

The Effect of Healthy and Sensory Language on the Perception of Food

Nina Jansen, s4563964

Radboud University

15-06-2021

Wordcount: 7978

Master International Business Communication

Supervisor: Laura Speed

Assessor: Brigitte Planken

Abstract

The aim of this study was to examine the effect of sensory, healthy, and neutral language in L1 and L2 on the perception of plant-based products. By marketing plant-based products better, consumers may increasingly choose to consume these products instead of meat-based products. This is important because plant-based products are less harmful to the environment than meat production and consumption. Moreover, replacing meat with plant-based products would be healthier for consumers as well. Based on previous research, it was predicted that sensory language would result in the highest attitude towards the product description, desirability, and purchase intention. Healthy language, on the other hand, was expected to negatively impact these variables because healthy translates to less tasty and filling. Moreover, it was assumed that L1 would be more effective than L2 because it is easier to process and people experience a stronger emotional connection to L1.

In an online experiment, participants listened to auditory advertisements, which contained the different types of description in L1 (Dutch) or L2 (English) and answered questions in regard to attitude towards the product description, desirability, and purchase intention. It was discovered that sensory language resulted in a higher attitude towards the product description, desirability, and purchase intention compared to neutral language. Furthermore, sensory language also resulted in a higher desirability compared to healthy language. The results showed no difference between L1 and L2, which may have been caused by the high English proficiency of the Dutch participants. The findings suggest, therefore, that the best strategy to promote the increased consumption of plant-based products in the Netherlands may be to use sensory language in either L1 or L2.

Key words: Language; description type; grounded cognition theory of desire; revised hierarchical model; emotional intensity language; perception of food

Introduction

Currently, climate change is one of mankind's largest problems. Not only does it cause extreme weather events, but the rising sea levels also pose a threat, particularly to coastal countries. To halt the increasing rise in temperature, lowering greenhouse gas emissions is crucial. One of the contributors to these emissions is meat production and consumption (Chapman, Power, Chandra & Cozzolino, 2018; Poore & Nemecek, 2018). Its impact has increased over the years as the human population grew and the amount of meat that the average person consumed increased (Milford, Le Mouël, Bodirsky & Rolinsky, 2019). One way to reduce emissions may therefore be to replace meat with environmentally friendly products. Not only would this benefit the environment, but it would likely have a beneficial effect on people's health as well. Research has shown that a high intake of meat may result in obesity (Wang & Beydoun, 2009) and it has also been linked to various forms of cancer (Nogueira, Yabroff & Bernstein, 2020).

Although a viable alternative already exists in the form of plant-based products, few people are altering their diets to include these. This is likely caused by consumers perceiving meat as more attractive than plant-based products (Papies, Johannes, Daneva, Semyte & Kauhanen, 2020) and therefore, people often choose taste over healthiness. Thus, it is important to evaluate first of all what makes meat more appealing and secondly, how this knowledge can be used to make plant-based products more appealing.

Advertisements may be able to contribute to a more positive diet since people are frequently exposed to them. Although it is difficult to give a precise estimate, an individual may be exposed to between a hundred to several thousand advertisements in a day (Moerman, 2019). Considering this high number, it becomes crucial to look at advertisements and how they can affect the food choices that people make.

Theoretical framework

Factors influencing the choice of food

There are various factors at play concerning people's diets. Existing literature has pointed out that factors such as lifestyle and geographic location can influence an individual's meat intake with people in cities tending to eat more outside of their homes (Schmidhuber & Shetty, 2005). Other research suggests that people's choice of food is based on motivations and justifications, which are referred to as food consumption orientations (Graça, Truninger, Junqueira & Schmidt, 2019). Examples of these orientations are health, convenience, cost, and naturalness. Not all food consumption orientations are as important as the others. Another

study found that Americans considered taste to be the most important factor when deciding on their food choices (Glanz, Basil, Maibach, Goldberg, Snyder, 1998). Realizing what food consumption orientations are considered the most important is valuable knowledge, which is necessary to determine which aspects of plant-based products marketing should be improved (Graça, et al., 2019). Other studies discovered that eating habits (Rees, Bamberg, Jäger, Victor, Bergmeyer & Friese, 2018) as well as perceived pleasure (Papies, Johannes et al., 2020) influence an individual's meat intake. Since many people are used to eating meat regularly and perceive it as more appealing, they are more likely to continue to consume meat-based products unless they are convinced there are more appealing alternatives.

Product Description

One important factor that ought to be considered is the product description of both meat-based and plant-based products in advertisements. The type of language used in products descriptions can determine how consumers perceive the product. This can be explained with the linguistic relativity theory that refers to the idea that language influences how people perceive the world (Lucy, 1997). To what extent thought is influenced by language is still an ongoing discussion, but researchers do agree that language influences thought to at least some extent (Wolff & Holmes, 2010). Thus, different language use on product descriptions and in advertising may result in consumers perceiving the product differently.

Previous research has explored different types of language in food descriptions. First of all, healthy language can often be found in product descriptions. Products are often described in light of their perceived health or nutritional benefits with terms such as “fat free” or “nutritional” (Turnwald & Crum, 2019). Previous research has looked at the effect of healthy language in cafeteria labels and discovered that rather than enticing potential consumers, using healthy language seemed to decrease the appeal of the meal (Turnwald, Boles & Crum, 2017). Moreover, a study that looked at restaurant menus discovered that restaurants described their healthy options as less appealing and focused more on the healthy attributes of the meals than they did for their other menu options (Turnwald, Jurafsky, Conner & Crum, 2017). This suggests that healthy and tasty food items are considered opposites. Raghunathan, Walker Naylor, and Hoyer (2006) found that the less healthy a food item was, the more it was considered tasty, enjoyed while being consumed and preferred when having to make a food choice. Furthermore, another study found that healthy food was considered less filling (Finkelstein & Fishbach, 2010). In this study, the same food product was labeled with either healthy or tasty language and participants either ate one of the labeled products or no

food. Participants who were assigned to healthy food reported that they felt hungry sooner than the people who had eaten tasty food or people who had not eaten any food at all. This effect did, however, disappear when people voluntarily choose to eat the healthy food. The researchers concluded that people who choose to eat healthy do not feel hungry because eating healthy is their goal. On the other hand, people who did not watch their weight viewed healthy food as less fulfilling and experienced an increased appetite (Finkelstein & Fishbach, 2010).

A second form of language found on product descriptions can be classified as sensory language. Referring to how language can engage with the consumer's senses, sensory language has been increasingly used in recent years (Krishna and Schwarz, 2014). When brands make use of sensory marketing this refers to how they focus on the consumer's senses to make a product more appealing (Krishna, 2009). An example of sensory language is using the phrase "juicy oranges" rather than just "oranges" (Krishna, 2012). The word 'juicy' engages the sense of taste. Thus, the phrase "juicy oranges" is an example of a sensory description. Previous research on product descriptions in UK supermarkets found that meat-based products were described with more sensory language compared to its plant-based counterparts (Papies, Johannes et al., 2020). A distinction can be made between sensory language and hedonic language. Hedonic language focuses on the degree to which a consumer experiences pleasure from the product (Deliza & MacFie, 1996) rather than on engaging the consumers' senses. These terms have been used interchangeably in previous studies. It is important, however, to acknowledge that these are two different types of language and treat them accordingly because they may have different effects on the consumer. Being aware of these effects will help to optimize the marketing of plant-based products.

Some studies have looked at the grounded cognition theory of desire to explain the effect of sensory language (Papies, 2013; Papies, Best, Gelibter & Barsalou, 2017; Papies, Johannes et al., 2020). It hypothesizes that language induces eating simulations, which refer to the imagining of eating a food item but not actually eating it (Papies, 2013; Papies, Barsalou & Rusz, 2020). Instead of solely focusing on the food item, this simulation also includes factors around the process of eating of the food such as location and event (Barsalou, 2009). Each time a food item is consumed, a memory of that moment is stored, which can be retrieved later when a cue such as language triggers it, thus, resulting in an eating simulation (Papies, Barsalou et al., 2020). Eating simulations occur more often with food items that are considered appealing, compared to food items that qualify as neutral because the experience is expected to be more rewarding (Papies, 2013). Papies and Johannes et al. (2020) also state

that the more a consumer simulates eating a food product, the more attractive it becomes. Thus, language, and specifically sensory language, can be used to activate eating simulations, which in turn makes the product more attractive (Papies, 2013).

Other studies looked at the influence of tasty versus healthy descriptions. Products with taste-focused labeling were considered more attractive and were rated higher after consumption compared to products that used health-focused labeling (Turnwald & Crum, 2019). Evidence was also found that meals which contained meat were described as more appealing in restaurants compared to vegetarian meals (Turnwald, Jurafsky et al., 2017). More specifically, they found that standard menu items were often described in more sensory language than vegetable dishes, which underlined the tastiness of the standard meals (e.g. crispy, salty). On the other hand, healthy descriptions were used to describe the vegetable dishes (e.g. light, low-fat). Based on previous research, it can be assumed that these descriptions will be less effective than sensory language descriptions because they are less likely to induce eating simulations (Papies, Barsalou et al., 2020). This is also in line with Graça et al. (2019) who found that people who chose food based on pleasure tended to consume more meat, while people who based their decisions on health tended to refrain from eating meat-based products. However, it is essential to look at the effect of different description types in regard to plant-based products to discover how these products can be marketed properly to achieve an increased consumption.

Language Choice

It has been established that the type of description that is used is important. However, are the effects of different description types similar in L1 compared to L2? Previous research has focused on the possible differences between L1 and L2 (Luna & Peracchio, 2001). The Revised Hierarchical Model (RHM) provides an explanation for the differences that may occur. This model hypothesizes that L1 and L2 vocabulary is stored differently on the lexical level but in the same place conceptually (Luna & Peracchio, 2001). It is stated that when learning L2 vocabulary, individuals rely on their L1 until they have attained sufficient proficiency in the L2 (Dufour & Kroll, 1995). Therefore, L2 words are lexically linked to L1 words. An individual's L1, on the other hand, is acquired through both experience, e.g. hearing the words being used, and linking the words to actual objects. According to the RHM, the L1 is processed more easily than the L2. It takes more effort to process the L2 because of the early reliance on the L1. Consequently, it may be possible that consumers unconsciously

prefer hearing their L1 over L2 in advertising and that L1 is more effective than L2 (Luna and Peracchio, 2001).

Not only is an L1 processed differently than an L2, but the perceived emotional intensity is also different (Puntoni, De Langhe & Van Osselaer, 2008). Keysar, Hayakawa and An (2012) found that people make more rational decisions and experience lower loss aversion in a foreign language. This is caused by the emotional distance that is created by the L2. Emotions can influence people's decisions so the distance that is created by the L2 causes the decision-making to become more rational (Keysar et al., 2012). This perceived emotional distance can also be positive if individuals encounter a product that they are biased against. Due to the emotional distance that is created by the L2, the negative bias will be experienced as less strong (Keysar et al., 2012). In this manner, using an L2 can be a good strategy if it is unclear what people's stance is regarding the product. Thus using L2 can create emotional distance, while using L1 can increase the experienced emotional intensity (Pavlenko, 2012). The anchor contraction effect also focuses on a difference in perceived emotional intensity. This effect can be described as an individual's tendency to report more intense emotions when they are filling in a questionnaire in their L2 compared to their L1 (De Langhe, Puntoni, Fernandes & Van Osselaer, 2011). For example, if participants with English as their second language are presented with a scale and are asked to rate their opinion on a product, they are more likely to pick an extreme answer such as "I hate it" or "I love it". On the other hand, participants who answer the same question in their L1 are likely not to choose the extreme answers despite the product being the same. People perceive their first language as being more emotionally strong than their second language and will, therefore, give different answers to the same question depending on which language is used (De Langhe et al., 2011). This is crucial to consider when using questionnaires in different languages since it can influence the results of a study.

Based on these theories, it may be a good strategy to use L1 in product descriptions for plant-based products since it can result in the product being more appealing for both sensory and healthy language compared to using L2. The reason for this increased appeal of the different description types is the strong emotional connection that comes with an L1, which also results in a strong effect of L1 on the perception of plant-based products (Puntoni et al., 2008). Thus, it would be plausible that sensory language, which is expected to be the most appealing out of the three description types, will be more appealing in L1 compared to L2. However, it is still unclear how people will respond to auditory advertisements and what the effect of L1 compared to L2 will be in this context.

The Present Study

It has been established that the current amount of meat consumption causes problems, both for humans and the environment. However, simply acknowledging these problems has not been enough to change human behavior. Previous research has noted that the type of description that is used can influence the appeal of the product. The present study aimed to replicate these previous findings and then add to them by examining the effect of L1 compared to L2. Furthermore, the present study did not present the participants with the descriptions in a cafeteria setting as many other studies did. Instead, the participants only listened to the descriptions and were not influenced by factors such as smell or visuals. Moreover, the sensory words that were chosen for the advertisements had sensory ratings to ensure they were considered sensory language. In short, this study compared sensory, healthy, and neutral language in L1 and L2 to see which type of language resulted in the highest attitude towards the description, desirability and purchase intention.

Although various studies have focused on written advertisements, spoken advertisements, such as advertisements used on the radio or television, have remained largely unstudied. Thus, there remains a need for research on spoken language in advertisements since it is unclear whether the previous results also translate to spoken advertisements. One difference, for example, is that when consumers encounter written advertisements, they control the pace and they can reread the advertisement (Redeker, 1984). When they encounter a spoken advertisement, however, they have no control over the pace and are forced to process the message as quickly as it is presented to them without being able to listen to it again. It is necessary to look at the appeal of the descriptions of plant-based products in spoken language because these mediums can reach a large audience. For example, these auditory advertisements can be encountered when an individual is on his way to buy food, which can then influence what products the consumer buys. By using a short advertisement rather than just focusing on individual words, this study also examined sensory language in the context of marketing. Only audio clips were used in this study to recreate this environment.

So, the present study aimed to provide insight into how plant-based products could be marketed best in regard to description type and language in auditory advertisements to achieve the highest attitude towards the product description, desirability, and purchase intention. The present study aimed to fill this research gap by answering the following question:

RQ: To what extent is the perception of a plant-based product influenced by sensory, healthy, and neutral language in L1 compared to L2 in auditory advertisements?

Previous research suggested that sensory language would be more appealing to consumers than other types of language because it engages with the consumer's senses and induces eating simulations which make products even more attractive. Thus, it was hypothesized that:

H1: The use of sensory language in auditory advertisements will result in more positive responses in regard to the attitude towards the product description, desirability, and purchase intention compared to healthy and neutral language.

Because of the suggested difference in processing and perceived emotional intensity in L1 compared to L2, it was also hypothesized that:

H2: The product descriptions in the L1 will result in more positive responses in regard to the attitude towards the product description, desirability, and purchase intention compared to descriptions in L2.

H3: The difference between sensory and healthy descriptions will be larger in L1 compared to the difference between sensory and healthy descriptions in L2 in regard to the attitude towards the product description, desirability, and purchase intention.

Methodology

Materials

The present study investigated the effect of 'language' and 'description' on the appeal of food items. The independent variable 'language' was operationalized by the native language (L1) and a second language (L2). The L1 used in this study is Dutch, while the L2 was English. The independent variable 'description' was operationalized by differentiating between sensory, healthy, and neutral language (see Appendix I for the full list of descriptions). The sensory words which were used had been taken from a study conducted by Speed and Brysbaert (2020), in which Dutch words were rated from 0 to 5 based on how strong their association was to one of the senses. The sensory words selected for this study were all rated high (at least 2.5) on the sense of taste. For example, one of the advertisements that was used for sensory language was: "Try this alternative for meat. You can enjoy this savory falafel every day." The healthy words that were selected for this study referred to the nutrients or healthy attributes of the food items. The following is an example of a healthy description:

“Try this alternative for meat. You can enjoy this protein rich falafel every day.” Lastly, neutral language consisted of words that referred to neither the taste nor the health attributes of the food items. This is an example of neutral language that was used for the experiment: “Try this alternative for meat. You can enjoy this classic falafel every day.” The experiment used 36 advertisements, which means that six advertisements per product were used. Each product had sensory, healthy, and neutral descriptions in both L1 and L2. The average word count across the 36 advertisements was 15.22 words per advertisement (range 13.67-16.33). The length differed between the different products. For each product, the length was matched across descriptions within a language (L1/L2) but the translation from Dutch to English did not always allow for a similar length.

The study used audio clips in which the descriptions of plant-based products were read. These audio clips were recorded in both the L1 and the L2. The decision to only use audio clips and not include any additional visual materials was based on the belief that visual materials may influence the participants’ perception of the food items. The audio clips were recorded by a Dutch woman with a sufficient English proficiency level. The decision to have just one individual record the audio clips was made to prevent a possible effect due to a preference of voice. The speaker had not been made aware of the research aim to prevent her from unconsciously using this knowledge while recording the audio clips.

Subjects

A total of 152 participants began the experiment and 114 participants completed the questionnaire. In total, 36 participants were removed: Twenty-seven participants were removed from the data due to an incorrect answer at the attention check question and one participant was removed due to the mention of sensory language at the awareness check question. An additional eight participants were removed due to them taking longer than an hour to complete the questionnaire. This final requirement was not mentioned in the pre-registration. However, after careful consideration it was decided that it would be best if the questionnaires were completed in one sitting and it was decided to add the one-hour requirement. Thus, 78 participants remained. This number met the required sample size, which was calculated by using G*Power. The type of power analysis selected was an a priori, the effect size f was 0.2, the α error probability was 0.05, the power was 0.8, the number of groups was 2 and the number of measurements was 3.

The 78 participants were all Dutch L1 speakers. They were randomly assigned to a language group. 50 participants were assigned to the L1 condition and 28 participants were

assigned to the L2 condition. 13 participants were male (16.7%), 64 were female (82.1%) and one participant preferred not to disclose their gender (1.3%). A Chi-square test showed no significant relation between language and gender ($\chi^2 (2) = .78, p = .677$). Thus, the groups did not differ in gender. The participants' age ranged from 18 to 66. The average age of the participants was 35.63. An independent samples t-test showed no significant results for age and language ($t (76) = .723, p = .472$), which meant that the groups did not differ in age.

The lowest education level of the participants was VMBO and the highest was university. Most participants had obtained a HBO degree (38.5%), followed by a university degree (32.1%). The least frequent education level was VWO (2.6%). A Chi-square test showed no significant relation between language and education level ($\chi^2 (5) = 6.37, p = .272$). Therefore, the groups did not differ in education level.

The effect of the control variables hunger and health was measured in additional analyses. For this reason, the participants were split into two groups for these variables. The separation level for hunger was determined based on the median, which was 2. All participants who had eaten two hours ago or less were placed in the low level hunger group. The participants who had eaten more than two hours ago were placed in the high level hunger group. 48 participants were assigned to the low hunger level group (61.5%), while 30 participants were assigned to the high level hunger group (38.5%). A Chi-square test showed no significant relation between language and hunger level ($\chi^2 (1) = .013, p = .911$). Thus, the groups did not differ in hunger level.

The participants were also separated based on health level. All participants whose average health concern score was below 5.67 were placed in the low level health concern group. The participants who had rated themselves 5.67 or higher were placed in the high level health concern group. 37 participants were assigned to the low health level group (47.4%), while 41 participants were assigned to the high health level group (52.6%). A Chi-square test showed no significant relation between language and health level ($\chi^2 (1) = .367, p = .544$), which meant that the groups did not differ in health level.

Design

This study used a 2 x 3 mixed subjects design with 'language' (L1 and L2) as the between-subjects variable and 'description type' (sensory, healthy, and neutral language) as the within-subjects variable.

Instruments

The study used the following dependent variables: Attitude towards the description, desirability, and purchase intention. Attitude towards the product description was measured through three items on a 7-point Likert scale from 1 (completely disagree) to 7 (completely agree): “I like this product description” (Huang & Wan, 2019), “I thought the description was clear” and “I thought the description was interesting” (Nederstigt & Hilberink-Schulpen, 2019). The reliability of ‘attitude towards the product description’ comprising three items was good: $\alpha = .88$. Consequently, the mean of all three items was used to calculate the compound variable ‘attitude towards the product description’. Desirability was measured on a 7-point Likert scale ranging from 1 (completely disagree) to 7 (completely agree) through the items “I have a strong desire to eat this food” and “and “I could eat this food now” (Ogden, Coop, Cousins, Crump, Field, Hughes & Woodger, 2013). The reliability of ‘desirability’ comprising two items was excellent: $\alpha = .92$. Therefore, the mean of the two items was used to calculate the compound variable ‘desirability’. Purchase intention was measured through three items on a 7-point Likert scale that was previously used in Fenko, Kersten, and Bialkova (2006). The participants rated their purchase intention based on the three items “I would buy this product in a store”, “I would actively seek this product in a store” and “I would consider buying this product”. The responses could range from 1 (completely disagree) to 7 (completely agree). The reliability of ‘purchase intention’ comprising three items was excellent: $\alpha = .93$. Thus, the mean of the three items was used to calculate the compound variable ‘purchase intention’.

Health orientation, hunger and English proficiency were used as control variables. Health orientation was measured through the following three items on a 7-point Likert scale: “I think a lot about my health,” “I am very self-aware about my health,” and “I generally pay attention to my inner feelings about my health” (Van der Vegt, 2020). The responses could range from 1 (completely disagree) to 7 (completely agree). The reliability of ‘health orientation’ comprising three items was good: $\alpha = .81$. Therefore, the mean of the three items was used to calculate the compound variable ‘health orientation’, which was used in the further analyses. Hunger was measured because the participants may have rated the products higher when they were hungry and the descriptions may have had a different effect, depending on the participants’ hunger level. Hunger was measured through the question: “How many hours has it been since you last ate?” This was an open response question. English proficiency was measured to ensure that a higher or lower level of English would not affect the results. The participants’ English proficiency was measured by using a slightly adapted scale which was previously used by Krishna and Ahluwalia (2008). The participants

were asked to rate their English proficiency (speaking, writing, reading, and listening skills) from 1 (bad) to 7 (good). The reliability of 'English proficiency' comprising four items was excellent: $\alpha = .94$. Consequently, the mean of the four items was used to calculate the compound variable 'English proficiency'.

An attention check question was included to ensure that the participants had listened to all the audio clips. The participants had to answer the following question: "Six different products were described in the audio clips. Can you mention at least two of them?" Lastly, the participants were asked the following question to check their awareness of the purpose of the study: "What was the purpose of this questionnaire according to you?" These two questions were both open response questions.

Procedure

Before the experiment began, the study was pre-registered on the Open Science Framework (OSF) (<https://osf.io/4se53>). The experiment was conducted through an online questionnaire. The questionnaire was only supplied in Dutch since this was the participants L1 and to prevent a possible anchor contraction effect (De Langhe et al., 2011). On average, it took the participants 9,5 minutes to complete the questionnaire. The participants were gathered through convenience sampling, by posting the questionnaire on websites where surveys are exchanged and by posting the questionnaire in survey exchange Facebook groups.

The participants were asked to sign a consent form before starting the questionnaire. This consent form also informed the participant about the anonymity of the questionnaire and the prerequisites of this study. After this, the participants were informed that they were about to listen to several auditory advertisements and instructed to listen carefully since they could only listen to the audio clips once. Following this, the experiment began and the participants listened to the first audio clip. Following this clip, they answered questions in regard to the description, the experienced desirability, and the purchase intention. This process repeated itself until the participant had listened to all the audio clips and answered all the corresponding questions. Each participant listened to six audio clips in either L1 or L2. The participants heard two sensory descriptions, two healthy descriptions and two neutral descriptions. Each audio clip described a different food item so participants did not hear descriptions of the same product twice. At the end of the questionnaire, the participants who listened to the audio clips in L2 were asked to rate their English proficiency level in regard to listening, reading, speaking, and writing. Following this, the participants were asked several questions in regard to their demographics such as their gender, age, educational level, health

orientation, and possible food allergies. The participants were also asked a control question in regard to how hungry they were at the time, since it was possible that this could influence the results. Finally, the participants were asked to name at least two of the products they had heard audio clips about and they were asked what they thought the aim of the research was. The participants were then thanked for their participation and told that they could close the questionnaire. They were not offered any financial rewards nor other incentives to participate in the experiment.

Results

The dependent variables were analyzed by using three repeated measures ANOVAs with ‘description type’ as within subjects factor and ‘language’ as between subject factor. The control variables were also analyzed by using repeated measures ANOVAs. Three repeated measures ANOVAs were conducted for each control variable. Due to the high level of reported English proficiency, it was decided to not include this control variable as a factor in the analysis ($M = 5.86$, $SD = 1.1$, median = 6).

Main analyses

There was a main effect of description type for the attitude towards the product description ($F(2, 152) = 3.42$, $p = .035$, $\eta^2 = .043$). Pairwise comparisons showed that sensory language ($M = 4.81$, $SD = 1.17$) led to higher ratings than neutral language ($M = 4.50$, $SD = .96$; $p = .017$). Sensory language and healthy language ($M = 4.57$, $SD = 1.12$) did not differ significantly from one another ($p = .062$) and neither did healthy and neutral language ($p = .566$). There was no main effect of language ($F(1, 76) < 1$, $p = .738$, $\eta^2 = .001$) and no interaction was found between description type and language for attitude towards the product description ($F(2, 152) < 1$, $p = .982$, $\eta^2 < .001$). This means that people had a more positive attitude towards the sensory descriptions than the neutral descriptions regardless of the language that was used. The means and standard errors can be found in Figure 1.

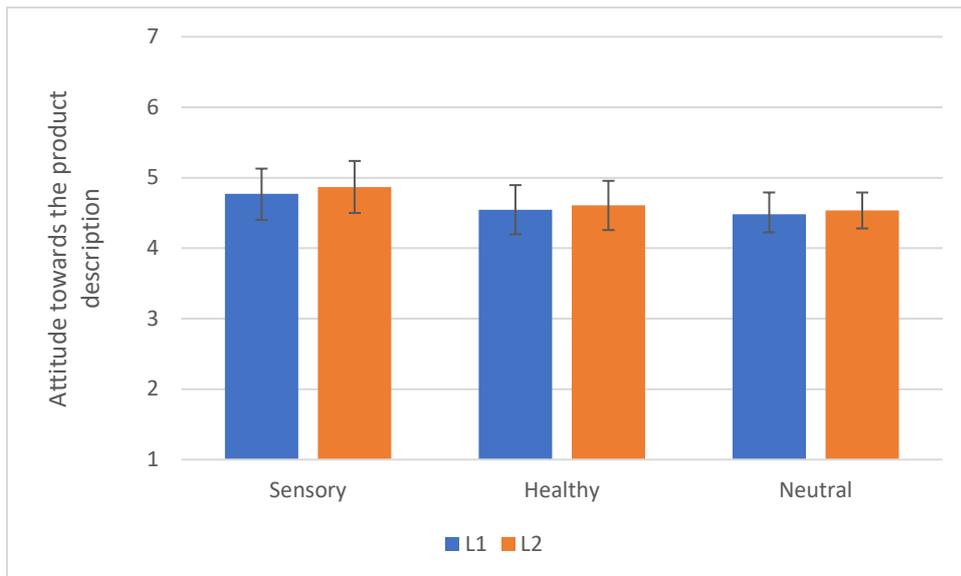


Figure 1. Means and standard errors of attitude towards the product description for sensory, healthy, and neutral language in L1 and L2 (1 = very negative, 7 = very positive).

There was a main effect of description type for the desirability ($F(2, 152) = 6.56, p = .002, \eta^2 = .079$). Pairwise comparisons showed that sensory language ($M = 3.99, SD = 1.43$) led to higher ratings than healthy language ($M = 3.58, SD = 1.40; p = .015$) and neutral language ($M = 3.41, SD = 1.15; p = .002$). Pairwise comparisons also showed that healthy and neutral language did not differ significantly ($p = .239$). There was no main effect found of language ($F(1, 76) < 1, p = .823, \eta^2 = .001$) and no significant interaction was found for description type and language for desirability ($F(2, 152) < 1, p = .961, \eta^2 = .001$). This means that people desired the products with the sensory description more than the products with the healthy or neutral descriptions. The means and standard errors can be found in Figure 2.

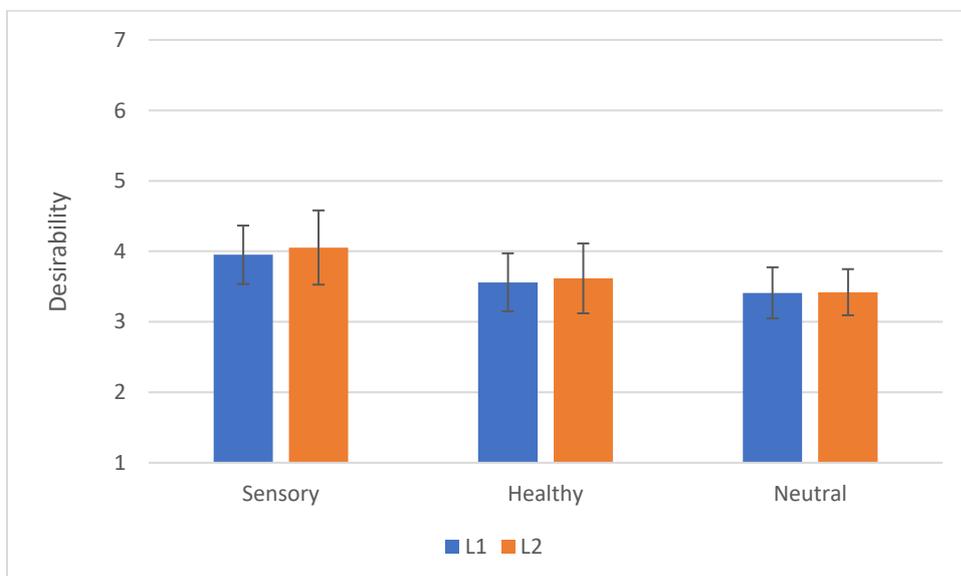


Figure 2. Means and standard errors of desirability for sensory, healthy, and neutral language in L1 and L2 (1 = very negative, 7 = very positive).

There was a main effect of description type for purchase intention ($F(2, 152) = 3.61, p = .029, \eta^2 = .045$). Pairwise comparisons showed that sensory language ($M = 4.00, SD = 1.38$) led to higher ratings than neutral language ($M = 3.57, SD = 1.22; p = .018$). Sensory language and healthy language ($M = 3.67, SD = 1.31$) did not differ significantly from each other ($p = .053$), but there was a trend for purchase intention to be rated higher for sensory language than for healthy language. Healthy and neutral language did not differ significantly from each other either ($p = .455$). There was no main effect of language ($F(1, 76) < 1, p = .921, \eta^2 < .001$) and no significant interaction was found between description type and language for purchase intention ($F(2, 152) < 1, p = .799, \eta^2 = .003$). This means that people experienced a higher purchase intention for products with sensory descriptions than for products with neutral descriptions regardless of the language that was used. The means and standard errors can be found in Figure 3.

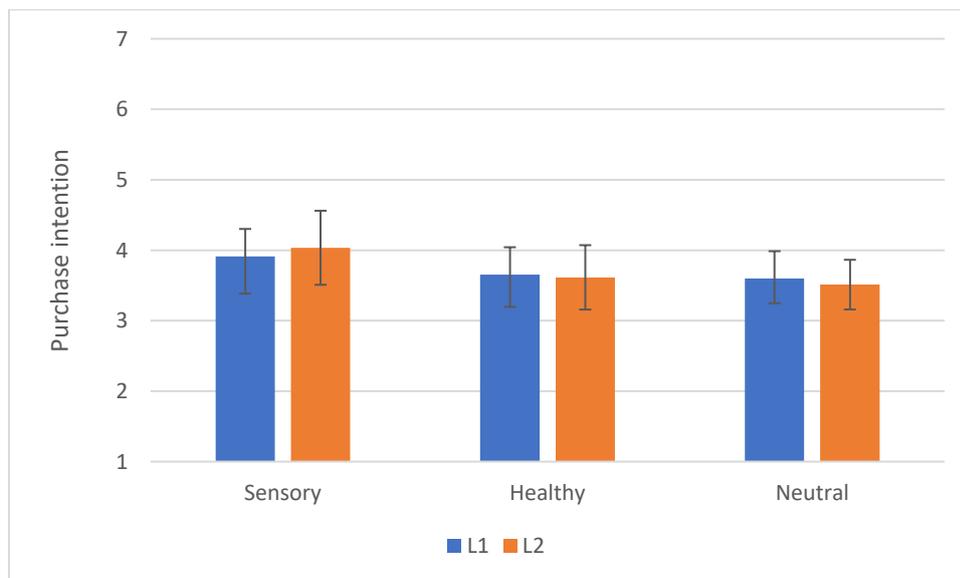


Figure 3. Means and standard errors of purchase intention for sensory, healthy, and neutral language in L1 and L2 (1 = very negative, 7 = very positive).

Control variables

The control variables did not interact with the independent variables. The reported results can be found in the appendix (Appendix II – Analyses control variables).

Conclusion and Discussion

The aim of the present study was to examine the effect of different auditory description types in L1 and L2 on the perception of plant-based products. Specifically, this study looked at how these factors affected attitude towards the product description, desirability of the product and the purchase intention. It was discovered that sensory language resulted in a higher attitude towards the product description, desirability, and purchase intention compared to neutral language, as well as a higher desirability than healthy language. Language did not influence the ratings. The control variables health and hunger, which were used in the analyses, did not influence the participants' attitude towards the product description, desirability, and purchase intention. Therefore, this study suggests that sensory language positively affects the perception of plant-based products in both L1 and L2.

The findings suggest that the use of sensory language in auditory advertisements increases the product's appeal more compared to neutral language and results in more positive responses in regard to the attitude towards the product description, desirability, and purchase intention (H1). This is consistent with earlier research that stated that sensory language would be seen as more appealing (Papies, Johannes et al., 2020; Turnwald, Boles et al., 2017). This effect may be caused by the activation of eating simulations through sensory language, which made the products that were described in sensory language seem more appealing to the participants than products that were described with neutral language (Papies, Barsalou et al., 2020; Papies, Johannes et al., 2020). Furthermore, products with a sensory description were more desirable than products with a healthy description. This is in line with previous research as well since earlier research discovered that using healthy descriptions did not increase the product's appeal and, instead, often had a negative effect, while sensory language could make products that are considered healthy, such as vegetables, more appealing and desirable (Turnwald, Boles et al., 2017).

Based on previous research, it was expected that the food items with the healthy advertisements would be less appealing to the participants than the food items with sensory advertisements (Raghunathan et al., 2006; Finkelstein & Fishbach, 2010). Contrary to other studies, however, products with sensory descriptions were not rated that differently from products with a healthy description in regard to attitude towards the product description and purchase intention, although there was a trend for purchase intention to be rated higher with sensory language than with healthy language. This may be explained by the participants' health concern. Most participants rated their own health concern as relatively high ($M = 5.56$, $SD = .86$) which meant that they were focused on their health and thought about it often.

Thus, it is possible that the participants rated their attitude towards the product description and purchase intention higher for the healthy product advertisements in the present study because they were very health-orientated in general. It is also possible that the participants were not as averse to the healthy descriptions because they were aware that they were not actually buying the food. Perhaps the results would have been different if the participants had to actually pick a food item and eat it. This could also be a possible explanation to why desirability was the only variable in which the participants clearly preferred sensory language and not attitude towards the product description and purchase intention. The healthy advertisements may not have convinced the participants that the product was desirable but if they were very health-orientated, it could have increased their attitude towards the healthy food description and their purchase intention. The result in regard to desirability is also in line with previous research that discovered that a product was enjoyed more when it was described in sensory language compared to healthy language, even by people who did not agree with the statement that healthy food is less enjoyable than unhealthy food (Raghunathan et al., 2006). Thus, this could mean that food items that are marketed in sensory language rather than healthy language are considered more desirable by people regardless of their health-orientation.

Now that it has been established that sensory language is effective, future research can build on this study by examining the lack of results when comparing sensory and healthy language. It was expected that sensory language would always lead to significantly higher ratings than healthy language, but this was only the case for desirability. It was proposed that this was caused by the participants' high health level but future research can look into the issue to discover whether or not this was correct.

The findings of this study did not indicate that product descriptions in the L1 were viewed more favorably than the product descriptions in the L2 and did not result in more positive responses in regard to the attitude towards the product description, desirability, and purchase intention (H2). Moreover, it was predicted that the difference between sensory and healthy descriptions would be larger in L1 compared to the difference between sensory and healthy descriptions in L2 in regard to the attitude towards the product description, desirability, and purchase intention (H3). However, this was not confirmed by the results either. This is not in line with previously conducted research, which suggested a preference for L1 (Dufour & Kroll, 1995; Luna and Peracchio, 2001). A possible explanation for this difference may be that Dutch people tend to have a high English proficiency level compared to other nationalities. Dufour and Kroll (1995) compared English and French, while Luna and Peracchio (2001) looked at Spanish-English bilinguals. Compared to these nationalities, the

average Dutch person has a higher English proficiency. The average high proficiency of Dutch people is also confirmed by the participants of the present study that listened to the English product descriptions who rated their own English skills for listening, reading, speaking, and writing as 5.86 out of 7 on average. If most of the participants had reached an adequate possession of the English language, this could mean that the suggested mediated effect of L1 on L2 had already disappeared (Dufour & Kroll, 1995). Thus, the use of L1 did not result in a higher attitude towards the product description, desirability, and purchase intention. Future research may consider using other languages than Dutch for L1 and English for L2 to avoid similar results. As previous research has shown, it is possible to find an effect of language, however, it appears that this is not the case when comparing Dutch and English.

English proficiency, health concern, and hunger were explored to discover if they had an effect on the attitude towards the product description, desirability of the product, and purchase intention. However, the findings showed no effect of the control variables. The high level of English proficiency resulted in the decision to not run any analyses with it. In regards to health concern, it is possible that no effect was found due to the high ratings the participants gave themselves. Unlike English proficiency, health concern was included in the analyses but since it also had relatively high ratings, it is possible that the difference between the low and high level groups was not large enough to show the impact that health concern has on the attitude towards the product description, desirability, and purchase intention. Therefore, future research should be carried out to confirm the effect of health concern on the attitude towards the product description, desirability, and purchase intention of plant-based products. This may be possible by ensuring that the difference between the low level and high level health group are larger. The health level could be determined by, for example, looking into the participants' diets and placing them into groups based on what they consume, rather than letting them self-rate their health concern. It was also expected that the hunger experienced by the participants could influence the results. However, this was not confirmed by the results either. The separation for hunger level was made at two hours because this was the median for the participants that were gathered. However, it is possible that this division was too low. For example, the difference between two and three hours is not that much in regards to how hungry an individual is. Thus, this difference might have been too small to result in different answers in regards to the questions since the hunger that was experienced by participants in the low and high hunger level groups did not differ that much timewise. Future research may consider manipulating the hunger level by controlling when participants ate last in order to gain larger differences in the low and high hunger level groups. By doing

so, they may be able to answer the question to what extent hunger can influence how people view description types.

One of the limitations of the present study was the lack of questions in regard to lifestyle (vegetarian/no vegetarian). While the present study asked the participants about their health concern, it did not include a question about whether or not the participants were vegetarian. Previous research has shown that people are more likely to have a positive attitude towards diets similar to their own, while they are more negative towards diets that differ from their own, e.g. vegetarians called diets including meat cruel and unhealthy, while meat eaters considered vegetarian diets to be expensive and boring (Povey, Wellens & Conner, 2001). Therefore, vegetarians were more likely to have a positive attitude towards the plant-based products that were presented in the experiment than non-vegetarians because they were more likely to have diets that included plant-based products. Knowing which participants belonged to which group could have created a possibility for additional tests to examine how this factor influenced the attitude towards the product description, desirability, and purchase intention. Future research can build on this study by including these questions and examining how this affect the results.

Based on the findings, it can be concluded that sensory language results in a higher attitude towards the product, desirability of the product, and purchase intention than neutral language. Furthermore, sensory language is also preferred over healthy language in regard to desirability. This means that in order to improve the perceptions and consequently the consumption of plant-based products, it is essential to use sensory language in the product descriptions. While the results did not provide clear evidence for the use of either L1 or L2, it is highly likely that this had to do with the two languages that were selected, namely Dutch and English. Thus, the implication of the present study is that it is a good strategy to use sensory language in either L1 (Dutch) or L2 (English) in the Netherlands to increase the consumer's attitude towards the product description, desirability, and purchase intention of plant-based products. Consequently, this strategy is the most likely to result in a higher plant-based product intake in the Netherlands.

The findings of the present study contribute to the already existing knowledge on sensory and healthy language for food products and also adds additional information about the effect of sensory, healthy, and neutral language in regard to plant-based product advertisements. The present study adds new insights as it examined spoken language and L1 vs L2, it did not make use of a cafeteria setting, and selected sensory words based on sensory rating. Due to a lack of research on spoken language in the advertising context, the present

study contributed by making use of auditory advertisements and studying its effects on the attitude towards the product description, desirability, and purchase intention. This led to new information which can be used to market plant-based products better. By not using a cafeteria setting, the present study prevented factors such as smell and visuals from influencing the results, which may have had an influence in previous studies. It is also recreated how people would encounter these advertisements in real life, for example, hearing the advertisement while driving. In this scenario, people would not be exposed to smell or appearance either. Thus, it can be assumed that the responses people gave in the experiment would be similar to how people would respond to hearing the advertisement in real life. Moreover, the present study selected the sensory words which were used based on sensory ratings. This ensured that the words that were selected were actually sensory words rather than, for example, a mix between sensory and hedonic words. All these factors contributed to new insights on how to best promote plant-based products in auditory advertisements.

Auditory advertisements can be encountered in many places nowadays and are, therefore, an important tool to promote the consumption of plant-based products. This study has contributed to the field as it discovered how language for product description advertisements can be used to increase the attitude towards the product description, the desirability of the product, and the customer's purchase intention. This knowledge can be used to create a more positive perception of plant-based products, increase the consumption of plant-based products and consequently, reduce the intake of meat which will lead to a healthier diet and a reduced risk of climate change.

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Appendix I - Advertisements

The product descriptions in sensory, healthy, and neutral language in both the L1 (Dutch) and L2 (English). The sensory, healthy, and neutral descriptions have been marked red.

Burger

	Sensory language	Healthy language	Neutral language
L1	Geniet van een gepeperde vegetarische burger met een stevige bite die past bij alle maaltijden.	Geniet van een biologische vegetarische burger die alle noodzakelijke voedingsstoffen bevat en past bij alle maaltijden.	Geniet van een traditionele vegetarische burger die makkelijk te bereiden is en past bij alle maaltijden.
L2	Enjoy a peppery vegetarian burger with a firm bite that goes with all meals.	Enjoy an organic vegetarian burger with all necessary nutrients that goes with all meals.	Enjoy a traditional vegetarian burger that is easy to prepare and goes with all meals.

Cheese schnitzel

	Sensory language	Healthy language	Neutral language
L1	U kunt genieten van deze vegetarische kaasschnitzel. Van buiten knapperig , maar romig vanbinnen.	U kunt genieten van deze vegetarische kaasschnitzel. Bomvol voedingsstoffen zoals calcium en vitamine B12!	U kunt genieten van deze vegetarische kaasschnitzel. Het product is samengesteld uit unieke ingrediënten.
L2	You can enjoy this vegetarian cheese schnitzel. Crunchy on the outside, but creamy on the inside.	You can enjoy this vegetarian cheese schnitzel. Packed with nutrients like calcium and vitamin B12 .	You can enjoy this vegetarian cheese schnitzel. It is made out of unique ingredients.

Falafel

	Sensory language	Healthy language	Neutral language
L1	Probeer dit alternatief voor vlees. U kunt elke dag genieten van deze hartige falafel.	Probeer dit alternatief voor vlees. U kunt elke dag genieten van deze proteïnerijke falafel.	Probeer dit alternatief voor vlees. U kunt elke dag genieten van deze klassieke falafel.
L2	Try this alternative for meat. You can enjoy this savory falafel every day.	Try this alternative for meat. You can enjoy this protein rich falafel every day.	Try this alternative for meat. You can enjoy this classic falafel every day.

Fish

	Sensory language	Healthy language	Neutral language
L1	Heeft u ooit overwogen malse vegetarische vis te eten? Het smaakt ook goed met wat toegevoegde kruiden .	Heeft u ooit overwogen ijzerrijke vegetarische vis te eten? Het is gevuld met vetzuren en mineralen .	Heeft u ooit overwogen authentieke vegetarische vis te eten? Een maaltijd die snel op je bord ligt.
L2	Have you ever considered eating tender vegetarian fish? It also tastes good with some added herbs .	Have you ever considered eating iron rich vegetarian fish? It's filled with fatty acids and minerals .	Have you ever considered eating authentic vegetarian fish? It's a meal that is quick to prepare.

Sausages

	Sensory language	Healthy language	Neutral language
L1	Heeft u onze sappige vegetarische worstjes al geprobeerd? Ze passen goed bij een knapperig broodje!	Heeft u onze vetarme vegetarische worstjes al geprobeerd? Ze passen goed bij een vezelrijk broodje!	Heeft u onze nieuwe vegetarische worstjes al geprobeerd? Ze passen goed bij een geroosterd broodje!
L2	Have you tried our juicy vegetarian sausages yet? They also go well with a crispy sandwich!	Have you tried our low-fat vegetarian sausages yet? They also go well with a high-fiber sandwich!	Have you tried our new vegetarian sausages yet? They also go well with a toasted sandwich!

Tofu

	Sensory language	Healthy language	Neutral language
L1	Voeg krokant gebakken tofu toe in uw maaltijd. Het is vooraf gekruid voor een pikante smaak.	Voeg tofu op basis van soja toe in uw maaltijd. Het is laag in calorieën en verzadigde vetten .	Voeg natuurlijke tofu toe in uw maaltijd. Een simpel ingrediënt dat zich aanpast aan het gerecht.
L2	Use crunchy baked tofu in your meal. It is pre-seasoned for a spicy taste.	Use soy-based tofu in your meal. It is low in calories and saturated fat .	Use natural tofu in your meal. A simple ingredient that changes based on the dish.

Appendix II – Analyses control variables

The data was split into groups for the control variables. The separation for the groups based on hunger level was made by calculating the median, which was 2. All participants who had eaten two hours ago or less were placed in the low level hunger group. The participants who had eaten more than two hours ago were placed in the high level hunger group. Three repeated measures ANOVAs with as within subject factor description type (sensory, healthy and neutral) and between subject factors language (L1 vs L2) and hunger (low hunger/high hunger) were conducted for hunger.

There was no main effect of description type for attitude towards the product description ($F(2, 148) = 2.61, p = .077, \eta^2 = .034$), no main effect of language ($F(1, 74) < 1, p = .775, \eta^2 = .001$) and no main effect of hunger level ($F(1, 74) < 1, p = .351, \eta^2 = .012$). The analysis showed no significant interaction between description type and language ($F(2, 148) < 1, p = .967, \eta^2 < .001$), no significant interaction between description and hunger level ($F(2, 148) < 1, p = .459, \eta^2 < .010$) and no significant interaction between description, language, and hunger level ($F(2, 148) < 1, p = .566, \eta^2 = .008$). The means and standard errors can be found in Figure 4.

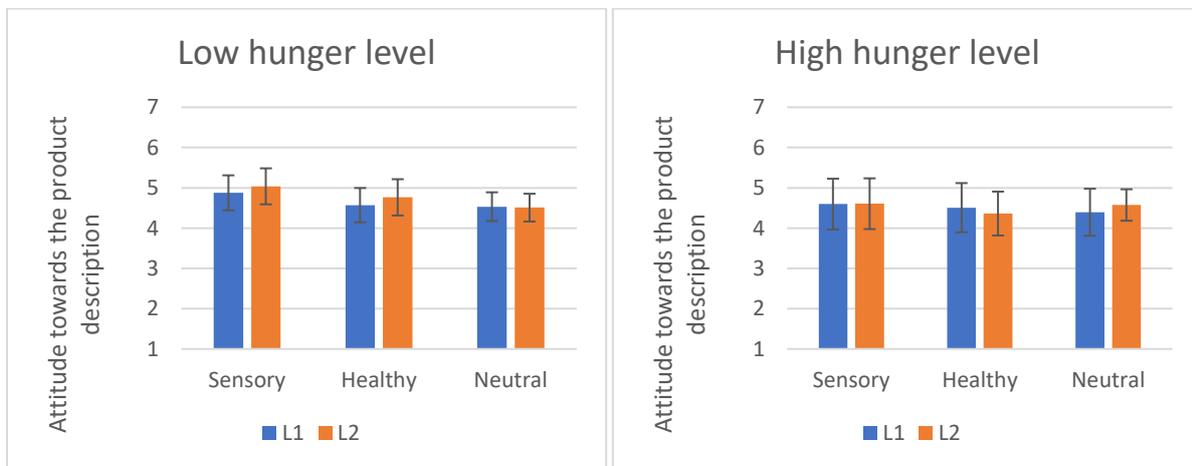


Figure 4. Means and standard errors of attitude towards the product description for sensory, healthy, and neutral language in L1 and L2 for low and high hunger level (1 = very negative, 7 = very positive).

There was a main effect of description type for desirability ($F(2, 148) = 5.87, p = .004, \eta^2 = .073$). Pairwise comparisons showed that sensory language ($M = 3.99, SD = 1.39$) and healthy language ($M = 3.58, SD = 1.40$) differed significantly ($p = .023$). Sensory language and neutral language ($M = 3.41, SD = 1.15$) also differed significantly ($p = .004$). Healthy language and neutral language did not differ significantly ($p = .258$). There was no

main effect of language ($F(1, 74) < 1, p = .901, \eta^2 < .001$) and no main effect of hunger level ($F(1, 74) < 1, p = .882, \eta^2 < .001$). The analysis showed no significant interaction between description type and language ($F(2, 148) < 1, p = .962, \eta^2 = .001$), no significant interaction between description and hunger level ($F(2, 148) < 1, p = .910, \eta^2 = .001$), no significant interaction between language and hunger level ($F(1, 74) = 2.27, p = .136, \eta^2 = .030$) and no significant interaction between description, language, and hunger level ($F(2, 148) < 1, p = .521, \eta^2 = .009$). This means that products with sensory descriptions were more desirable than products with healthy or neutral descriptions regardless of language and hunger level. The means and standard errors can be found in Figure 5.

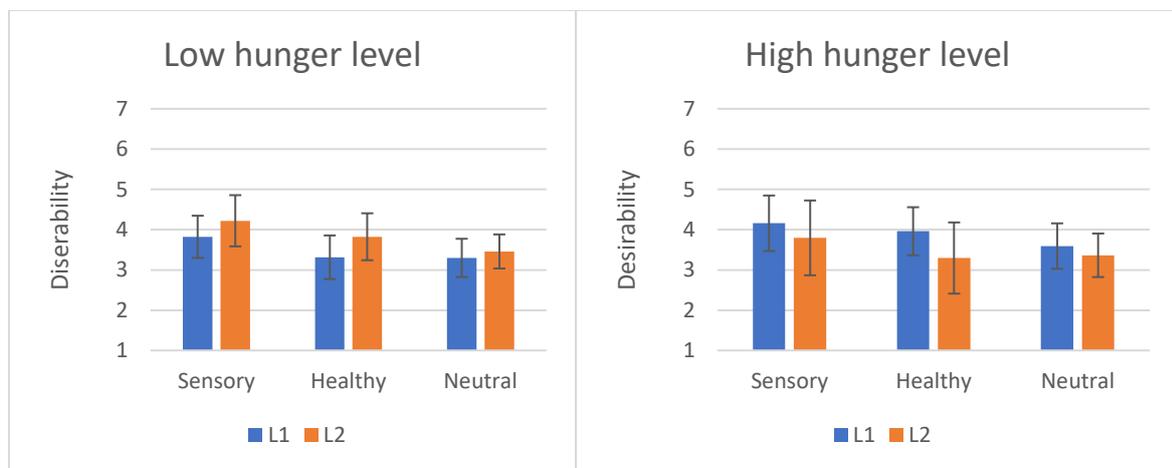


Figure 5. Means and standard errors of desirability for sensory, healthy, and neutral language in L1 and L2 for low and high hunger level (1 = very negative, 7 = very positive).

There was no main effect of description type for purchase intention ($F(2, 148) = 2.84, p = .061, \eta^2 = .037$), no main effect of language ($F(1, 74) < 1, p = .833, \eta^2 = .001$) and no main effect of hunger level ($F(1, 74) < 1, p = .481, \eta^2 = .007$). The analysis showed no significant interaction between description type and language ($F(2, 148) < 1, p = .881, \eta^2 = .002$), no significant interaction between description and hunger level ($F(2, 148) < 1, p = .579, \eta^2 = .007$), no significant interaction between language and hunger level ($F(1, 74) = 1.96, p = .166, \eta^2 = .026$) and no significant interaction between description, language, and hunger level ($F(2, 148) < 1, p = .715, \eta^2 = .005$). The means and standard errors can be found in Figure 6.

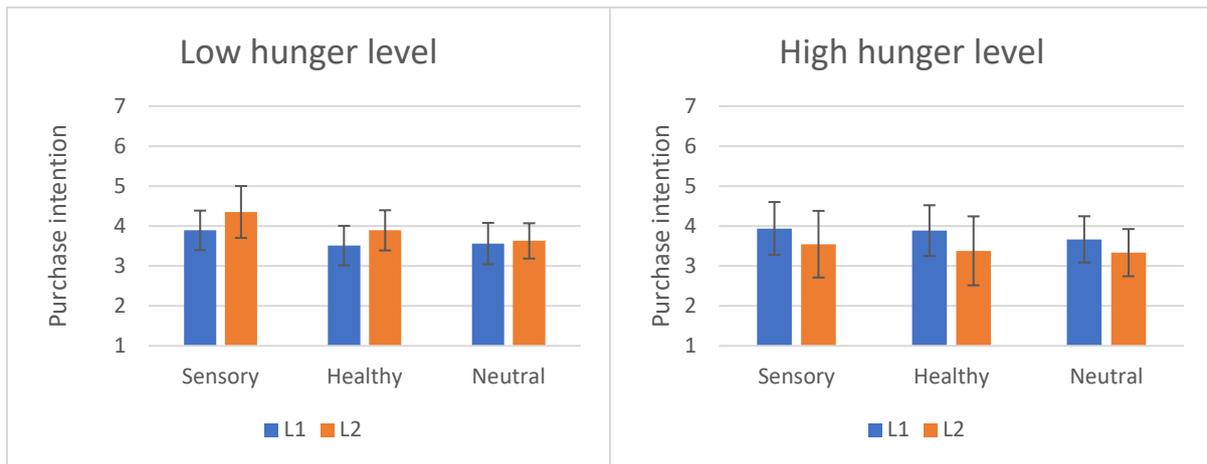


Figure 6. Means and standard errors of purchase intention for sensory, healthy, and neutral language in L1 and L2 for low and high hunger level (1 = very negative, 7 = very positive).

The separation for the groups based on health concern was made by calculating the median, which was 5.67. All participants whose average health concern score was below 5.67 were placed in the low level health concern group. The participants who had rated themselves 5.67 or higher were placed in the high level health concern group. Three repeated measures ANOVAs with as within subject factor description type (sensory, healthy and neutral) and between subject factors language (L1 vs L2) and health (low health/high health) were conducted for health.

There was a main effect of description type on attitude towards the product description ($F(2, 148) = 3.39, p = .036, \eta^2 = .044$). Pairwise comparisons showed that sensory language ($M = 4.81, SD = 1.17$) and neutral language ($M = 4.50, SD = .96$) differed significantly from each other ($p = 0.17$). Sensory language and healthy language ($M = 4.57, SD = 1.12$) did not differ significantly from each other ($p = .061$), nor did healthy language and neutral language ($p = .579$). There was no main effect of language ($F(1, 74) < 1, p = .800, \eta^2 = .001$) and no main effect of health level ($F(1, 74) < 1, p = .944, \eta^2 < .001$). The analysis showed no significant interaction between description type and language ($F(2, 148) < 1, p = .980, \eta^2 < .001$), no significant interaction between description and health level ($F(2, 148) < 1, p = .5, \eta^2 = .009$), no significant interaction between language and health level ($F(1, 74) = 1.33, p = .253, \eta^2 = .018$) and no significant interaction between description, language, and hunger level ($F(2, 148) < 1, p = .61, \eta^2 = .007$). This means that people responded more positively towards the sensory descriptions than to the neutral descriptions regardless of the language and health concern. The means and standard errors can be found in Figure 7.

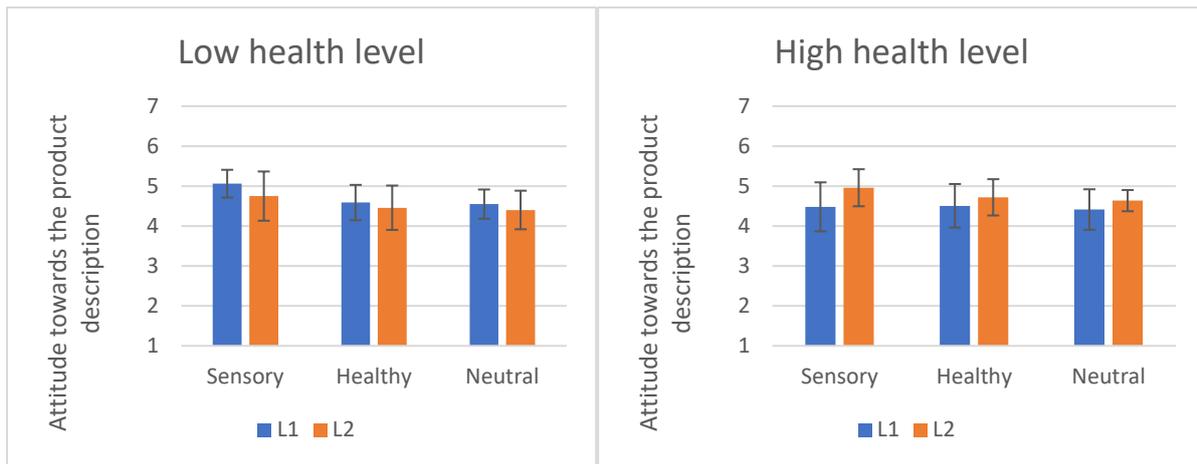


Figure 7. Means and standard errors of attitude towards the product description for sensory, healthy, and neutral language in L1 and L2 for low and high health level (1 = very negative, 7 = very positive).

There was a main effect of description type on desirability ($F(2, 148) = 6.21, p = .003, \eta^2 = .077$). Pairwise comparisons showed that sensory language ($M = 3.99, SD = 1.43$) and healthy language ($M = 3.58, SD = 1.4$) differed significantly from each other ($p = 0.18$). Sensory language and neutral language ($M = 3.41, SD = 1.15$) also differed significantly from each other ($p = .003$). Healthy language and neutral language did not differ significantly from each other ($p = .26$). There was no main effect of language ($F(1, 74) < 1, p = .866, \eta^2 < .001$) and no main effect of health level ($F(1, 74) < 1, p = .757, \eta^2 = .001$). The analysis showed no significant interaction between description type and language ($F(2, 148) < 1, p = .977, \eta^2 < .001$), no significant interaction between description and health level ($F(2, 148) < 1, p = .863, \eta^2 = .002$), no significant interaction between language and health level ($F(1, 74) = 1.33, p = .679, \eta^2 = .002$) and no significant interaction between description, language, and hunger level ($F(2, 148) = 1.05, p = .354, \eta^2 = .014$). This means that sensory descriptions resulted in a higher product desirability than healthy or neutral descriptions regardless of which language was used and how concerned people were about their health. The means and standard errors can be found in Figure 8.

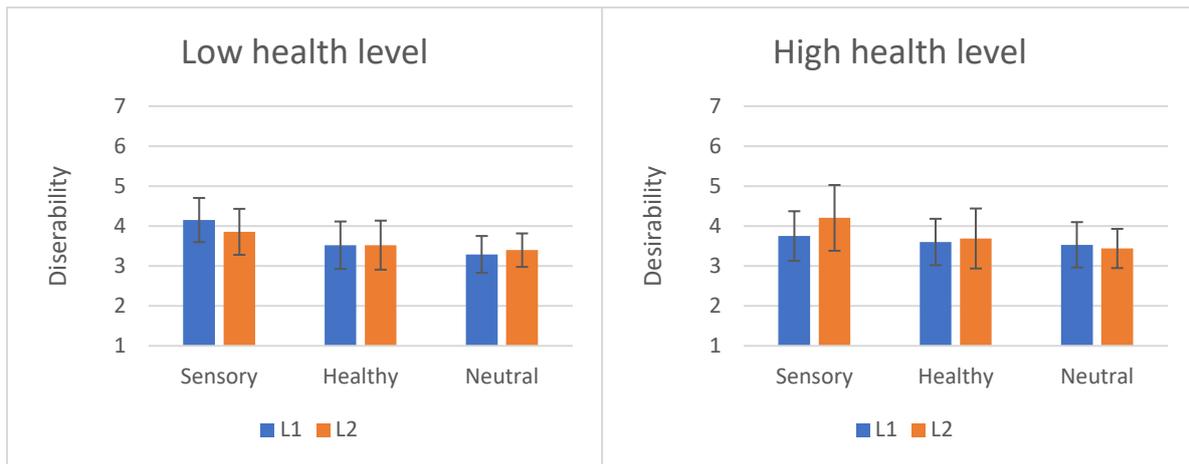


Figure 8. Means and standard errors of desirability for sensory, healthy, and neutral language in L1 and L2 for low and high health level (1 = very negative, 7 = very positive).

There was a main effect of description type on purchase intention ($F(2, 148) = 3.21, p = .043, \eta^2 = .042$). Pairwise comparisons showed that sensory language ($M = 3.96, SD = 1.38$) and neutral language ($M = 3.57, SD = 1.22$) differed significantly from each other ($p = 0.25$). Sensory language and healthy language ($M = 3.67, SD = 1.31$) did not differ significantly from each other ($p = .66$) and neither did healthy and neutral language ($p = .503$). There was no main effect of language ($F(1, 74) < 1, p = .978, \eta^2 < .001$) and no main effect of health level ($F(1, 74) < 1, p = .974, \eta^2 < .001$). The analysis showed no significant interaction between description type and language ($F(2, 148) < 1, p = .864, \eta^2 = .002$), no significant interaction between description and health level ($F(2, 148) < 1, p = .935, \eta^2 = .001$), no significant interaction between language and health level ($F(1, 74) = 1.07, p = .305, \eta^2 = .014$) and no significant interaction between description, language, and hunger level ($F(2, 148) < 1, p = .413, \eta^2 = .012$). This means that the use of sensory descriptions resulted in a higher purchase intention than neutral descriptions regardless of language and health concern. The means and standard errors can be found in Figure 9.

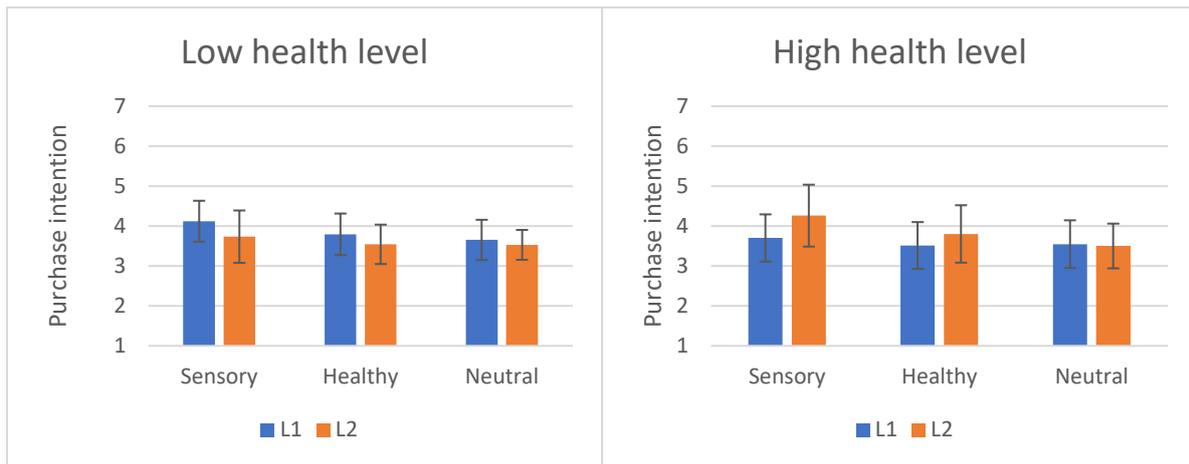


Figure 9. Means and standard errors of purchase intention for sensory, healthy, and neutral language in L1 and L2 for low and high health level (1 = very negative, 7 = very positive).