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**Obesity: a Matter of Language?  
Unravelling the Influence of Descriptive Styles and  
Food Types on Consumers' Desirability and  
Purchase Intentions**

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## **Abstract**

Obesity is one of the major causes of death worldwide and is mainly caused by people eating too much food, predominantly unhealthy. Previous research has found a big difference in the way healthy and unhealthy products are portrayed towards customers regarding language type and representation. This study investigates whether there is an effect of food type and the language type used in the product descriptions of these food types on the consumers' desirability and purchase intention of the products. To try to get an answer to the research question, an experiment has been conducted where Dutch participants were asked to rate their desirability and purchase intention on the basis of multiple product descriptions in the form of a questionnaire. Taking all the results of the experiment into consideration, it can be concluded that language type does not influence the desirability and purchase intention of the consumers, whereas food type does. Furthermore, health-focused language was found to be the most effective in inducing a difference between the desirability and purchase intentions of healthy and unhealthy products. This study, together with the existing literature and theories, shows that the way products are portrayed is a crucial aspect of consumers' preferences and choices. Manipulating product descriptions could successfully change consumers' expectations and motivation to make healthier food choices, which might ultimately result in a decrease in the worldwide obesity rate.

## **Introduction**

Thirteen percent of the world's population is obese, so approximately 975,000,000 people have an accumulation of body fat that could possibly impact their health (Ritchie & Roser, 2017). Obesity is the fifth highest cause of death and therefore an important topic to investigate. It is caused by consuming more energy than the amount of energy our body expends. This results in an energy surplus, which will eventually make a person gain weight. This surplus can be caused by two factors: consuming too much or expending too little. Energy consumption is mostly done through the intake of kilocalories. Food products that contain a lot of kilocalories are usually considered unhealthy, but delicious at the same time (Breitman, 2017). This is due to the fact that food that is high in calories also often contains high levels of fat and sugar. Fat and sugar strengthen the smell and flavour chemicals of foods and also give foods a pleasant texture. Correspondingly, little fat and sugar usually imply little flavour too (Elliott, 2023). This combination of factors causes people to consider unhealthy food as delicious. It is therefore critical to explore how people can be encouraged to make healthier food choices and thus how healthy products can be made more desirable.

A strategy that has been examined by Ye and Mattila (2021) is to focus on the social impact of eating vegetarian and plant-based dishes versus meat-based dishes. Plant-based and meat-based products cannot simply be classified as healthy or unhealthy, but the results might give an idea of the success of the strategy. The positive feelings of being able to do something good for society operate as a 'pull' factor and motivate people to choose vegetarian or plant-based options instead of meat-based options. Likewise, paying attention to the social costs of eating meat-based dishes decreases people's preferences for meat products, making vegetable products more desirable. This feeling of ambivalence towards meat eating operates as a 'push' factor that reduces the attractiveness of meat-based dishes and motivates people to choose plant-based options instead. Furthermore, Ye and Mattila (2021) tested whether this 'push' factor also works when informing consumers on the health risks of consuming meat. This, however, did not provide the desired effect. In general, the lack of nutritional information on unhealthy foods might cause people to be unaware of the negative consequences, compared to the possible excessive nutritional information on healthy food products (Raghunathan, Naylor, & Hoyer, 2006). All in all, these push and pull factors do increase the attractiveness of plant-based items and decrease the attractiveness of meat-based items, but this does not mean that the overall preference of consumers changed.

People still tend to buy meat-based items more frequently than plant-based items, despite the success of the communication strategies.

One of the main theories that explains people's preferences and what motivates them to make certain choices is the Grounded Cognition Theory of Desire (Papies, Best, Gelibter, & Barsalou, 2017). This theory states that people associate attractive food with positive contextual factors, such as the setting of eating it in or its taste and smell. These factors make people re-experience eating the food, causing a positive representation. This representation could also be referred to as mental simulation. Papies (2013) created an experiment in which participants were asked to write down the features they associated with 16 concepts: four attractive and unhealthy foods (e.g., cookies, vanilla ice cream), four neutral and healthy foods (e.g., apple, rice) and eight natural items and household objects (e.g., phone, butterfly). The associations were divided into a number of categories: taste, texture and temperature, eating situations, hedonic features, visual features, non-eating situations, health features and other features. The results showed that tempting foods were associated with more than twice as much eating simulation features (i.e., taste, texture and temperature, eating situations and hedonic features) as neutral foods. However, as only four items were used per category, it cannot be claimed with certainty that the results are generalisable among healthy and unhealthy foods in general. In addition, neutral foods were mostly described on the basis of what they look like, while tempting foods were described on the basis of what it is like to eat them and the associated feeling of reward after consumption. The positive representation as well as the feeling of reward make the desire for unhealthy food greater than for healthy food, as these aspects don't dominate for the latter. It is therefore important to analyse whether people's perceptions can be changed and if positive feelings and rewarding experiences could be created towards healthy foods too.

One of the factors that reinforces the association of unhealthy products with feelings of reward and positive representations, is that healthy food products are described with less attractive and appealing words than unhealthy food products (Turnwald, Jurafsky, Conner, & Crum, 2017). In their study, Turnwald, Jurafsky, Conner, and Crum (2017) examined the ways restaurants portray the healthy menu options. In comparison to standard menu items, the descriptions of healthy menu items use significantly fewer words regarding texture (e.g., crispy, creamy), fun (e.g., bites, dippable), tastiness (e.g., sour, salty) and excitement (e.g.,

adventure, crazy), for instance. Usually the focus is on the healthiness of the product, naming the nutritiousness and freshness of the food.

Furthermore, according to Papias, Johannes, Daneva, Semyte, and Kauhanen (2020), meat-based dishes are more often labelled in supermarket descriptions with sensory language and action words, whereas vegetarian and plant-based foods are usually labelled with ingredients and other words unrelated to eating experiences. In their study, they examined the supermarket descriptions of ready-meals in the UK and, additionally, manipulated food descriptions to test whether different types of languages would influence the attractiveness of the foods and consumers' eating simulations. Their results showed that simulation-based food descriptions, i.e., covering sensory, context and hedonic features, for vegetarian and plant-based foods increased the attractiveness, however not the desire and purchase intention. This study only tested plant-based versus meat-based product descriptions, so it is unclear whether the findings can be generalised among healthy and unhealthy foods, considering that the previously mentioned products cannot simply be categorised as either.

Referring back to Raghunathan, Naylor, and Hoyer (2006), health-focused language decreases people's preference and satisfaction. On the basis of four experiments, they found that people prioritise taste and indulgence over health. In one experiment, the participants were asked to match pictures of healthy and unhealthy foods with words associated with tastiness (e.g., delicious) and lack of taste (e.g., flavourless) for two category labels: incongruent ("healthy foods/enjoyable" versus "unhealthy foods/not enjoyable") and congruent ("unhealthy foods/enjoyable" versus "healthy foods/not enjoyable"). The results showed that the response time of matching pictures and labels for the incongruent condition was significantly higher than for the congruent condition. This means that people have more difficulty creating positive associations between tastiness and healthiness than negative associations. Another experiment asked participants to make a choice between a cracker with 11 grams of bad fat and 2 grams of good fat (unhealthy option) and a cracker with 2 grams of bad fat and 11 grams of good fat (healthy option). Half of the participants were requested to imagine that they were "in the mood for a snack", while the other half was requested to imagine they were "craving something really tasty". The results showed that the amount of participants who chose the unhealthy option was significantly greater for those "craving something really tasty" than for those "in the mood for a snack". These outcomes confirm that healthiness and tastiness, as people perceive it, are negatively correlated, not only regarding

judgement, but also regarding choice decisions. This means that as health increases, perceived tastiness decreases and vice versa. It would, however, be desirable to change the conception and convince people that foods can be healthy and tasty simultaneously. A positive perceived correlation between healthiness and tastiness would be beneficial for one's health.

Turnwald et al. (2019) also tested the effects of different languages, although mainly focused on vegetable dishes. They found that people tend to choose a vegetable dish more often when taste-focused labels (e.g., Herb n' Honey Balsamic Glazed Turnips) are used rather than health-focused labels (e.g., Healthy Choice Turnips) or basic labels (e.g., Turnips) as tested in 5 university dining halls. In fact, health-oriented labels cause the food to be perceived as less tasty than basic labels, making people choose it less often. Nevertheless, no personal preferences or dietary restrictions were measured. These individual differences could have influenced the results as someone might not have wanted to buy a product simply because they were not allowed to eat it or did not like it, meaning that this difference in choice does not necessarily have to be a consequence of the product labels and different language types. It is therefore questionable if the findings are representative and can be generalised. According to Turnwald et al. (2019), taste-oriented language seems to change people's motivation on choosing vegetable dishes for their tastiness rather than primarily for their healthiness, compared to basic language and health-focused language. This change in reasoning might, however, not arise by simply adding more fancy words or solely listing the ingredients. This was tested in an experiment where participants were asked to rate expectations of a positive taste experience, surprise or curiosity, and the likelihood of choosing the dish after seeing food descriptions with different types of labels: taste-focused (e.g., Panko Parmesan Crusted Zucchini), health-focused (e.g., Healthy High Fiber Zucchini), basic (e.g., Zucchini), fancy (e.g., Ambrosial Zucchini a l'Italienne), vaguely positive (e.g., Absolutely Awesome Zucchini) and ingredients lists (e.g., Zucchini, Bread Crumbs, Parmesan). Taste-focused labels increased the perceived tastiness of the products as well as the surprise and curiosity, compared to health-focused and basic labels. It is important to focus on creating expectations of experienced pleasure and distinct flavours in order for taste-focused language to be most effective. The elaborate and more specific taste-focused labels outperformed the labels that only added words and ingredients on vegetable selection, consumption and tastiness.

Another correlation of healthy foods is with fillingness. People believe that healthy food is not as filling as unhealthy food (Suher, Raghunathan, & Hoyer, 2016). This misconception could have come from the perception that healthy foods are usually lighter in terms of weight and density than unhealthy foods, making people believe unhealthy food to be more filling than healthy food. Another possible reason could be that unhealthy foods are flavourful and commonly served in bigger portions than healthy foods, causing people to frequently consume such foods to the point where they actually feel full. On the other hand, the belief might partially be true as unhealthy foods usually contain more kilocalories than healthy foods, which fuel our body with energy.

These correlations of healthiness with tastiness and fillingness cause people to create more sensory associations towards unhealthy products (Papies, 2013), making them more attractive and more difficult to resist (Raghunathan et al., 2006). It might therefore be questionable if the correlation between healthiness and tastiness is correct, as it could also simply be that unhealthy food creates more sensory experiences and is therefore perceived as more attractive (Speed, Papies, & Majid, 2023). In other words, unhealthy foods create more mental simulations than healthy foods, not only regarding taste but regarding the senses in general. This majority of positive associations causes people to prefer unhealthy products over healthy ones, so not exclusively because unhealthy products are believed to taste better.

In summary, Turnwald et al. (2017) concluded that there is a significant difference between the language use in food descriptions of healthy and unhealthy products regarding appeal and attractiveness towards consumers. Something that might influence people's perception, and what will be tested in this experiment, is using the same type of language for both healthy and unhealthy food descriptions. Health-focused languages have previously been found to negatively affect people's preferences towards healthy food products (Raghunathan et al., 2006). It is, however, also interesting to see whether focusing on the healthiness of unhealthy products is going to influence people's preferences. Ye and Matilla (2021) found this to be unsuccessful, however, only for the negative health consequences of meat-based dishes. Focusing on the benefits and healthiness of unhealthy products in general might displease more people and therefore make unhealthy foods less attractive. Papies et al. (2020) found simulation-based food descriptions to be effective only for the attractiveness of the food, but not for the desire and purchase intention. Again, this was tested comparing meat-based versus plant-based dishes. In this study, it will be examined if desire and purchase

intention could be influenced by simulation-based language too, when manipulating healthy and unhealthy food descriptions. The sensory language that will be used in the food descriptions will be chosen on the basis of the sensory modality norms presented by Speed and Brybaert (2021). By conducting multiple studies, they created an overview of sensory norms for more than 24,000 Dutch words on six modalities: audition, gustation, haptics, olfaction, vision and interoception. These new norms outperform already existing sensory norms, as the studies contained a higher amount of words, more word classes and a new modality, namely interoception. Using these sensory modality norms to select the right words to use in food descriptions is expected to give a more accurate result, as it is something no study has done before. Following up on the study done by Papies (2013), this current study will present a more elaborate list of healthy and unhealthy products in the experiment in order to be able to generalise the results among these categories. The categorization of products to either healthy or unhealthy will be determined on the basis of a pre-test. Lastly, one of the limitations of Turnwald et al. (2019) was that no personal preferences were taken into account. In this experiment people will be asked about their diets and allergies, in order to strengthen the validity of the results. Considering the limitations from the previously discussed literature, the present study will examine whether consumers can be motivated to buy more healthy foods by manipulating the language (descriptive, health-focused, sensory) that is used in the product descriptions.

Taking into account the aforementioned studies and their limitations, the following hypotheses have been created:

*H1: Sensory language leads to a higher desirability and purchase intention than non-sensory language, i.e. health-focused and descriptive language.*

*H2: Unhealthy foods lead to a higher desirability and purchase intention than healthy foods.*

Since there is not enough validation and substantiation to know with certainty if there is an interaction effect between language type and food type on desirability and purchase intention, a research question has been constructed: *“How does sensory and non-sensory language in relation to (un)healthy food impact desirability and purchase intention?”*.

## Methodology

### *Materials*

The first independent variable is type of language, specifically the use of descriptive language, health-focused language or sensory language in product definitions. The descriptive language was used as a control variable. It is the most basic and thus most ordinary language that could have been used. It solely consists of plain descriptions of the products without trying to make them sound more appealing. An example food description using descriptive language is: “Paprika chips, gemaakt van aardappels van eigen bodem” (*Paprika chips, made from home-grown potatoes*). Health-focused language is about the positive aspects important to one’s health. The product descriptions included words emphasising the healthiness of the foods. An example of a food description using health-focused language is: “Zoutarme paprika chips met weinig calorieën” (*Low-salt paprika chips with few calories*). Lastly, sensory language concentrates on stimulating the senses. As mentioned previously, the words used in the descriptions were chosen on the basis of the sensory modality norms presented by Speed and Brybaert (2021). If a word had a value greater than three, it was considered to have sufficient association with a specific sense to be used as successful sensory language. An example of sensory language used in food descriptions is: “Knapperige chips met een kruidige paprikasmaak” (*Crispy chips with a spicy paprika flavour*). Each of the food descriptions included one of the types of language, so either sensory, descriptive or health-focused. It was then examined which of the languages was found to be the most effective. The second independent variable is type of food, either healthy or unhealthy. On the basis of a pre-test, it has been decided what exactly can be defined as healthy or unhealthy. The participants were asked to rate the healthiness of certain products on a scale of 0 – 100. Products rated between 0 – 50 could be considered unhealthy and products rated between 50 – 100 were considered healthy (Speed et al., 2023). Some of the products that have been presented are fresh fruits, pre-packaged meals, vegetables, meat and cookies. The products that were rated at the most extreme side of the scale, preferably between 0 – 30 and 70 – 100, were used in the main experiment. The products that were considered the healthiest were washed spinach ( $M = 88.64$ ,  $SD = 12.18$ ), brown whole-grain bread ( $M = 86.64$ ,  $SD = 9.24$ ), paprika ( $M = 92.27$ ,  $SD = 9.77$ ) and quark ( $M = 78.10$ ,  $SD = 16.87$ ). In fact, bananas ( $M = 79.73$ ,  $SD = 9.57$ ) scored higher than quark, however in order to create a larger variety of products, it was decided to substitute the bananas so that not three of the four products would be fruits and vegetables.

The products that were considered the most unhealthy were paprika chips ( $M = 26.64$ ,  $SD = 16.06$ ), pizza BBQ chicken ( $M = 25.40$ ,  $SD = 21.18$ ), mayonnaise ( $M = 24.18$ ,  $SD = 16.99$ ) and *stroomwafels* ( $M = 30.10$ ,  $SD = 18.68$ ). No images were added to the pre-test as well as to the food descriptions in the survey, as this visual aspect could have had a possible influence on the participants' response towards the products.

### *Subjects*

The participants that took part in both the pre-test and the experiment needed to be native Dutch speakers, since both were conducted in Dutch. Participants had to be above 16 years old, as this is the youngest age that is allowed to be tested. Eleven people were recruited to take part in the pre-test of which seven were female (63.6%) and four were male (36.4%). The age ranged between 20 and 60 years old. Ninety-three people participated in the main study of which 66 were female (71%) and 27 were male (29%). The participants were divided equally among the three between-subjects variables. The sensory language descriptions were shown to 30 people; 23 were female (76.7%) and 7 were male (23.3%). The health-focused language descriptions were presented to 32 people, with 22 females (68.8%) and 10 males (31.2%). Lastly, 31 people have seen the descriptive language descriptions, of which 21 were female (67.7%) and 10 were male (32.3%). The age of the participants from the main study ranged between 18 and 84 years old. The participants of the pre-test and experiment were not allowed to be the same, in order to avoid giving them an idea of what the study might have been about.

### *Design*

The experiment used a 3 x 2 mixed-subjects design, meaning that both a between and a within subjects design were carried out. The within-subjects variable is the type of food for which the descriptions were created, consisting of two levels, namely healthy and unhealthy. The between-subjects variable is the type of language that was being used in the descriptions, consisting of three levels, being sensory, health-focused and descriptive. The participants have seen the descriptions for both the healthy and unhealthy products, but only including one of the types of language. A mixed-subjects design was chosen, because giving the whole experiment a within-subjects design would possibly have led participants to guess the purpose of the study by seeing the sensory language and the descriptive language as well as the health-focused language.

### *Instruments*

The dependent variables that were measured in the experiment were the participants' responses towards healthy and unhealthy foods, more specifically their desire for the product and purchase intention. This has been done through an online questionnaire consisting of statements about the above mentioned variables for all of the food descriptions. The participants' desire for the product was measured using a 7-point semantic differential scale for five items (Hornikx, Van Meurs, & Hof, 2013) following the statement "Ik beschouw dit product als ..." (*I believe this food product is ...*): 1. Onaantrekkelijk (*Unattractive*) – 7. Aantrekkelijk (*Attractive*), 1. Niet lekker (*Not tasty*) – 7. Lekker (*Tasty*), 1. Niet plezierig (*Not enjoyable*) – 7. Plezierig (*Enjoyable*), 1. Niet uitnodigend (*Not inviting*) – 7. Uitnodigend (*Inviting*), 1. Onaangenaam (*Not pleasant*) – 7. Aangenaam (*Pleasant*). The reliability of 'desire towards the products' comprising five items for every description was insufficiently reliable:  $\alpha = .63$ . The purchase intention of the participants was measured using a 7-point Likert scale for four items, being "Ik wil zeker weten dit product kopen" (*I definitely want to buy this food product*) (Van Hooft & Truong, 2012), "Ik zou eventueel dit product kopen" (*I would consider buying this food product*), "Ik zou dit product proberen" (*I would try out this food product*) and "Ik zou dit product aanraden aan anderen" (*I would recommend this food product to others*) with 1 = Helemaal mee oneens (*Completely disagree*) and 7 = Helemaal mee eens (*Completely agree*) as the anchors of the scale (Van Rompay, Franssen, & Borgelink, 2013). The reliability of 'purchase intention' comprising four items for every description was acceptable:  $\alpha = .73$ . Three different versions of the survey have been created for the different participating groups. Each of the versions contained descriptions using one of the types of language, i.e. sensory, descriptive or health-focused. Besides questions about the dependent variables, the participants were asked about their age, gender and, most importantly, their diet. Participants had to confirm whether or not they have any dietary restrictions. If so, they were shown a list of allergies and diets (e.g., lactose intolerance, gluten intolerance, vegetarianism) to choose from. People who have dietary restrictions might have opted for the healthy food options regardless of what type of language was used to describe them. The participants were also asked to rate their diet on a 5-point Likert scale following the statement "Ik consumeer ... gezonde voedingsproducten gedurende de week" (*I ... consume healthy food products during the week*) with 1 = nooit (*never*) and 7 = altijd (*always*). It is important to take into account any confounding variables, as these might have manipulated the validity of the research.

### *Procedure*

The recruitment of the participants was done by approaching Dutch acquaintances in real-life or through social media. The online survey was provided to them using the program Qualtrics. The first set of recruited participants took part in the pre-test by rating the healthiness of a list of products on a scale of 0 – 100 to determine the definition of healthy and unhealthy foods. Before the start of the pre-test, the participants were informed on what was expected of them, what would be done with their personal data and the voluntariness of participation. They were also asked about their age and gender. A number of healthy and unhealthy products, as previously classified during the pre-test, were used in the main questionnaire. Here, the second and also largest groups of recruited participants was asked to fill out a survey. The products used were washed spinach, brown whole-grain bread, paprika, quark, paprika chips, pizza BBQ chicken, mayonnaise and *stroopwafels*. Before the start of the main survey, a paragraph explained what was expected of the participants regarding the descriptions of supermarket products, what would happen to their personal data and the voluntariness of participation. The participants were randomly assigned to one of the three versions of the survey, i.e. to one of the types of language. At the beginning of the survey, a number of demographic questions were asked about the age and gender of the subjects. They were then presented with the food descriptions one by one in a random order. For each of the descriptions, they were requested to provide an answer to the statements regarding desire and purchase intention. After having seen all the food descriptions, two more questions have been asked about the participants' diets. The participants were then thanked for their assistance and informed that their responses had been recorded.

### *Statistical analysis*

A number of statistical tests were used in order to formulate an answer to the research question. First of all, Cronbach's alpha was calculated to test the reliability of the scales measuring desire and purchase intention. Secondly, two two-way analyses of variance (ANOVA) were conducted to find an interaction effect between language type and food type on desire and purchase intention. Four one-way analyses of variance were then used to find an effect of language type and food type on desire and purchase intention. Lastly, the aim was to use a Chi-square test to find a relation between the dietary restrictions of the participants and the answers given in the survey.

## Results

### *Desirability*

First of all, a repeated measures analysis with food type as within-subject factor and language type as between-subject factor, of which the data can be found in table 1 and has been visualised in figure 1, showed an insignificant main effect of language type ( $F(2, 90) = 1.81, p = .169, \eta^2 = .39$ ) on desirability. This insignificant main effect suggests that hypothesis 1 should be at least partially rejected, as there appears to be no difference between the influence of the three language types on desirability. The same repeated measures analysis showed a significant main effect of food type ( $F(1, 90)$

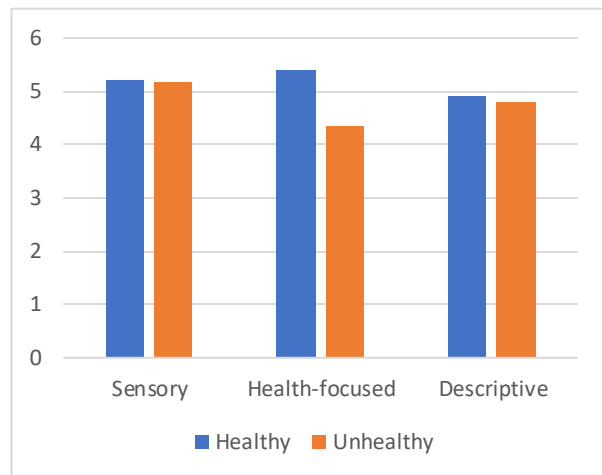
$= 14.56, p < .001, \eta^2 = .14$ ) on desirability.

This significant main effect reveals that hypothesis 2 needs to be rejected, as the total desirability for healthy products ( $M = 5.17, SD = .85$ ) is higher than for unhealthy products ( $M = 4.76, SD = 1.04$ ) instead of the other way around, as can be seen in table 2.

These main effects were qualified by a significant interaction between food type

and language type on desirability ( $F(2, 90) = 9.38, p < .001, \eta^2 = .17$ ). The interaction is due to the fact that the difference between the two types of food was only significant among subjects with health-focused language use: healthy food ( $M = 5.39, SD = .81$ ) was greater than unhealthy food ( $M = 4.34, SD = .18$ ) (see table 2). There was no significant difference between the two types of food for subjects with sensory language use and descriptive language use.

More specifically, a one-way analysis of variance (see appendix table 5) showed an insignificant effect of language type on the desirability of healthy foods ( $F(2, 90) = 2.55, p = .084, \eta^2 = .54$ ). However, another one-way analysis of variance (see appendix table 6) showed a significant effect of language type on the desirability of unhealthy foods ( $F(2, 90) = 5.26, p = .007, \eta^2 = .11$ ). Sensory language ( $M = 5.16, SD = .94$ ) had a significantly higher impact on desirability of unhealthy food compared to health-focused language ( $p = .002$ , LSD-correction;  $M = 4.34, SD = 1.08$ ). There was no significant difference between the desirability of products using descriptive and sensory language ( $p = .177$ ) and products using descriptive and health-focused language ( $p = .065$ ). Partially answering the research question, these results show that



**Fig. 1.** Average desirability of language type and food type, and their interaction effect.

the desirability of healthy and unhealthy products is not diverged by sensory language. The language type most capable of making a difference is health-focused language, as it increases the desire for healthy products but decreases the desire for unhealthy ones.

**Table 1.** Results of within-subjects and between-subjects factors of Two-way ANOVA showing the effects of language type and food type on desirability, including interaction effect

Source		Df	Mean Square	F	Sig.	Partial Eta Squared
Food type	Sphericity	1	7.56	14.56	<.001	.14
	Assumed					
Language type	Sphericity	2	2.13	1.81	.169	.39
	Assumed					
Food type * Language type	Sphericity	2	4.87	9.38	<.001	.17
	Assumed					
Error (Food type)	Sphericity	90	.52			
	Assumed					
Error (Language type)	Sphericity	90	1.17			
	Assumed					

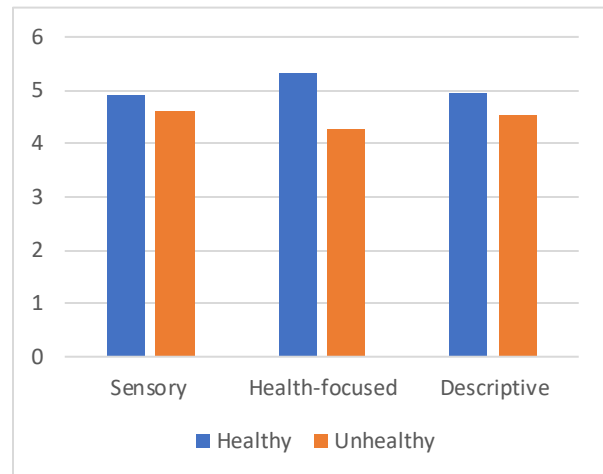
**Table 2.** Descriptive statistics of Two-way ANOVA testing desirability with interaction of food type and language type (1 = negative attitude, 7 = positive attitude)

Food type	Language type	Mean	Std. Deviation	N
Healthy average desire	Sensory	5.22	.87	30
	Health	5.39	.81	32
	Descriptive	4.91	.83	31
	Total	5.17	.85	93
Unhealthy average desire	Sensory	5.16	.94	30
	Health	4.34	1.08	32
	Descriptive	4.81	.96	31
	Total	4.76	1.04	93

### Purchase intention

Secondly, a repeated measures analysis with food type as within-subject factor and language type as between-subject factor, of which the data can be found in table 3 and has been visualised in figure 2, showed an insignificant main effect of language type ( $F(2, 90) < 1$ ) on purchase intention. This insignificant main effect confirms that hypothesis 1 needs to be rejected completely, as there also does not seem to be a difference between the influence of the three language types on purchase intention. The same repeated measures analysis

showed a significant main effect of food type ( $F(1, 90) = 34.86, p < .001, \eta^2 = .28$ ) on purchase intention. This significant main effect presents that hypothesis 2 needs to be rejected, as the total purchase intention for healthy products ( $M = 5.05, SD = .91$ ) is higher than for unhealthy products ( $M = 4.46, SD = 1.04$ ) instead of vice versa, as can be seen in table 4. These main effects were qualified by a significant interaction



**Fig. 2.** Average purchase intention of language type and food type, and their interaction effect.

between food type and language type on purchase intention ( $F(2, 90) = 5.76, p = .004, \eta^2 = .11$ ). The interaction is due to the fact that the difference between the two types of food was only significant among subjects with health-focused language use: healthy food ( $M = 5.31, SD = .78$ ) was greater than unhealthy food ( $M = 4.26, SD = .97$ ) (see table 4). There was no significant difference between the two types of food for subjects with sensory language use and descriptive language use. More specifically, a one-way analysis of variance (see appendix table 7) showed an insignificant effect of language type on the purchase intention of healthy foods ( $F(2, 90) = 1.94, p = .149, \eta^2 = .04$ ). Another one-way analysis of variance (see appendix table 8) also showed an insignificant effect of language type on the purchase intention of unhealthy foods ( $F(2, 90) = 1.02, p = .364, \eta^2 = .02$ ). To completely answer the research question, these results show, identical to desirability, that the purchase intention of healthy and unhealthy products is not diverged by sensory language. Health-focused language is again the language type with the biggest influence, as it increases the purchase intention for healthy products but decreases it for unhealthy products.

**Table 3.** Results of within-subjects and between-subjects factors of Two-way ANOVA showing interaction of food type and language type on purchase intention, including interaction effect

Source		Df	Mean Square	F	Sig.	Partial Eta Squared
Food type	Sphericity	1	15.91	34.86	<.001	.28
	Assumed					
Language type	Sphericity	2	.04	.03	.98	.001
	Assumed					
Food type * Language type	Sphericity	2	2.63	5.76	.004	.11
	Assumed					
Error (Food type)	Sphericity	90	.46			
	Assumed					
Error (Language type)	Sphericity	90	1.42			
	Assumed					

**Table 4.** Descriptive statistics of Two-way ANOVA testing purchase intention with interaction of food type and language type (1 = negative attitude, 7 = positive attitude)

Food type	Language type	Mean	Std. Deviation	N
Healthy average purchase intention	Sensory	4.90	1.09	30
	Health	5.31	.78	32
	Descriptive	4.95	.80	31
	Total	5.05	.91	93
Unhealthy average purchase intention	Sensory	4.62	1.18	30
	Health	4.26	.97	32
	Descriptive	4.52	.95	31
	Total	4.46	1.04	93

## Discussion

As can be read in the conclusion, the hypotheses were strongly rejected, meaning that the results showed an overall different outcome than was expected based on the literature discussed in the introduction. First of all, Raghunathan et al. (2006) found that health-focused language decreases people's preference and satisfaction. Besides that, people seem to prioritise taste and indulgence over health. The results, however, showed that there was no significant difference between any of the languages at all regarding desirability and purchase intention. This difference in results could be caused by the different measuring points, as Raghunathan et al. (2006) focussed on judgement and choice, whereas this experiment measured desire and purchase intention. Another difference is the number of participants used in the experiments. This study involved significantly fewer participants than Raghunathan et al. (2006), which could have accounted for the difference in effect of language types. Secondly, Speed et al. (2023) concluded that unhealthy products create more mental simulations than healthy ones, causing people to prefer the unhealthy products more. Papies (2013) added to this that both the positive representation and the feeling of reward make the desire for unhealthy food greater than for healthy food. As the results showed, there was a difference in the desirability and purchase intention of healthy and unhealthy products, however in the opposite direction than initially expected. It can therefore be concluded that the assumption and expectation that a strong positive representation and mental simulation lead to a high desirability and purchase intention is incorrect, as healthy products had a higher value for both variables. Lastly, Papies et al. (2020) found that simulation-based food descriptions for vegetarian and plant-based foods increased the attractiveness, however not the desire and purchase intention. Besides that, according to Turnwald et al. (2019) people tend to choose a vegetable dish more often when taste-focused labels are used instead of health-focused or basic labels. They even found that health-focused labels cause the food to be perceived as less tasty than basic labels, causing people to choose it less. The results showed that sensory language, i.e. simulation-based descriptions or taste-focused labels, was only dominant for the influence on the desirability of unhealthy products and that health-focused language was surprisingly the greatest influence on the desirability of healthy products. In fact, health-focused language was the only language that showed a significant difference between the two food types, as it had a higher impact on the desirability and purchase intention of healthy products than unhealthy ones. This difference in results could

have been caused by the difference in products used in the experiments, as the previously mentioned studies only focused on plant-based and meat-based dishes, and not on healthy and unhealthy products in general. Moreover, Turnwald et al. (2019) conducted an experiment by measuring people's purchase intention in a university dining hall instead of through a survey. This might be another possible explanation as to why the findings contradict each other. The outcome does add to the theory of Papies et al. (2020), as it can now be confirmed that manipulating product descriptions of healthy and unhealthy foods in general makes a difference in the desirability of these products, opposite to plant-based and meat-based products.

With regards to the limitations of the experiment, some elements of the method could have had an influence on the results, meaning that the validity is debatable. First of all, the sample size was too small, since only 93 participants took part in the experiment. This might have been the reason there was no effect of language type on both desirability and purchase intention, as language is a broad topic that needs a significantly large group of subjects in order to get valid results. Secondly, there was no equal division of gender for both the pre-test and the main experiment. Previous research has shown that men and women have particular eating behaviours and, therefore, have different attitudes towards food (American Society for Microbiology, 2008). Men tend to eat more meat, carbs and calories, whereas women generally eat more fruits and vegetables. Considering that 63.3% of the participants from the pre-test and 71% of the participants from the experiment were female, the overall outcome of the study may be more representative of a somewhat healthier population and not of Dutch people in general. Furthermore, it is difficult to measure people's attitudes toward food as there will always be personal preferences. Someone might not desire a product simply because they do not like it and not as a consequence of any verbal or visual aspects. It is therefore unclear whether the results can be considered valid, since individual preferences were not taken into account. Also, the participants' dietary restrictions were ultimately not taken into consideration as the data got lost. There seemed to be an error in the functioning of Qualtrics, because the responses were initially registered but not downloaded. Additionally, the terms used in the questions about desire were taken from a previous study (Hornikx, Van Meurs, & Hof, 2013) and translated from English to Dutch. This may have affected the strength of the statements and thus the reliability of the questions, hence the insufficient Cronbach's alpha. Lastly, the statements about purchase intention

could have been better as some participants reported afterwards that they were a bit unclear, especially the difference between “Ik wil zeker weten dit product kopen” (*I definitely want to buy this food product*) and “Ik zou eventueel dit product kopen” (*I would consider buying this food product*). The results also did not show a significant effect. The problem might have been that the participants had difficulties imagining themselves actually buying the products, so the measuring of purchase intention needs to be improved.

A suggestion for future research tackling the previously mentioned limitations of this study could be to adopt a larger sample size to find a more valid effect of language type. Additionally, it would be desirable to recruit an equal amount of men and women to participate in the experiment in order to be able to generalise the results and draw conclusions for the Dutch, or any other, population as a whole. It is also possible to actually focus on this difference in eating habits between men and women and see whether there are distinctions for each gender in the effect of the language use. Another suggestion for future research is to take into consideration the individuals’ personal preferences and diets. This could be done by selecting people on the basis of their allergies, dietary restrictions and product disliking. By ensuring to add products to the experiment that no one is allergic to, cannot eat or does not like, it would be possible to measure the direct effect of language type and food type. However, this would change the selection process from random to selective, which might lower the external validity of the study. Lastly, it would be beneficial to improve the statements regarding desire and purchase intention to increase the Cronbach’s alphas by basing them on previous research preferably conducted in Dutch. Even better would be to find different ways to measure desire and purchase intention. A possibility to measure desire would be through implicit measurements, like salivation or brain activation, rather than attractiveness rating scales. A solution to try to measure consumers’ actual purchase intention would be in a real-life situation by putting the product descriptions on packaging to study consumers’ food ordering or shopping behaviour.

In summary, this research has found insignificant effects of sensory and non-sensory languages on the desirability and purchase intention of products, rejecting hypothesis 1. On the other hand, healthy and unhealthy products did show significant effects on desirability and purchase intention, however opposite to what hypothesis 2 assumed. Additionally, there was a strong interaction effect of the food types and language types on the consumers’ attitudes, providing an answer to the research question. That is to say, health-focused

language was the only language that caused a significant difference between the desirability and purchase intention of healthy and unhealthy products. All in all, this experiment has made it clear what the effect is of sensory and non-sensory language in relation to healthy and unhealthy food on consumers' desirability and purchase intention. An understanding of this fact could contribute to finding ways to make healthy products more desirable in order to encourage people to make healthier food choices and to eventually be able to reduce obesity.

Word count (excl. reference list): 6608

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## Appendix

**Table 5.** Results of One-way ANOVA showing the average effects of healthy products on desirability

	Df	Mean Square	F	Sig.	Partial Eta Squared
Between groups	2	1.79	2.55	.084	.54
Within groups	90	.70			
Total	92				

**Table 6.** Results of One-way ANOVA showing the average effects of unhealthy products on desirability

	Df	Mean Square	F	Sig.	Partial Eta Squared
Between groups	2	1.79	5.26	.007	.11
Within groups	90	.70			
Total	92				

**Table 7.** Results of One-way ANOVA showing the average effects of healthy products on purchase intention

	Df	Mean Square	F	Sig.	Partial Eta Squared
Between groups	2	1.57	1.94	.149	.04
Within groups	90	.81			
Total	92				

**Table 8.** Results of One-way ANOVA showing the average effects of unhealthy products on purchase intention

	Df	Mean Square	F	Sig.	Partial Eta Squared
Between groups	2	1.10	1.02	.364	.02
Within groups	90	1.07			
Total	92				