

**Eating healthy or having a healthy appetite: studying the effects of
language and cultural orientation on desire and food choice for
healthy meals**

Master's thesis

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Abstract

As public health decreases, it becomes more and more important to find a way to increase the appeal for healthy foods. In order to achieve this goal, the present study focuses on language (sensory and health-focused) as a means to stimulate desire and purchase intention for healthy meals. In addition, this study takes culturally determined goal orientations into account and hypothesizes that cultures with a long-term orientation will be more so influenced by language that emphasizes health aspects in order to live a long and healthy life, whereas short-term oriented cultures will be more so influenced by language that is sensory and thus provides immediate gratification. In an online survey, Dutch participants (operationalized as having a short-term, more sensory orientation) and German participants (operationalized as having a long-term, health-focused orientation) assessed meals described by sensory, health-focused and neutral language. Contrary to prior studies, findings of this study present no evidence for the effects of language on desire and purchase intention. In addition, there was no effect of goal orientations on the influence of sensory and healthy language. Thus, this study concludes that while the effects of sensory language and health focused language may occur sometimes, they do not occur at all times. More psycholinguistic research into pinpointing exactly how language can increase appeal is needed.

Introduction

The idea that language shapes thought and therefore how we perceive the world around us is not a new concept (Wolff & Holmes, 2011). Following this notion, language may also have the ability to influence the way we think about food. Chances are, a description like ‘an apple that is sweet and crisp’ sounds more appealing to most than a description like ‘an apple that is high in fiber and vitamins’. However, whether this is actually the case remains a topic of interest.

As public health struggles with diseases caused by poor nutrition (World Health Organization, 2021), it seems most necessary to help consumers in making the right choices related to food. Therefore, to know how our choices are affected by language is to know how to support consumers in making healthier decisions. By changing the language that is used on food labels or in advertising, marketers might have the power to increase the appeal of healthier food options. As healthier food options are often expected to be less tasty (Raghunathan et al., 2006) and consumers that are less health-focused may therefore be more inclined to choose the more unhealthy food options, it seems imperative to know if and how healthier options can be

made more appealing through language. The present study will therefore investigate which type of language has the most power to increase appeal for healthier food options.

In addition to investigating the type of language that is most effective in eliciting desire, this study is focused on the possible influence of cultural orientations on language effectiveness and food choice. As research suggests that motives for food choice differ cross-culturally (Januszczyk et al., 2011; Prescott et al., 2002; Eertmans et al., 2006), besides adding to the existing framework on the relation between language and food, this study aims to offer new insights in the ways cultural orientations may influence the effectiveness of different kinds of language as well.

In sum, this study aims to investigate whether the type of language used to describe foods (sensory or health-focused) will increase the appeal of healthier food options and whether the type of language that is most effective is dependent on culturally determined goal orientation (short-term or long-term).

Grounded-cognition theory of desire

A theory that proves important in exploring how creating appeal for a food transpires is the grounded-cognition theory of desire. In the domain of grounded cognition, research suggests that our knowledge of concepts is shaped by simulations of earlier experiences (Papies, 2013; Barsalou, 2008; Barsalou, 2009). Each interaction we have with a concept or object lays down a situated memory which can be triggered by a cue, after which our earlier representation of the concept is simulated (or partially 'reenacted') (Papies, Barsalou, et al., 2020). This is due to the fact that when we think about an object, we activate similar brain areas when processing the object perceptually as we would when actually using the object (Papies, 2013; Pulvermüller & Fadiga, 2010). Because of this, we are able to behave in a goal-directed way based on previous experiences (Papies, Barsalou, et al., 2020). In line with this, the grounded-cognition theory of desire is a theory that is more specifically applied to food. This theory posits that consumption and reward simulations (that are based on earlier consumption experiences) can be triggered by appetitive cues. These simulations are, in turn, able to motivate desire for food (Papies, Barsalou, et al., 2020). An example to illustrate this theory is often done by having readers imagine passing by a coffeeshop. When passing by, the sight of the shop and the smells coming out the door will make you think about a nice cup of coffee: replenishing your energy, waking up your foggy brain. The smell of roasted coffee beans makes you think about the rich taste of the perfect espresso. You might just walk inside and order one. This example shows how appetitive cues can have immediate effects on our behavior through mental simulations.

To improve public health, it is therefore important to understand the role of sensory simulation in our mental representation of food (Speed et al., 2021) – when we know how to create desire, we might also be able to create desire for the right products.

However, desire might be more easily created for foods that are deemed unhealthier. Earlier research shows that attractive foods, foods that are high in calories that mostly come from sugar and fats, are more likely to initiate eating simulations than healthier foods (Papies, 2013; Pinel et al., 2000). This has an evolutionary cause, in that humans have evolved to share a liking for such food items: we are believed to not be driven to eat by declines in energy resources, but rather by the anticipated pleasure of eating (Pinel et al., 2000). We therefore seek out the food that we find most palatable, or, in other words, the food we find more attractive and that is thus often more unhealthy. This “unhealthy = tasty” intuition has shown to mediate a lower consumption of fruits and vegetables, and a greater strength in this belief is associated with a higher BMI (Raghunathan et al., 2006; Briers et al., 2020). However, research by Speed et al. (2021) suggests that this notion should perhaps be characterized as “unhealthy = strongly sensory”, as unhealthy food is seen as more attractive because it is more strongly associated with sensory experience. Together, these findings indicate that appetitive cues can trigger eating simulations which can cause desire, and that unhealthy food options are more likely to initiate eating simulations than healthier food options because of their stronger association to sensory experiences. Based on this, the question arises whether this process could also be used to increase the appeal of healthier foods.

Eating simulations can be induced in multiple ways: by showing pictures of a food (Papies, 2013), by instructing participants to think about eating certain foods (Muñoz-Vilches et al., 2019), but also through language. Prior studies have investigated types of language that have the most power to create eating simulations.

Food and language

Initial findings by Turnwald and Crum (2019) suggest that language can indeed create appeal for healthier food options. Studying vegetable dishes in dining settings, the researchers concentrated on taste-focused labels (“mouthwatering grilled vegetable wrap”) and health-focused labels (“healthy choice vegetable wrap”) and found that taste-focused labels increased product choice and appeared tastier. In the same vein, Turnwald et al. (2017) found the same to be true for restaurants’ descriptions of meals. While these studies did not measure eating simulations, their findings are still in line with the possibility that increasing eating simulations through language on labels increases desire even for healthy foods (Papies, Johannes, et al.,

2020). However, from a linguistic point of view these findings seem ambiguous. ‘Taste-focused’ language is a relatively broad term: the precise aspects of this language that make it effective in creating appeal are still up for debate.

A study by Papies, Johannes, et al. (2020) was more specifically focused on different kinds of language and took into account the power of eating simulations. In this study, the researchers focused on simulation-based food descriptions to describe plant-based foods (which they framed as the healthier option) and meat-based foods (which they framed as the less healthy option). Simulation-based descriptions were made by combining different kinds of words: sensory (referring to taste, flavor and texture, like ‘sweet’ or ‘crisp’), context words (referring to contextual features like the setting (‘pub’) or positive consequences (‘satisfying’)) and hedonic words (referring to the pleasure of eating something, like ‘delicious’ or ‘tasty’). The researchers hypothesized that these simulation-based descriptions would increase the appeal of both the healthier and the more unhealthy products through the grounded-cognition theory of desire. To assess if eating simulations actually occurred, participants were asked whether they were imagining what the food would taste and feel like when presented with a food description. Results showed that simulation-based descriptions indeed caused an increase in the appeal of both healthier and unhealthy foods, and that this increase was mediated by eating simulations (Papies, Johannes, et al., 2020).

While these studies suggest that creating eating simulations through language can also be done for healthier foods, the type of language that is most effective in doing so remains unclear. As sensory language is the type of language that most directly refers to eating, it seems plausible that this might be the type of language most able to do this. The study by Papies, Johannes, et al. (2020) partially confirms this, but because this study did not look at effects of sensory, context and hedonic words apart from each other, it is difficult to pinpoint the exact effects of sensory language alone. Moreover, while this particular study did control for linguistic features such as description length, many other similar studies (see for example Turnwald, 2017; Turnwald & Crum, 2019) did not. Thus, a psycholinguistic analysis of what language is most effective in creating eating simulations and, therefore, most effective in creating appeal is needed.

Cultural (goal) orientations

In addition to language, there are other factors that may influence eating simulations. Eating simulations created by sensory language may make certain foods more appealing to some consumers, but this might not be the case for others. In fact, earlier research suggests that the

degree to which eating simulations occur may depend on individuals' goals with regard to eating (Papies, 2013). The type of language that is most effective in creating appeal may therefore depend on an individuals' goal orientation: whether someone is more interested in immediate, short-term gratification or whether they are working towards long-term goals. It thus seems important to pinpoint this orientation for consumers in order to pair consumers with the right type of language. However, as of yet, it is unclear how exactly we should determine this orientation for consumers.

According to Hofstede and Minkov (2010), these orientations are determined through culture. They state that there are two cultural orientations: long-term and short-term. In long-term oriented cultures, individuals learn to not expect immediate gratification of their desires, but to strive towards their goal of living a long and healthy life. In contrast, in short-term oriented cultures, individuals are said to have a need for immediate gratification and are thus more focused on fulfilling short-term goals (Hofstede & Minkov, 2010).

Hofstede's approach to culture nowadays is subject to criticism, as it is often deemed limited and outdated (Baskerville, 2003). However, the idea that goal orientation may be determined by culture is still present in research today. A multitude of studies have investigated motives for food choice cross-culturally, and found that such motives were strongly linked to nationality (see for example Prescott et al., 2002; Eertmans et al., 2006). For instance, for consumers from Belgium, Hungary and Romania, factors like sensory appeal, health, convenience and price are the most important in shaping food choice (Januszewska et al., 2011). Many Asian consumers, in turn, are found to pay less attention to sensory appeal (Januszewska et al., 2011; Prescott et al., 2002). Moreover, the unhealthy = tasty belief does not seem to hold up cross-culturally. In France, the opposite seems true: healthy is tasty, and unhealthy is considered bad taste (Werle et al., 2013). In a French sample, neutral foods described as healthy were considered tastier, more pleasurable and of better quality than when they were described as unhealthy (Werle et al., 2013). These findings imply that we cannot just apply a one-size-fits-all language strategy to all cultures.

A study that investigated the effect of goal orientations on the evaluations of food products is the study by Muñoz-Vilches et al. (2019). They investigated whether a short-term versus a long-term goal orientation impacted consumers' evaluations of vice (unhealthy) and virtue (healthy) products. They operationalized participants with a short-term perspective as more interested in sensory appeal and participants with a long-term perspective as more interested in health-related motives. Findings of their study indicated that this pattern was indeed confirmed. In addition, health orientation was shown to moderate the effect of mental

simulation on wanting and choice (Muñoz-Vilches et al., 2019). However, the study by Muñoz-Vilches et al. (2019) was centered around mental instruction, meaning that participants were instructed to think about what it would be like to eat a certain product, and was therefore not focused on the effects of language. Moreover, this study focused on goal orientations by individuals as opposed to the general orientation of different cultures as a whole. Expanding this field of research, the present study will therefore investigate whether the type of language that is most effective in creating desire for healthy foods is dependent on culturally determined goal orientations.

In this study, the effects of sensory and health-focused language on two cultures were measured. Neutral language was included as a third language type to control for the effects of sensory and healthy language. The cultures that are compared in this study are the Dutch culture (which is operationalized as having a short-term orientation) and the German culture (which is operationalized as having a long-term orientation). For cultures with a short-term (goal) orientation, it is hypothesized that the language that would work best in creating desire is sensory language. This type of language works, through eating simulations, towards goal-directed behavior and thus immediate wanting. From this, the following hypothesis is posed:

1. Dutch participants (with a short-term orientation) will be more likely to desire and purchase foods that are described by using sensory language as opposed to health-focused or neutral language.

In addition, for cultures with a long-term (goal) orientation, it is hypothesized that health-focused language would be more effective in creating desire. Individuals not interested in immediate gratification but in striving to reach long-term goals and reaching an old age may be most affected by language that compliments this. Therefore, a second hypothesis is posed:

2. German participants (with a long-term orientation) will be more likely to desire and purchase foods that are described by using health-focused language as opposed to sensory language or neutral language.

By assessing these two hypotheses, this study aims to answer the question whether there is a language type that is most effective in creating appeal and whether this type of language depends on culturally determined goal orientations.

Method

In an online experiment, German and Dutch participants rated descriptions of healthy foods on desire and purchase intention. Food descriptions were written using either sensory words, health-focused words or neutral words.

Materials

All participants rated descriptions of six healthy, vegetarian meals: a vegetarian burger, cheese salad, a vegetable wrap, spaghetti with mushroom sauce, a vegetable quiche and a burrito bowl. Differences in descriptions will be made by changing adjectives, as was done in the study by Turnwald et al. (2017). For each description, one adjective was placed at the beginning of each sentence to ensure no differences in placement throughout and to make sure the adjective was the first word of each description the participants read. Adjectives were selected from the database by Speed and Brysbaert (2021). In this database, Dutch words were rated on sensory modalities, for which 0 was the lowest possible rating and 5 the highest. Sensory words were selected when their rating on taste fell between 3.5 and 5 and were not instantly negative or off-putting ('crispy'/'knapperig' instead of 'spoiled'/'bedorven'). Health-focused words were based on the study by Papiés et al. (2020) and were selected when their rating on taste fell between 0 and 2.5 in the database. Neutral words were selected directly from the database and were selected when their rating fell between 0 and 2.5 on taste. The final set of words that was selected was the following:

Sensory: knapperig (crispy), kruidig (spiced/aromatic), pikant (spicy), sappig (juicy), smeuig (creamy), zoetzuur (sweet-and-sour)

Health-focused: ijzer (iron), voedingsstof (nutrient), vezel (fiber), vitamine (vitamin), gezond (healthy), voedzaam (nutritious)

Neutral: klassiek (classic), karakteristiek (characteristic), kenmerkend (distinct), rustiek (rustic), simpel (simple), standaard (standard)

An independent samples t-test showed a significant difference on taste-ratings between the sensory and neutral words ($t(5.75) = 19.49, p = .018$). Neutral words were significantly less associated with taste ($M = .11, SD = .14$) than sensory words ($M = 4.43, SD = .52$). There was no significant difference on taste-ratings between sensory words and health-focused words ($t(8.14) = 6.93, p = .173$). However, as the health-focused words refer to (healthy aspects of)

foods and are therefore inherently related to taste, this was deemed unavoidable. In addition, as the health-focused words did not describe the sensory experience of eating, this was not considered a potential problem.

Whereas in the study by Turnwald et al. (2017) descriptions were not controlled on length, descriptions in this study were controlled on comparable lengths (no differences of more than two words). Moreover, pictures, brand names or packaging materials were not used as they might influence representations of the meals (Papies, 2013; Huang & Lu, 2016).

All Dutch adjectives were translated to German via the back translation method. The final descriptions are displayed in Appendix A.

Participants

Based on scores on the Long Term Orientation (LTO) dimension by Hofstede, participants were Dutch and therefore categorized as having a short-term orientation (score of 67 out of 100) or German and categorized as having a long-term orientation (score of 83 out of 100) (Hofstede Insights, n.d.). After controlling for non-response, consent, age (above 16), nationality (only Dutch and German) and food allergies (no participants with food allergies), 41% of the original sample were removed, so the final sample size was $N = 141$. Of these participants, 92 (65.2%) were Dutch and 49 (34.8%) were German. The mean age of all participants was 34 ($SD = 14.68$, range 17-69) and 56.4% of all respondents were female (3 respondents (2%) identified as non-binary, 2 (1.4%) preferred not to disclose their gender). An independent samples t-test showed a significant difference in age between Dutch and German participants ($t(135.63) = 3.47, p < .001$). Dutch participants were significantly older ($M = 37.00, SD = 16.36$) than German participants ($M = 29.46, SD = 9.16$). In addition, a chi-square test showed no significant relation between gender and nationality ($\chi^2(3) = 5.27, p = .153$). Gender was distributed equally between the two nationalities.

Design

This study had a 3 within-subjects (sensory/healthy/neutral descriptions) x 2 between-subjects (Dutch vs German) mixed design. The independent variables were food descriptions and nationality. The dependent variables were desire and purchase intention. The neutral descriptions were added as a control variable.

Instrumentation

Orientation perspective

To check whether there was a difference in orientation between German and Dutch participants, the Food Choice Questionnaire (FCQ) by Steptoe et al. (1995) was used. This questionnaire was developed to investigate motives for food choice. Although the questionnaire originally contains nine dimensions (health, mood, convenience, sensory appeal, natural content, price, familiarity and ethical concern), only two dimensions were used. Based on Muñoz-Vilches et al. (2019), the health motive was used to measure long-term time orientation, whereas the sensory appeal was used to measure short-term time orientation.

The health/long-term motive was introduced by the statement “it is important to me that the food I eat on a typical day...” and was measured with six items: “contains a lot of vitamins and minerals”, “keeps me healthy”, “is nutritious”, “is high in protein”, “is good for my skin, teeth, hair, nails, etc.” and “is high in fiber” ($\alpha = .84$). The sensory/short-term motive was introduced by the statement “it is important to me that the food I eat on a typical day...” and measured by four items “smells nice”, “looks nice”, “has a pleasant texture” and “tastes good” ($\alpha = .75$). All scales were rated on a scale of 0-100 based on Muñoz-Vilches et al. (2019), anchored by “not at all – very much”.

Dependent variables: desire and purchase intention

In this study, desire was defined as the desire to eat the presented meal at that point in time and was measured by statements based on Muñoz-Vilches et al. (2020), Burger et al. (2011) and Papiés et al. (2020). Desire was measured by the statements ‘How much would you want to eat this meal right now?’, ‘How much do you desire to eat this meal?’ and ‘How appealing does this meal sound to you right now?’ which were rated on 7-point Likert scales anchored by ‘not at all - very much’ ($\alpha = .81$).

In addition, purchase intention was defined as the likeliness of buying the described meals and was measured by statements based on Papiés et al. (2022), Láyva-Hernandez et al. (2021) and Teng and Wang (2015). Purchase intention was measured by the statements ‘I am very likely to buy this meal’, ‘I would recommend buying this meal to my acquaintances’ and ‘If this meal was available in the shops, I would buy it’, which were rated on 7-point Likert scales anchored by ‘not at all - very much’ ($\alpha = .73$).

Background variables

Background variables in this study were dietary restrictions (including allergies, intolerances and dietary preferences) and hunger level. These factors were taken into account as they were potentially able to influence evaluations. For instance, someone that is hungry when

participating might score higher on desire than when they are not. Similarly, as Papiés, Johannes, et al. (2020) found that meat-based foods elicited more desire for participants that frequently eat meat, in the same vein, vegetarians could potentially desire vegetarian dishes more than frequent meat-eaters.

Hunger level was measured on 7-point Likert scales based on Hill et al. (1984) and Fay et al. (2015) by the following questions: ‘How strong is your desire to eat?’ (anchored by ‘very strong – very weak’), ‘How hungry do you feel?’ (‘very hungry – not at all hungry’), ‘How full do you feel?’ (‘Very full – not at all full’) and ‘How much food do you think you could eat?’ (‘A large amount – nothing at all’) ($\alpha = .71$).

Dietary restrictions were measured by the statements ‘Currently, I am following a diet (to lose weight)’ based on Verhoeven et al. (2015) and ‘I am allergic to one (or more) ingredients’ and could be answered by either yes or no. In addition, to measure dietary preferences, participants were asked to indicate the type of diet they maintained: vegan, vegetarian, flexitarian, pescetarian, lacto-ovo-vegetarian, lacto-vegetarian diet, a diet different from the ones mentioned or none at all (omnivorous).

Procedure

The experiment took place via an online questionnaire administered in Qualtrics. Participants were recruited via social media (Facebook and Reddit). The questionnaire started with an instruction page informing the participants of the aim of the study. In addition, the instruction page informed participants about what happens to their data when participating in the study (all data will be removed afterwards) and asked for consent. Participants were first asked to choose their country of origin, after which the survey continued in the participants’ native language. All questions were translated from English to German and Dutch via the back translation method.

Questions to measure a participants’ current hunger level were asked first, after which participants were asked to rate different food descriptions. Every participant got presented with every food, but for each meal rated only one type of description. The order in which the descriptions were presented was randomized. After rating the descriptions, participants were asked to rate statements that measured their orientation, dietary preferences and demographic characteristics. Each participant was required to fill out the survey individually and anonymously and needed to complete the whole questionnaire. The average time it took to complete the survey was 8 minutes ($SD = 14.41$).

Statistical treatment

To test whether the two cultures actually differed on goal orientation, independent samples t-tests were conducted. In addition, to investigate the effects of food descriptions (sensory vs healthy vs neutral) and nationality/goal orientation (German/long-term vs Dutch/short-term) on desire and purchase intention, two-way mixed ANOVAS were conducted. The background variables (dietary restrictions and hunger level) were made into categorical variables. Their possible influences on desire and purchase intention were measured in separate two-way mixed ANOVAs. Any significant effects were followed up with separate independent samples t-tests.

Results

Tests were first done to check the assumption that the Dutch sample ($N = 92$) had a more short-term orientation and whether the German sample ($N = 49$) had a more long-term orientation. An independent samples t-test showed no difference in short-term orientation between Dutch and German participants ($t(100.89) = 1.49, p = .566$). Out of 100, the Dutch scored on average 76.45 ($SD = 15.83$) on sensory/short-term attributes, whereas the Germans rated short-term/sensory attributes as 72.38 ($SD = 15.32$) on the scale. In addition, an independent samples t-test showed no significant difference in long-term orientation between Dutch and German participants ($t(84.54) = 4.51, p = .145$). Health aspects/long-term attributes were generally rated to be of somewhat lower importance: German participants rated health aspects as 51.42 ($SD = 19.94$) on the scale, whereas Dutch participants rated them as 66.49 ($SD = 16.74$) out of 100.

As there were no significant differences on a cultural level, a split on orientation was made on an individual level instead of by nationality. A new variable was created by subtracting the mean scores on long-term orientation from the mean scores on short-term orientation, after which the data was split based on the median score on this variable (13.5). As a result, 71 participants were categorized as having a healthy-/long-term orientation (76% Dutch), and 70 participants were categorized as having a sensory-/short-term orientation (54% Dutch).

Main variables

To investigate whether the different description types and orientations influenced desire and purchase intention, mixed ANOVAs were performed.

Desire

A mixed ANOVA for desire with description types as within-subjects factor and orientation as between-subjects factor showed no main effect of description type ($F(2, 278) = .55, p = .578, \eta_p^2 = .004$), no main effect of time orientation ($F(1, 139) = .76, p = .384, \eta_p^2 = .005$) and no interaction between description type and time orientation ($F(2, 278) = .12, p = .890, \eta_p^2 = .001$). The language that was used to describe the meals (sensory, healthy and neutral) as well as individual differences in orientation (healthy/long-term, sensory/short-term) did not have an effect on desire for the described meals. Results are displayed in Table 1.

Purchase intention

A mixed ANOVA for purchase intention with description types as within-subjects factor and orientation as between-subjects factor showed no main effect of description type ($F(2, 278) = .18, p = .835, \eta_p^2 = .001$), no main effect of time orientation ($F(1, 139) = .43, p = .511, \eta_p^2 = .003$) and no interaction effect between description type and time orientation ($F(2, 278) = .23, p = .796, \eta_p^2 = .002$). The kind of language used for each description as well as an individuals' time orientation did not have an effect on purchase intention of the meals that were described (Table 1).

Table 1. Means and standard deviations of goal orientation (health orientation and sensory orientation) per description type on desire and purchase intention (1 = lowest, 7 = highest)

	sensory		healthy		neutral	
	<i>N</i> = 71		<i>N</i> = 71		<i>N</i> = 71	
	M (<i>SD</i>)	<i>n</i>	M (<i>SD</i>)	<i>n</i>	M (<i>SD</i>)	<i>n</i>
<i>Desire</i>						
Health orientation	3.24 (1.45)	71	3.36 (1.51)	71	3.32 (1.54)	71
Sensory orientation	3.42 (1.52)	70	3.50 (1.54)	70	3.57 (1.56)	70
Total	3.33 (1.48)	141	3.42 (1.52)	141	3.44 (1.55)	141
<i>Purchase intention</i>						
Health orientation	3.35 (1.49)	71	3.34 (1.43)	71	3.35 (1.46)	71
Sensory orientation	3.39 (1.35)	70	3.55 (1.35)	70	3.47 (1.37)	70
Total	3.37 (1.42)	141	3.44 (1.39)	141	3.41 (1.42)	141

Background variables

Hunger level

To test whether the hunger level of participants influenced an individuals' desire and purchase intention, hunger was made into a categorical variable based on the median score of the scale. Participants with scores of 3.5 or lower were categorized as not hungry; participants with scores greater than 3.5 were categorized as hungry. Based on this, 76 participants (53.9%) were categorized as not hungry at the time of taking the survey, and 65 participants (46.1%) were categorized as hungry.

A mixed ANOVA for desire with description types as within-subjects factor and hunger level as between-subjects factor showed a significant main effect of hunger level ($F(1, 139) = 50.37, p < .001, \eta_p^2 = .266$). Participants that were hungry at the time of taking the survey scored higher on desire ($M = 4.12, SD = .14$) than participants that were not ($M = 2.78, SD = .13$). There was no main effect of description type ($F(2, 278) = .58, p = .561, \eta_p^2 = .004$) and no interaction effect between description type and hunger level ($F(2, 278) = .11, p = .899, \eta_p^2 = .001$). The language that was used to describe the meals did not elicit differences in desire depending on the hunger level of participants. Similarly, a mixed ANOVA for purchase intention with description types as within-subjects factor and hunger level as between-subjects factor showed a significant main effect of hunger level ($F(1, 139) = 12.08, p < .001, \eta_p^2 = .080$). Participants that were hungry at the time of taking the survey scored higher on purchase intention ($M = 3.75, SD = .14$) than participants who were not ($M = 3.11, SD = .13$). There was no main effect of description type ($F(2, 278) = .18, p = .834, \eta_p^2 = .001$) and no interaction effect between description type and hunger level ($F(2, 278) = .66, p = .518, \eta_p^2 = .005$). The different kinds of language that were used to describe the meals did not influence an individuals' purchase intention depending on the hunger level of participants. All results (means and standard deviations) for the background variable hunger level are displayed in Table 2.

Table 2. Means and standard deviations of hunger level (hungry and not hungry) per description type on desire and purchase intention (1 = lowest, 7 = highest)

	sensory		healthy		neutral		total
	M (SD)	<i>n</i>	M (SD)	<i>n</i>	M (SD)	<i>n</i>	
<i>Desire</i>							
Hungry	4.02 (1.35)	65	4.15 (1.44)	65	4.19 (1.34)	65	4.12 (.14)
Not hungry	2.74 (1.34)	76	2.81 (1.32)	76	2.80 (1.43)	76	2.78 (.13)
Total	3.33 (1.48)	141	3.43 (1.52)	141	3.44 (1.55)	141	-
<i>Purchase intention</i>							
Hungry	3.67 (1.45)	65	3.74 (1.28)	65	3.84 (1.35)	65	3.75 (.14)
Not hungry	3.11 (1.35)	76	3.19 (1.43)	76	3.04 (1.38)	76	3.11 (.13)
Total	3.37 (1.42)	141	3.44 (1.39)	141	3.41 (1.42)	141	-

Dietary preferences

Finally, it was investigated whether dietary restrictions and dietary preferences influenced desire and purchase intention. When measuring dietary restrictions, 11.4% of all participants indicated to currently be on a diet. Since only a small portion of participants reported being on a diet, it was chosen to not further analyze this as a factor.

Dietary preferences was made into a categorical variable categorizing participants as either maintaining a vegan or vegetarian diet, a flexitarian diet or an omnivorous diet. Participants that indicated to maintain any other type of diet were not included in this analysis (5 participants in total). Of all participants, 18.4% were vegan or vegetarian, 45.4% were flexitarian and 32.6% were omnivorous. A mixed ANOVA for desire with description types as within-subjects factor and dietary preferences as between-subjects factor showed no main effect of description type ($F(2, 266) = .45, p = .640, \eta_p^2 = .003$), no main effect of dietary preferences ($F(2, 133) = 1.60, p = .205, \eta_p^2 = .024$) and no interaction effect between description type and dietary preferences ($F(4, 266) = .32, p = .864, \eta_p^2 = .005$). The type of diet someone maintained did not influence desire for the described meals, nor did the kind of language that was used to describe the meals and the type of diet individuals maintained have any effect on each other.

A mixed ANOVA for purchase intention with description types as within-subjects factor and dietary preferences as a between-subjects factor showed a significant main effect of dietary preferences ($F(2, 133) = 3.16, p = .046, \eta_p^2 = .045$). However, when following up on this effect, independent samples t-tests showed no difference between vegetarians or vegans and flexitarians ($t(41.36) = .92, p = .786$), no difference between vegetarians or vegans and meat-eaters ($t(46.50) = 2.23, p = .851$) and no difference between flexitarians and meat-eaters ($t(95.04) = 1.88, p = .923$). An individual's dietary preference did not influence purchase intention. There was no main effect of description type ($F(2, 266) = .48, p = .619, \eta_p^2 = .004$) and no interaction between description type and dietary preference ($F(2, 266) = .48, p = .747, \eta_p^2 = .007$). An individual's dietary preference did not influence effectiveness of the kind of language that was used to describe the meals. All results of the background variable dietary preferences (means and standard deviations) are displayed in Table 3.

Table 3. Means and standard deviations of dietary preferences (vegan/vegetarians, flexitarians and meat-eaters) per description type on desire and purchase intention (1 = lowest, 7 = highest)

	sensory		healthy		neutral		total
	M (SD)	n	M (SD)	n	M (SD)	n	
<i>Desire</i>							
Vegan/vegetarians	3.32 (1.44)	26	3.55 (1.75)	26	3.61 (1.75)	26	3.49 (.25)
Flexitarians	3.50 (1.55)	64	3.48 (1.35)	64	3.48 (1.40)	64	3.48 (.14)
Meat-eaters	3.03 (1.36)	46	3.14 (1.35)	46	3.05 (1.41)	46	3.07 (.19)
Total	3.31 (1.47)	136	3.38 (1.51)	136	3.36 (1.48)	136	-
<i>Purchase intention</i>							
Vegan/vegetarians	3.49 (1.41)	26	3.81 (1.55)	26	3.72 (1.54)	26	3.67 (.21)
Flexitarians	3.48 (1.38)	64	3.46 (1.37)	64	3.35 (1.24)	64	3.43 (.14)
Meat-eaters	2.97 (1.37)	46	3.07 (1.24)	46	3.11 (1.42)	46	3.05 (.16)
Total	3.31 (1.39)	136	3.39 (1.38)	136	3.34 (1.37)	136	-

General discussion

The aim of this study was to investigate what type of language would be most successful in creating desire and purchase intention for healthy meals. In addition, it was investigated whether motives for food choice differed depending on culturally determined goal orientations and whether the language that was most effective in creating appeal for consumers depended on these orientations.

The main finding of this study was that there was no effect of language on desire and purchase intention: sensory language did not increase appeal for healthy meals. These findings are highly inconsistent with previous findings by Turnwald and Crum (2019), Turnwald et al. (2017), Speed et al. (2021) and Papies, Johannes, et al (2020), who found that sensory, eating simulation-inducing language increased appeal more than other types of language. There are several possibilities as to why findings of the present study are not congruent with literature.

First off, possibly, the grounded-cognition theory of desire (Papies, Barsalou, et al., 2020) was not at play in this study. Where in the research by Turnwald and Crum (2019), Turnwald et al. (2017), and Papies, Johannes, et al. (2020), two adjectives per description type were used, the present study used only one. It could therefore be that using only one adjective per description sentence was not powerful enough to actually be an appetitive cue and, following this, that eating simulations were not induced. This would mean that there was no creation of immediate wanting and, in turn, no increase in the appeal of healthy foods. However, this also implies that there might be a certain threshold before the grounded-cognition theory of desire is triggered, and that using one adjective may not pass this threshold. For future research, it is therefore recommended to experiment with different numbers of sensory adjectives in order to pinpoint when exactly eating simulations are induced. In addition, like in the study by Papies, Johannes, et al. (2020), it is recommended to have participants rate to what extent eating simulations actually occurred. In this way, clearer conclusions on the effects of eating simulations through (sensory) language can be drawn.

Next to using one adjective, other linguistic aspects may also have caused findings of this study to differ from previous studies. Stimuli in this study were successfully controlled on description length, while in the studies by Turnwald et al. (2017) and Turnwald and Crum (2019) they were not. However, Papies, Johannes, et al. (2020) did control for description length and found an effect of sensory language on desire nonetheless. Therefore, results on description length remain inconclusive. While longer descriptions offer the opportunity for a greater number of words to include appealing language, longer descriptions can also cause readers to

pay less attention. The opposite may be true for shorter descriptions. It is thus not yet clear how description length influences appeal. Based on this, future studies could perhaps focus on the effects of different description lengths on the creation of desire.

In addition, in this study, there was no difference in taste-modality ratings between sensory language and health-focused language. While this study aimed to distinguish the effects between specific types of language, this might therefore not have been successful. Moreover, the taste-modality ratings that were used in this study were only measured in Dutch and not in German. It is possible that for the German sample, modality ratings were lower when translating the Dutch words to German, possibly causing less of an effect than there would have been had the ratings been checked in German. Together, these aspects might have made it harder for participants to experience differences between sensory and health-focused language and can thus have undermined the effect of both types of languages.

Another possibility that might explain the current findings is the importance of linguistic context. Speed et al. (2021) found that mental simulation differs by linguistic context, meaning that word ratings can differ depending on the composition of the word set to be rated. It is difficult to pinpoint if, or to what extent, linguistic context played a role in this study. Possibly, ratings on desire and purchase intention would have been different had the stimuli material been composed differently. However, would this be true, this would mean that the workings of sensory language alone could be weak and could be greatly dependent on context. Furthermore, Speed et al. (2021) also found that explicit mental instruction heightened sensory simulation. Explicit mental instruction was also used in the study by Muñoz-Vilches et al. (2019), but was not used in the present study. This possibly explains the absence of an effect of language in creating appeal through eating simulations in the present study. Moreover, this again suggests that the effects of sensory language alone could be feeble and perhaps not as strong as they would be in combination with other aspects. Perhaps, in marketing strategies, it would therefore be wise to combine sensory language with explicit mental instruction to most effectively trigger food appeal through the grounded-cognition theory of desire.

A last explanation for why this finding of the present study differs from past findings is that in other studies, a different combination of types of languages was used. For example, in the studies by Turnwald et al. (2017) and Turnwald and Crum (2019), taste-focused language was investigated, whereas in the study by Papies, Johannes, et al. (2020) the effects of sensory versus neutral versus hedonic language were investigated. This makes it difficult to compare the effects of different language types to results of the current study.

In addition to investigating the effects of sensory language, this study investigated whether goal orientations would influence the type of language that would be most successful in creating appeal. Results of this study suggest that individual goal orientations did not influence the effects of language. Participants categorized as having a short-term and therefore more sensory orientation were not more influenced by sensory language as opposed to healthy or neutral language. Similarly, participants with a long-term and more health-focused orientation were not more influenced by health-focused language. These findings are inconsistent with findings by Papiés (2013), Speed et al. (2021) and Muñoz-Vilches et al. (2019), who found that the type of language that was most effective in creating appeal for foods depended on individuals' goal orientations. There are some possible explanations for the differing results of the present study.

First, as previously mentioned, if the appetitive cues in this study were not strong enough, eating simulations were not induced. For short-term oriented participants, this could therefore be an explanation for why they were not influenced by sensory language: their need for the immediate gratification a tasty meal offers was not triggered, because the sensory language in this study was not strong enough to be an appetitive cue. For health-oriented individuals, while Papiés (2013) stated that the degree to which eating simulations occur may depend on an individuals' goals, with health-focused language, it may just be harder to induce eating simulations overall. Perhaps, even when being completely health-focused, you would still need at least *some* appeal of taste. However, there may also be something else going on. Results of this study show that many participants scored high on not just one orientation, but on both orientations at the same time (the average score for the health-focused, long-term orientation was 61 out of 100, whereas the average score for the sensory, long-term orientation was 75 out of 100). This raises the question whether someone can truly only adhere to just one type of orientation. Maybe, goal orientations can be situational. Logically, this makes sense: it seems plausible that we can be interested in the immediate gratification a tasty meal offers, while at the same time think it important to maintain a healthy lifestyle. If this is true, it suggests that even when prioritizing health, individuals could (perhaps equally) be interested in sensory aspects. A meal that is described as healthy alone might therefore not be appealing enough when there is no sensory appeal at all. While the study by Muñoz-Vilches et al. (2019) categorized participants in a similar way, it was not clear from their study whether participants scored high on both orientations as well. Possibly, in their study, a similar pattern was found.

Where there were no effects of language, an individuals' hunger level did influence desire and purchase intention. Participants who were hungry generally scored higher on desire and purchase intention than those who were not. While this may be expected, it also implies that

when a consumer is hungry, the type of language that is used to describe healthy foods may not matter that much.

In addition, vegans and vegetarians, flexitarians and frequent meat-eaters scored equally high on desire and purchase intention. This is not in line with findings by Papies et al. (2020), who found that meat-eaters scored higher on desire for meals that contained meat as opposed to meals that were vegetarian. In line with this finding, it would have been expected that in the present study, seeing as all described meals were vegetarian, vegans or vegetarians would score higher on desire and purchase intention than meat-eaters would. Possibly, the general liking of the described meals played a part in this: if participants disliked (ingredients of) the described meals, naturally, their appeal would increase. For future research, it is therefore recommended to include general liking in order to disentangle the effects of general liking on the appeal of foods.

The last finding of this study was that there was no difference in short-term versus long-term orientation between the German and Dutch cultures. The German sample did not lean towards being more long-term oriented and the Dutch sample did not lean towards being more short-term oriented. This finding is not in line with earlier findings by Hofstede's (n.d.) cultural values amounting to a difference in orientation between Germany and the Netherlands. The contrasting findings of this present study could perhaps be explained by the high scores of participants on both value orientations, making it harder to categorize participants into one specific orientation. In addition, however, there might be something to be said for Baskerville's (2003) point, who stated that nationality cannot be equated with culture. A nation can be made up of many different cultures and subcultures: people do not belong to just one. It may therefore be outdated to make the assumption that cultures could be homogenous or adhere to a fixed set of cultural values.

Another possible explanation as to why presumed cultural differences might not be reflected in this study is the phenomenon of globalization. With the growing interconnectedness of the world, it seems like a logical by-product that cultural orientations merge or grow into a more hybrid version. This may be true, perhaps especially, for neighboring countries like Germany and the Netherlands. Hofstede's (n.d.) take on cultural values may thus not have kept up with the times.

To conclude, results of this study suggest that while sensory language may be able to create appeal in some cases, its effects may only be palpable under certain conditions and in certain contexts. In addition, this research suggests that goal orientations may not be determined by culture and might even be situational. While this study has presented some new insights in

the workings of language on desire, more psycholinguistic research is needed to determine its exact effects. For now, we can take solace in the fact that, for hungry people, language does not seem to matter anyway.

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Appendix A. Descriptions

Dutch/German

Burger

Sappige bonenburger met tomaat en rucolasalade / Saftiger Bohnen-Burger mit Tomaten und Rucola

Voedingsstofrijke bonenburger met tomaat en rucolasalade / Nährstoffreicher Bohnen-Burger mit Tomaten und Rucola

Rustieke bonenburger met tomaat en rucolasalade / Rustikaler Bohnen-Burger mit Tomaten und Rucola

Salad

Knapperige salade met kaas, avocado en yoghurt dressing / Knackiger Salat mit Käse, Avocado und Joghurtdressing

Vitaminerijke salade met kaas, avocado en yoghurt dressing / Vitaminreicher Salat mit Käse, Avocado und Joghurtdressing

Klassieke salade met kaas, avocado en yoghurt dressing / Klassischer Salat mit Käse, Avocado und Joghurtdressing

Wrap

Zoetzure bietenwrap met falafel en gemixte groenten / Süß-saurer Rote-Bete-Wrap mit Falafel und gemischtem Gemüse

Vezelrijke bietenwrap met falafel en gemixte groenten / Ballaststoffreicher Rote-Bete-Wrap mit Falafel und gemischtem Gemüse

Simpele bietenwrap met falafel en gemixte groenten / Einfacher Rote-Bete-Wrap mit Falafel und gemischtem Gemüse

Pasta

Smeuïge pasta met champignonsaus en kaas / Cremige Nudeln mit Pilzsauce und Käse

Ijzerrijke pasta met champignonsaus en kaas / Eisenreiche Nudeln mit Pilzsauce und Käse

Standaard pasta met champignonsaus en kaas / Standardnudeln mit Pilzsauce und Käse

Quiche

Kruidige quiche met courgette- en tomatenvulling / Würzige Quiche mit Zucchini-Tomaten-Füllung

Gezonde quiche met courgette- en tomatenvulling / Gesunde Quiche mit Zucchini-Tomaten-Füllung

Karakteristieke quiche met courgette- en tomatenvulling / Charakteristische Quiche mit Zucchini-Tomaten-Füllung

Burritobowl

Pikante burritobowl met pulled jackfruit, sla en rijst / Pikante Burrito-Bowl mit Pulled Jackfruit, Salat und Reis

Voedzame burritobowl met pulled jackfruit, sla en rijst / Nährhafte Burrito-Bowl mit Pulled Jackfruit, Salat und Reis

Kenmerkende burritobowl met pulled jackfruit, sla en rijst / Unverwechselbare Burrito-Bowl mit Pulled Jackfruit, Salat und Reis

Appendix B. EACH checklist

Checklist EACH (version 1.6, November 2020)

(Complete and submit, together with your research proposal, to your supervisor).

You fill in the questions by clicking on the square next to the chosen answer

After clicking, a cross will appear in this square

1. Is a health care institution involved in the research?

Explanation: A health care institution is involved if one of the following (A/B/C) is the case:

- A. One or more employees of a health care institution is/are involved in the research as principle or in the carrying out or execution of the research.
- B. The research takes place within the walls of the health care institution and should, following the nature of the research, generally not be carried out outside the institution.
- C. Patients / clients of the health care institution participate in the research (in the form of treatment).
 - No → continue with questionnaire
 - Yes → Did a Dutch Medical Institutional Review Board (MIRB) decide that the Wet Medisch Onderzoek (Medical Research Involving Human Subjects Act) is not applicable?
 - Yes → continue with questionnaire
 - No → This application should be reviewed by a Medical Institutional Review Board, for example, the Dutch [CMO Regio Arnhem Nijmegen](#) → end of checklist

2. Do grant providers wish the protocol to be assessed by a recognised MIRB?

- No → continue with questionnaire
- Yes → This application should be reviewed by a Medical Institutional Review Board, for example, the Dutch [CMO Regio Arnhem Nijmegen](#) → end of checklist

3. Does the research include [medical-scientific research](#) that might carry risks for the participant?

- No → continue with questionnaire
- Yes → This application should be reviewed by a Medical Institutional Review Board, for example, the Dutch [CMO Regio Arnhem Nijmegen](#) → end of checklist

Standard research method

4. Does this research fall under one of the stated [standard research methods](#) of the Faculty of Arts or the Faculty of Philosophy, Theology and Religious Studies?

- Yes → 12. Standard questionnaire research (**fill in name and number of standard research method**) → continue with questionnaire
- No → assessment necessary, end of checklist

Participants

5. Is the participant population a healthy one?

- Yes → continue with questionnaire
- No → assessment necessary, end of checklist → [go to assessment procedure](#)

6. Will the research be conducted amongst minors (<16 years of age) or amongst (legally) incapable persons?

- Yes → assessment necessary, end of checklist → [go to assessment procedure](#)
- No → continue with questionnaire

Method

7. Is a method used that makes it possible to produce a coincidental finding that the participant should be informed of?

- Yes → assessment necessary, end of checklist → [go to assessment procedure](#)
- No → continue with questionnaire

8. Will participants undergo treatment or are they asked to perform certain behaviours that can lead to discomfort?

- Yes → assessment necessary, end of checklist → [go to assessment procedure](#)
- No → continue with questionnaire

9. Are the estimated risks connected to the research minimal?

- No → assessment necessary, end of checklist → [go to assessment procedure](#)
- Yes → continue with questionnaire

10. Are the participants offered a different compensation than the usual one?

- Yes → assessment necessary, end of checklist → [go to assessment procedure](#)
- No → continue with questionnaire

11. Should [deception](#) take place, does the procedure meet the standard requirements?

- No → assessment necessary, end of checklist → [go to assessment procedure](#)
- Yes → continue with questionnaire

12. Are the standard regulations regarding [anonymity and privacy](#) met?

- No → assessment necessary, end of checklist → [go to assessment procedure](#)
- Yes → continue with questionnaire

Conducting the research

13. Will the research be carried out at an external location (such as a school, hospital)?
- No → continue with questionnaire
 - Yes → Do you have/will you receive written permission from this institution?
 - No → assessment necessary, end of checklist → [go to assessment procedure](#)
 - Yes → continue with questionnaire
14. Is there a contact person to whom participants can turn to with questions regarding the research and are they informed of this?
- No → assessment necessary, end of checklist → [go to assessment procedure](#)
 - Yes → continue with questionnaire
15. Is it clear for participants where they can file complaints with regard to participating in the research and how these complaints will be dealt with?
- No → assessment necessary, end of checklist → [go to assessment procedure](#)
 - Yes → continue with questionnaire
16. Are the participants free to participate in the research, and to stop at any given point, whenever and for whatever reason they should wish to do so?
- No → assessment necessary, end of checklist → [go to assessment procedure](#)
 - Yes → continue with questionnaire
17. Before participating, are participants informed by means of an information document about the aim, nature and risks and objections of the study? (zie [explanation on informed consent](#) and [sample documents](#)).
- No → assessment necessary, end of checklist → [go to assessment procedure](#)
 - Yes → continue with questionnaire
18. Do participants and/or their representatives sign a consent form? (zie [explanation on informed consent](#) and [sample documents](#)).
- No → assessment necessary, end of checklist → [go to assessment procedure](#)
 - Yes → checklist finished

If you want to record the results of this checklist, please save the completed file.

If you need approval from the EACH due to the requirement of a publisher or research grant provider, you will have to follow the formal assessment procedure of the EACH.

Appendix C. Declaration on plagiarism and fraud

Declaration on plagiarism and fraud

The undersigned

[first name, surname and student number],

Anna Leeuw, 4494423

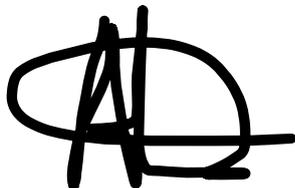
Master's student at the Radboud University Faculty of Arts,

declares that the assessed thesis is entirely original and was written exclusively by himself/herself. The undersigned indicated explicitly and in detail where all the information and ideas derived from other sources can be found. The research data presented in this thesis was collected by the undersigned himself/herself using the methods described in this thesis.

Place and date:

Nijmegen, July 6th 2022

Signature:

A handwritten signature in black ink, appearing to be 'AL' with a large loop and a horizontal stroke at the bottom.