implied that visual appearance did play an important role in eliciting disgust, which means that hypothesis one was proven. Product Designation, however, did not seem to play any role in forming consumers' attitude. Furthermore, the results showed that General Attitude and Expected Credence Quality showed no interaction effect, whereas Expected Experience Quality did. Overall, I recommend a few measures to further explore the most appropriate approach to positioning edible insects on the Western market.

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1. Introduction

The world population is growing, it is estimated that in 2050 the world will host over 9 billion people (UN, 2011). To accommodate this enormous growth, the current amount of food produced will have to be doubled. However, land is scarce and oceans are overfished. Hence, in order to feed the world, what we eat and how we produce it needs to be re-evaluated. Insect consumption, also referred to as entomophagy, is argued to be sustainable and could therefore help in feeding the growing world population (Looy, Dunkel, & Wood, 2014). Edible insects like buffalo worms, mealworms, crickets, and grasshoppers can be a source of exceptional nutritional benefits accompanied with high fat, protein, vitamin, fiber and mineral content (van Huis, 2014). Additionally insects have the potential to be produced with significantly less negative environmental impact than most other common food consumed today (Durst et al, 2010).

It is estimated that edible insects already provide at least 2 billion people with a vital source of nutrients and calories in many tropical and subtropical countries (van Huis, 2014). Moreover, edible insects are seen as delicacies, especially in the tropics. (Raubenheimer, 2013). However, despite its potential, Western society has a history of public, political, and scholarly resistance to seriously considering insects as a source of food (DeFoliart 1999, 2012). Kellert (1993) showed that the majority of Western population expresses feelings of aversion, disgust or fear towards edible insects. Furthermore, Van Huis et al. (2013) mention the 'disgust factor' and argue that the large majority of Westerners still view insects as pests. These feelings are fed by the introduction of Western reality television game shows such as Fear Factor and Survivor. These reality programs showcased horrifying footage of challenges in which the contestants rapidly have to eat gross looking insects in order to be victorious (Looy, Dunkel, & Wood, 2014). Eating insects is portrayed as a novel, exotic, and marginal activity instead of normalized behavior that the Westerner population could adapt to.

Acculturation of non-Western population towards a Western lifestyle tends to decrease the use of insects as a source of food worldwide. Hence, it is important for the Western world to become more aware of their bias against insect consumption. Not merely because the Western world itself is in need of more food sources, but also because feeding the entire world population asks for a more sustainable way of producing food (Francis, 2010).

So far, despite various attempts little has changed in the widespread Western attitude towards insect consumption (Francis, 2010). However, Looy & Wood (2000; 2006) used educational presentations and 'bug banquets' to increase awareness on the added value insects bring to human

diet. Although the study helped respondents in overcoming the disgust factor, little changed in the overall Westerner consumption of edible insects. Additionally, a widely quoted UN report which stated that 'insects are safe and attractive for human consumption' failed its purpose to convince Western society (Durst et al., 2012)

Clark (1995) states that consumers' attitude is not merely constructed by rational frameworks that are influenced by education and increased awareness. He argues that emotions and cultural dimensions are also playing an important role in constructing consumer attitude. Hence, education on edible insects alone is not enough; the challenge ahead is to persuade an insect phobic Western culture to adopt edible insects in their diet.

A useful tool to increase the attractiveness of edible insects is product positioning. According to Hooley, Piercy & Nicoulaud (2008) product positioning involves communication of the meaning, the benefits, and the advantages on competitive products. Finding an appropriate position that will make sense to the consumers is essential in successfully introducing insects as a source of food on the market (Loken, Barsalou, & Joiner, 2008).

Visual appearance and product designation are important attributes in positioning edible insects on the Western market. Henceforward, visual appearance will be referred to as the visual features of the product itself and product designation will be referred to as the product place in a specific department. In relation to visually presenting edible insects, one can distinguish between two different approaches. One approach involves grinding insects into granular or paste form to subsequently present them as burger, nugget, meatball, or schnitzel and hide their present shape (van Huis, 2014). The other approach involves leaving the insects' visibilities untouched to subsequently present them as a whole recognizable animal. Hiding the insects' present shape evokes the notion that one is not consuming an insect, whereas presenting insects as a whole evokes the notion that one is consuming an insect.

Nonetheless, it is debatable whether insects' present shape should be hidden or insects should be presented as a whole recognizable animal. Due to the fact that insects can elicit a feeling of disgust by presenting them as a whole (Kellert, 1993), insects present shape is often hid, e.g. Jumbo's insect burgers and schnitzels (Jumbo, 2015). However, consuming insects as a whole can also be considered as novel, exotic, and marginal (Looy, Dunkel, & Wood, 2014), which is why presenting insects as a whole also might be an appropriate approach, e.g. Albert Heijn's Goodlife Tribolo's mealworms (AH, 2015). Currently, there is no conclusive research on what the best approach is to visually presenting edible insects.

In addition to the different approaches of visually presenting edible insects, one can distinguish between designating edible insects in the 'meat department' or 'vegetarian department'. Placing edible insects in the meat department evokes the notion that the product is animal meat, whereas placing edible insects in the vegetarian department evokes the notion that the product is vegetarian.

Similarly, it is debatable whether edible insects should be designated in the meat or vegetarian department. Due to the fact that insects have high protein content (Deroy, Reade, & Spence, 2015), insects are often considered to be placed most appropriately in the meat department. However, the texture, smell, and flavor of insects is significantly different from meat, which is why insects can also be considered to be placed most appropriately in the vegetarian department. Currently, there is no binding regulation in which the product designation is determined.

Thus, it remains unknown what the most effective approach is to increasing edible insect consumption in terms of visual appearance and product designation in Western society. In this paper, research will focus on finding the most appropriate approach of product positioning in order to elicit a positive consumer attitude on the Western market, since Western society as a whole is too big to investigate focus will be on the Netherlands. Hence, the main research question reads as follows: "What product designation and visual appearance is congruently the most effective approach to increasing positive attitudes on insect consumption in the Netherlands?" The following questions will help guiding this research:

- What is the most effective approach to visually presenting edible insects?
- What is the most effective approach to product designation of edible insects?

In section (2) an account of literature on positioning edible insects in the Western market is presented. In section (3) the method used in this research will be explained. In section (4) the results are shown. And lastly in section (5) the results are discussed.

2. Literature Review

The goal of this study is to find the most effective approach of product positioning in order to elicit positive consumers' attitude on the Western market. Many consumers know that they can eat insects, but very few are willing to eat them (Deroy, Reade, & Spence, 2015). Firstly, existing literature on visual appearance and its effect on the level of disgust in consumers' mind is presented. Subsequently, existing literature on different forms of product designation that leads to differences in consumers' attitude is presented. Lastly, an account of literature on visual appearance and product designation combined is presented.

2.1 Visual Appearance and Disgust

The way products are visually presented can have significant effects on humans' emotions. In many African and Asian countries presenting insects as a whole recognizable animal will elicit fairly positive associations (Raubenheimer, 2013). However, despite various efforts, Westerners generally experience consuming insects as disgusting (Looy & Wood, 2006). Disgust, not to confuse with distaste, is a basic and universal human emotion that signals when one intends to do something that will lead to negative consequences and should therefore be avoided (Rozin, Haidt & McCauley, 2000).

Disgust is currently recognized by emotion theorists as one of humans 'core emotions' (Rozin et al., 1983). Disgust can be distinguished in core disgust, body violation disgust, and moral disgust. Core disgust is the oldest form and is often generated by rotten food, vomit, and feces. It focusses on defending against infection through the oral route. Secondly, body violation disgust is generated by blood, injuries, and bodily harm. Lastly, moral disgust is generated by moral transgressions, which focusses on avoiding unsuitable interaction partners (Rozin, Haidt, & McCauley, 2000). Insect consumption is often categorized by consumers as core disgust (Deroy, Reade, & Spence, 2015).

Experienced emotions of disgust when consuming insects can be largely dedicated to visual features of the insect, such as shape and size (Shepardson 2002). Schösler, de Boer, & Boesema (2012) show that presenting meat substitutes with visible insects are perceived more negatively compared to a presentation in which insect visibilities are hidden. Similar results were found by Tan et al. (2015) and Verkerk et al. (2007), who show that grinding an insect to invisibility proved to work, since consumer attitude became more positive. Additionally, Lensvelt & Steenbekkers. (2014) found

that consumers are more likely to consume insects that are mixed into a dish than eating them individually.

Martins & Pliner (2006) indicate that there are two determinants of a disgust reaction: aversive textural properties and the extent to which the product reminds of livingness or animalness. The latter is emphasized by Rozin & Fallon (1987), who argue that the core elicitors of disgust are animals and animal products. Additionally, the head and viscera of animals are the strongest reminders of the animal origin of food (Rozin & Fallon, 1987). Hence, the first hypothesis reads as follows:

H1: Main effect of visual appearance: Presenting insects as a whole recognizable animal will elicit a higher level of disgust than hiding insect features.

2.2 Product Designation and Consumer Attitude

The way products are designated in store can have significant effects on consumer attitude towards products (Buchanan et al. 1999). Henceforward, placing a product in a specific department and shelf displaying will be interchangeable. Shelf display consists of taxonomic-displaying and goal-based displaying. Taxonomic displaying is referred to as placing a product in a shelf with other products of the same nominal category. Goal-based displaying is referred to as placing a product in a shelf with other products that all have the same consumer goal (Desai & Ratneshwar, 2003). Henceforth, I assume that insect consumption is a goal-based activity, since insects are mostly consumed for idealist purposes.

Two different options are possible in evaluating product designation, either 'assimilation' or 'contrast'. Assimilation can be explained as a product being evaluated as similar to the rest of the products in the shelf, whereas contrast can be explained as a product being evaluated as different from the rest of the products in the shelf. When a new product is added to a goal-based shelf and prominently features an atypical attribute, contrast occurs. Consequently, consumers will wonder whether the product fulfils the same goal compared to the rest of the products on the same shelf, which likely leads to a relatively negative consumer attitude (Desai & Ratneshwar, 2003).

Henceforth, I assume that consumers expect products in the meat department that fit to their concept of meat. In a similar vein, I assume that consumers expect no products in the

vegetarian department that contain components of slain animal. Hence, the second hypothesis reads as follows:

H2: Main effect of product designation: Presenting edible insects, irrespective of their appearance (whole recognizable animal vs hidden insects features), will elicit a less positive consumer attitude in the vegetarian department than in the meat department.

2.3 Interaction

However, it can be expected that the predicted effect of product designation on consumers' attitude (H2) will be less strong than the predicted effect of visual appearance (H1). Hence, exploratory research will be done to combine these two main effects. It is expected that the best approach to positioning edible insects is to hide their insects' features and designate them in the meat department. This is due to the fact that the meat department contains different varieties of meat, which are presented as animal products, both recognizable and unrecognizable. Spare-ribs, chicken breast, cow-tongue, brains, tails, meatloaf, burgers, and schnitzels are all displayed in the same department. Hence, when adding edible insects to this department, consumers will not perceive this as atypical and therefore assimilation will occur. It is predicted that presenting insects as a whole in the meat department will elicit higher levels of disgust than presenting them while hiding their animal features and therefore will subsequently lead to a more negative consumer attitude.

Additionally, it is expected that the worst approach to position insects is to present them as a whole recognizable animal in the vegetarian department due to the fact that none of the displayed products in the vegetarian department contain animal features. Hence, when adding edible insects to this department, consumers will perceive this as atypical and therefore contrast will occur. Since consumers expect no products in the vegetarian department that contain components of slain animal, presenting them as a whole recognizable animal will elicit higher levels of disgust than presenting them while hiding their animal features. Hence, the third hypothesis reads as follows:

H3: interaction effect: Product designation is a moderator in the relation between disgust and consumers' attitudes. The effect of visual appearance as predicted in hypothesis 1, will be less strong in the meat department than in the vegetarian department.

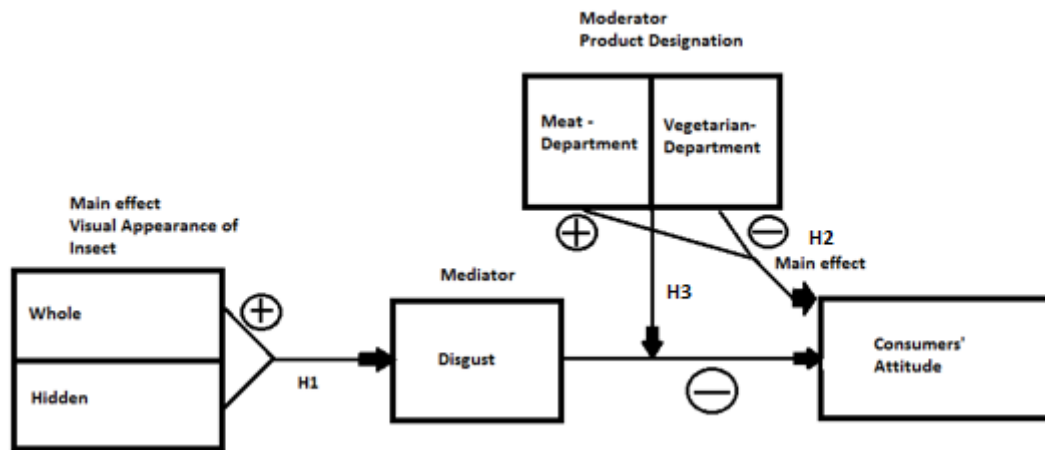


Fig.1: Research model

3. Methodology

The following chapter provides insight into the deployed methodology. The following sections explain the defined population, the research design, the manipulation, the measures, and the procedure.

3.1 Defining the Population

The research was limited to the Netherlands, which is a typical example of a Western society. The target population contains consumers who at least sometimes do household food purchases, between the ages of 18-75, since this segment of people, on average, is familiar with different forms of shelf displaying and approaches to visually presenting products in a supermarket. Additionally, it is expected, based on the fact that these consumers at least sometimes do household food purchases that this group is familiar with making decisions between different types of food. I obtained 106 respondents by sending out surveys. 46% of the respondents were man 54% were woman.

3.2 Research Design

A 2 x 2 between respondents design is used, in which visual appearance and product designation are paired up into different combinations. Visual appearance distinguishes presenting insects as a whole recognizable animal and hiding animal features. Product designation distinguishes placing the product in the meat department and in the vegetarian department.

3.3 Manipulation

Respondents will be divided in four different conditions that all entail a different approach to edible insect positioning.

The four approaches are (Also see Table 1):

- 1: insect designated in vegetarian department, visually appearing as a whole recognizable animal.
- 2: Insect designated in vegetarian department, visually appearing as hiding the animal features.
- 3: Insect designated in meat department, visually appearing as a whole recognizable animal.
- 4: Insect designated in meat department, visually appearing as hiding the animal features.

Table 1: Product Positioning

Product designation: Meat department Vega department	Position 1	Position 2
	Position 3	Position 4
	Recognizable	Hidden
	Visual appearance:	

Table 1: four approaches to position edible insect products

Respondents will be shown a photo of an edible insect product. Either visually appearing as a whole recognizable animal or in a form that hides the animals' visual features. A second photo shows that the insect product is designated in the meat department or in the vegetarian department. Above the photo stands: 'look carefully, before continuing'. Additionally, a scenario description is attached that tells the participant in what department the product is designated and what the products visibilities are.

3.4 Measures

Overall Disgust is evaluated on the base of five different questions. Disgust, enthusiasm, disapproving, curiosity, and amazement. Questions were answered on a 7 point bipolar scale ranging from no disgust to a lot of disgust, no enthusiasm to a lot of enthusiasm etc.

Consumers' attitude is evaluated on the base of questions formed by Ajzen (2002). These questions evaluate feelings towards the product, based on four item pairs: good/bad, valuable/worthless, pleasant/unpleasant, and interesting/boring. These questions were evaluated through a 7 point bipolar scale ranging from extremely good to extremely bad. Additionally, based on open conversations, 8 extra questions are constructed to measure consumers' attitude. The content of these questions is about: perceived risk, easiness to swallow, taste, fitting without products, healthiness, texture, naturalness, and ease to prepare. All 8 questions were answered on a 7 point bipolar scale ranging from totally agree to totally disagree.

Beyond the main variables, several background variables were included. Firstly, food neophobia, which consist of 10 questions (Pliner & Hobden, 1992) that are answered on a 7 point bipolar scale ranging from totally agree to totally disagree. Since the questions in the survey are Dutch, I used the translation of Landelijk Kenniscentrum Kinder-en Jeugdpsychiatrie (2014). Secondly, different reasons of vegetarianism were examined. This was tested based on the evaluations of importance on: animal welfare, health, taste of meat, and environment. Questions were evaluated based on a 7 point bipolar scale ranging from extremely important to not important at all.

3.5 Procedure

Respondents were randomly assigned to one of four experimental conditions, subsequently, they were excluded from the remaining groups. Following a brief introduction, respondents were presented with one of the scenarios and images of the product. After carefully examine the shown content, respondents were asked to answer the questions in the following order: Disgust (5 Items), Attitude (12 items), reasons of vegetarianism (4 items), and Neophobia (10 items). A total of 36 items were evaluated. Lastly, respondents were thanked for their participation and a confirmation of completion was shown.

4. Results

This chapter consist of the following sections: scale consistency; The relationship between Visual Appearance of the edible insects on the one hand and Disgust, Disapproval, Enthusiasm, Amazement and Curiosity on the other hand; Effects of Disgust and Product Designation on the one hand and the three aspects of Consumers' Attitudes on the other hand; Effects of Disgust and Product Designation on the one hand and the three aspects of Consumers' Attitudes on the other hand; Relationship between Visual Appearance on the one hand and the three aspects of Consumers' Attitudes, Appropriateness of Product Designation; and Covariates Neophobia, age, gender and familiarity with eating insects.

4.1 Scale Consistency

To determine whether the variables that were measured in the survey constitute homogenous (sub) scales, reliability scores were calculated with Cronbach's Alpha. Different questions were combined in case of the Cronbach's Alpha being higher than 0.70. Based on factor analysis with oblique rotation (which permits correlation of factors) three factors to measure consumer attitude showed high correlations based on Eigen-Values > 1.00. The combinations of the following questions formed the three subscales of the concept Consumers' Attitude.

Four items (good - bad, valuable - worthless, pleasant - unpleasant, interesting - boring) formed a reliable (Cronbach's Alpha = 0.75) subscale which is interpreted as General Attitude towards the way in which the edible insects were presented (on the pictures with accompanying texts). The score of General Attitude was calculated by averaging respondents' answers to these four items.

Four items (predicted easiness to swallow, predicted texture, predicted taste, predicted easiness to prepare) formed a reliable (Cronbach's Alpha = 0.79) subscale which is interpreted as Expected Experience Quality. The score of Expected Experience Quality was calculated by averaging respondents' answers to these four items.

Three items (product naturalness, product safety, product healthiness) formed a reliable (Cronbach's Alpha = 0.77) subscale which is interpreted as Expected Credence Quality. The score of Expected Credence Quality was calculated by averaging respondents' answers to these three items.

Scale consistency of the construct Neophobia was also checked for homogeneity. Negative items were reverse-coded and all ten items were combined into a general Neophobia score (Cronbach's Alpha = 0.86).

4.2 The relationship between Visual Appearance of the edible insects on the one hand and Disgust, Disapproval, Enthusiasm, Amazement and Curiosity on the other hand

The effect of Visual Appearance of the insects on Disgust ("no disgust" (1) to "extreme disgust" (7)) was tested by an ANOVA. Respondents reported significantly less disgust for hidden insect products ($M_{hid} = 2.96$) than for recognizable insect products ($M_{recogn} = 4.08$; $F(1, 98) = 10.32$, $p < .002$). This supports H1, i.e., a main effect of Visual Appearance on Disgust: Presenting insects as a whole recognizable animal elicits more disgust than hiding insect features. It should be noted that respondents' disgust for hidden insects is more than 1 scale-point *below* the neutral mid-point of the 7-point scale, while disgust for recognizable insects is about neutral, i.e., at the midpoint of the 7-point scale.

Since disgust is measured by means of merely one variable, I posed additional questions to measure respondents' feelings ("My feeling towards the product", measured on a 7-point bipolar scale ranging from "no disapproval" (1) to "extreme disapproval" (7)). Respondents reported less disapproval for hidden insect products ($M_{hid} = 2.76$) than for recognizable insect products ($M_{recogn} = 3.53$; $F(1,97) = 5.427$, $p < 0.02$). Thus, respondents did not only show significantly less disgust but also less disapproval for hidden insect products than for recognizable insect products.

A one-way ANOVA of the effect of Visual Appearance of the insects showed that hiding insect features had a significant positive effect on respondents' Enthusiasm about the product ($M_{hid} = 3.70$, $M_{recogn} = 3.00$; $F(1, 98) = 6.022$, $p < 0.02$), a marginally significant effect on respondents' Amazement about the product ($M_{hid} = 3.30$, $M_{recogn} = 3.91$; $F(1, 98) = 9.202$, $p < 0.07$) and no effect on respondents' Curiosity to find out more about the product ($M_{hid} = 4.57$, $M_{recogn} = 4.47$; $F(1, 98) = 0.093$, $p = 0.76$). Thus, hiding insect features evokes more enthusiasm, somewhat less amazement, but no difference in curiosity.

4.3 Effects of Disgust and Product Designation on the one hand and the three aspects of Consumers' Attitudes on the other hand

A factorial ANCOVA with Disgust (as a measured continuous variable), Product Designation (Meat - Vegetarian Dept) and their interaction on General Attitude was conducted, showing a significant overall effect, ($F(3, 94) = 9.248, p < 0.001$). No main effect of Product Designation was found ($F(1, 94) = 0.524, p = 0.47$). A significant main effect of Disgust was found ($F(1, 94) = 25.546, p < 0.001$) with more Disgust resulting in a more negative General Attitude. The absence of a significant interaction between Disgust and Product Designation ($F(1, 94) = 1.311, p = 0.26$) indicates that more Disgust results in a more negative General Attitude, irrespective of whether the product is designated in the Meat Department or in the Vegetarian Department.

A factorial ANCOVA with Disgust (as a measured continuous variable), Product Designation (Meat - Vegetarian Dept) and their interaction on Expected Experience Quality was conducted, showing a significant overall effect, ($F(3, 96) = 5.274, p < 0.002$). No main effect of Product Designation was found ($F(1,96) = 2.327, p = 0.13$). A significant main effect of Disgust was found ($F(1, 96) = 9.790, p < 0.02$) with more Disgust resulting in a more negative Expected Experience Quality. Interestingly, the significant interaction between Disgust and Product Designation ($F(1, 96) = 4.970, p < 0.03$) indicates that Disgust is a much stronger predictor of Expected Experienced Quality of insect products positioned in the Meat department ($b = -.324$; more Disgust results in more negative Expected Experience Quality) than in the Vegetarian department ($b = .054$; no significant relationship between Disgust and Expected Experience Quality).

A factorial ANCOVA with Disgust (as a measured continuous variable), Product Designation (Meat - Vegetarian Dept) and their interaction on Expected Credence Quality was conducted, showing no significant overall effect, ($F(3, 96) = 1.397, p = 0.25$). No main effect of Product Designation was found ($F(1, 96) = 0.495, p = 0.48$), a marginally significant main effect of Disgust ($F(1, 96) = 3.384, p < 0.07$) with more Disgust resulting in a more negative Expected Credence Quality. The absence of a significant interaction between Disgust and Product Designation ($F(1, 96) = 0.476, p = 0.49$) indicates no significant relationship between Disgust and Expected Credence Quality.

4.4 Relationship between Visual Appearance on the one hand and the three aspects of Consumers' Attitudes on the other hand.

Consumers' Attitude consists of three subscales, i.e., General Attitude, Expected Experience Quality, and Expected Credence Quality. The relationship between Visual Appearance and the three subscales was tested by means of ANOVA. There was no effect on General Attitude ($M_{hid} = 3.43, M$

$M_{\text{recogn}} = 3.65$; $F(1, 98) = 1.328$, $p = 0.25$), Expected Experience Quality ($M_{\text{hid}} = 3.91$, $M_{\text{recogn}} = 4.21$; $F(1, 98) = 1.770$, $p = 0.18$) and Expected Credence Quality ($M_{\text{hid}} = 2.71$, $M_{\text{recogn}} = 2.43$; $F(1, 98) = 1.409$, $p = 0.23$).

4.5 Appropriateness of Product Designation

I explored whether the Visual Appearance of the insect products (either as hidden or recognizable insects) in combination with their Positioning (either in the Meat Department or in the Vegetarian Department) affected respondents' answers to the question "Is the designation of the insects product appropriate in this department?" (not at all (1), very much so (7)). The results are presented in Table 2.

Table 2: Mean scores

Product designation: Meat department Vegetarian department	Meat department	M=3.27 SD:1.87	M=3.15 SD:1.74
	Vegetarian department	M=2.91 SD:1.41	M=4.05 SD:1.86
		Recognizable	Hidden
Visual appearance:			

Table 2: Mean scores product positioning

A 2 X 2 ANOVA showed no significant main effect of Product Designation ($F(1, 96) = 0.593$, $p = 0.44$), indicating that respondents consider positioning the insect products in the Meat Department ($M = 3.45$) not significantly more appropriate than positioning the insect products in the Vegetarian department ($M = 3.21$). There was no main effect of visual appearance of the products ($M_{\text{hidden}} = 3.55$; $M_{\text{recogn}} = 3.11$; $F(1, 96) = 2.121$, $p = 0.15$). There was a marginally significant interaction effect between products designation and visual appearance of the products ($F(1,96)=3.16$, $p=0.08$)

4.6 Covariates Neophobia, age, gender and familiarity with eating insects

I explored the potential role of Neophobia, age, gender, and familiarity with eating insects as covariates on the effect of Visual Appearance on respondents' disgust. A factorial ANOVA showed that

Neophobia, age, gender, and familiarity with eating insects did not play a role as significant covariates to predict disgust.

Furthermore, an independent ANOVA showed that age, gender and familiarity with eating insects did not have a significant effect on General Attitude, Expected Experience Quality, nor Expected Credence Quality. However, Neophobia did have a significant effect on General Attitude ($F(1, 92) = 10.430, p = 0.002$) and Expected Credence Quality ($F(1,94) = 5.351, p = 0.023$). More specifically, the higher respondents' fear of anything new (Neophobia), the less positive their General Attitude towards insect products as well as their beliefs about product naturalness, product safety, product healthiness of insect products.

5. Discussion & Conclusion

The present study explores two ways to counteract the assumed general negative Western attitude towards insect consumption. Despite numerous attempts (Francis, 2010; Looy & Wood, 2006), the majority of Westerners are assumed to express feelings of aversion, disgust, and fear towards edible insects. Therefore, the goal of this research was to find the most appropriate approach to positioning edible insects on the Western market. Different approaches to visually presenting edible insects and product designation were examined, which was done by measuring consumers' disgust as a function of products' visual appearance and product designation. I measured respondents' general attitude, expected experience quality, and expected credence quality as a function of disgust and product designation.

Firstly, the results of this study indicate that the respondents did not collectively rate edible insects to be disgusting. This may indicate that the above mentioned existing literature is out dated or that the respondents of this survey do not give a good representation of the targeted population. Another explanation is that this study was based in Wageningen, a city of life science in which relatively much attention is on sustainability relatively to the rest of the Netherlands and even the Western World.

Since the results of this study imply that hiding insect features will lead to less disgust than recognizable insect features, in order to promote insect consumption, producers of edible insect products should focus more on hiding insects' visual features instead of producing edible insects with all their visual features. In the long run, however, as Westerners will become more familiar with insect consumption and therefore hiding insects' visual features may be less necessary, attitudes may become even more positive. Thus, in order to familiarize consumers with insect consumption, it can be recommended that insect producers hide insects' visual features, but in the long run re-evaluate this approach to conceal insect features.

Furthermore, the present results suggest that General Attitude and Expected Experience quality are strongly related to disgust. However, interestingly, at the same time respondents' beliefs about Expected Credence Quality (product naturalness, product safety, and product healthiness) are not related to disgust. An explanation could be that Expected Credence Quality is based on private prior beliefs about insect consumption. These rational beliefs are not strongly affected by emotions.

Since the current study states that overall consumers' attitude is based on all three subscales (General Attitude, Expected Experience Quality, and Expected Credence Quality), it is argued that changing insect products' visual appearance alone will not be sufficient in changing overall

consumers' attitude because it will not affect Expected Credence Quality. Therefore, in order to change the prior private thoughts on insect consumption, the government and producers should put more effort in educating consumers about the benefits of insect consumption and additionally invest money in campaigns and advertisements in order to reach a wide audience. The recommendation above, however, only holds under the assumption that Expected Credence Quality is important in forming overall consumers' attitude. Therefore, further research should point out whether Expected Credence Quality does in fact affect overall consumers' attitude.

The direct effect of visual appearance on respondents' General Attitude, Expected Experience Quality, and Expected Credence Quality were not significant. This insignificance may be explained by the present experimental procedure. The presentation to the respondents of one of the four slides (4 experimental conditions) was given in the beginning of the survey, while the attitude questions were asked much later on in the survey. Consequently, the respondents might have forgotten some aspect of the slide or accompanying text, or they simply may not have considered the specific slide and/or accompanying text to be relevant for their attitude. Another explanation for this insignificant effect of appearance and General Attitude, Expected Experience Quality, and Expected Credence Quality may be that the respondents based their answers to these attitude questions on private prior knowledge and/or beliefs about insect consumption, irrespective of the visual appearance. Future research could address which factors may influence the relationship between the visual appearance of the insect products and consumers' attitudes, for example: students from Wageningen University being less sensitive to changes in visual appearance of edible insect products than students in the northern provinces, since WUR students are more familiar with the thought of insect consumption and will therefore be less repulsed by the idea of consuming a worm.

The present results show that there is no significant effect of product designation on General Attitude, Expected Experience Quality and Expected Credence Quality. Moreover, respondents did not consider the Meat or Vegetarian Department to be more appropriate for positioning edible insect products. This result is not in line with the existing literature (Desai & Ratneshwar, 2003; Buchanan et al. 1999). The discrepancy may again be explained by the present experimental procedure: Participants of the present study were exposed only once, in the beginning of the survey, to edible insects either in the Meat Department or in the Vegetarian Department. Thus, they could not compare the presented positioning to an alternative positioning. Hence, one could argue, that in order to find meaningful potential effects of product designation, respondents should be made aware of different departments in which the insect products could be positioned. Such a research requires a within-subjects design. Another explanation for the discrepancy with the existing literature

may be that, in reality, respondents' attitudes are indeed simply not affected by product designation. Further research on respondents' attitudes towards edible insect products should re-evaluate or may ignore the effect of product designation when searching for the best approach of insect product designation.

Looking at the results of the combined effects of product designation and disgust on General Attitude and Expected Credence Quality, I found no significant interaction effects. However, interestingly, product designation and disgust yielded a significant interaction effect on Expected Experience Quality, indicating that disgust is a stronger predictor of expected experience quality of edible insects positioned in the meat department than in the vegetarian department. This finding is in contrast with our prediction based on existing literature (Desai & Ratneshwar, 2003) suggesting that disgust is relatively less strong predictor of consumers' attitudes in the meat department. This difference in predictive power could be explained by consumers expecting specific products in the Meat Department, insects might not fit this expectation and therefore may be categorized as unusual for that Department.

In the current study, a survey was used to measure consumer attitude based on different approaches to product positioning. However, a more diverse sample should be used to generalize the results, as the external validity of the research is disputable since most of the respondents were students from Wageningen University. As explained before, Wageningen University is known for its research and expertise on insect consumption, which makes it likely that the students were also more familiar with insect consumption beforehand. Hence, to strengthen external validity of this study, a wider audience should be questioned, consisting of respondents across the Netherlands and with a wider age variety since most respondents of this study were below the age of 25.

To conclude, the results of the current study imply that different approaches to visually presenting edible insects do in fact elicit different levels of disgust. The results imply that presenting insects as a whole recognizable insect would lead consumers' to feel more disgust than presenting insects while hiding their visual features. Therefore, I argue that insect consumption could increase if producers keep inventing new ways to hide insect features. Additionally, results of the current study imply that different approaches to Product designation did not yield any usable results to increase insect consumption. Hence, I argue that in future research different attributes of product positioning should be investigated.

7. References

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