

# EATING LESS MEAT:

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how to stimulate the choice for  
a vegetarian option  
without inducing reactance?

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# Eating Less Meat: How to Stimulate the Choice for a Vegetarian Option without Inducing Reactance?

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## **Abstract**

Excessive meat consumption has a negative impact on the environment, people's health and animal welfare. The growing importance of this problem and the push and pull towards Corporate Social Responsibility make it an interesting issue, on which foodservices could respond by stimulating the choice for vegetarian options. Yet, this could lead to reactance. To avoid inducing reactance, freedom of choice and the nature of the threat should be taken into account. In this study, therefore, we tested the effectiveness of presenting vegetarian options as a norm in stimulating the choice for vegetarian options, and compared it to the effectiveness of restrictions. This by looking at the effect of different menus using these strategies on willingness to eat at a restaurant, food choice, and compliance (i.e., people wanting to eat at the restaurant and choose a vegetarian option). Results show that the all vegetarian menu and the optional adding meat menu were most effective in stimulating the choice for vegetarian options. Reactance did not mediate the effects. The usage of these menus might be promising in reducing meat consumption and should be tested in real-life situations to see if indeed they can achieve a change in behaviour.

*Keywords:* reducing meat consumption, vegetarian, norms, restrictions, reactance

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## **1. Introduction**

The NOS (2017) reports that in the Netherlands, there was a decrease in meat consumption from 2010 to 2015, but in 2016 this decrease came to an end. People still eat 39 kilograms of meat per person per year, while the Netherlands Nutrition Centre advises to eat no more than 26 kilograms (Voedingscentrum, 2017). This overconsumption has a negative impact on the environment, people's health and animal welfare. With regard to the environment, the National Institute for Public Health and the Environment (RIVM) (2017) reports that of all foods, the production of meat leads to the highest greenhouse gas (GHG) emission. Concerning health, it reports that excessive meat consumption does not fit a healthy diet and increases the risk of getting various diseases. It also heightens the chance of food infections and decreases food safety. Last, the high demand for meat leads to abuses in the livestock industry, like the rise of factory farms, more cattle shed fires, outbreaks of livestock diseases, stressful and pitiful transport and non-stun slaughter (Wakker Dier, n.d.).

People seem to underestimate the negative effects of meat consumption on health and the environment (RIVM, 2017). Also, even if people are aware of the downsides of eating meat, they continue to do so, says Frank in the article of the NOS (2017). She made a documentary about people's desire for meat and found that the urge to eat it is very big. Nutritionist and researcher Ludidi adds that in Dutch culture, meat is seen as an important part of dinner, and without it, dinner would feel incomplete (NOS, 2017).

Yet, more and more people are becoming so called "flexitarians" (Keuchenius & van der Lelij, 2015), which means they regularly do not eat meat. According to the RIVM (2017), about one-third of the Dutch people do not eat meat on a daily basis. Choosing vegetarian options is made a lot easier than in the past. For example, there was a 75% increase in products certified with the European V-label for vegetarian and vegan products in the Netherlands last year (Vegetariërsbond, 2018), which makes it easier for people to recognize and buy these products. Also, a quality mark is created to indicate that foodservices are suitable for vegetarians (Vegetariërsbond, 2017). Remarkably however, despite the growing number of flexitarians, research found that only 7% of the people sometimes chooses a vegetarian option at a restaurant (Klumper, 2017).

Companies and organizations are being held responsible for a sustainable society to a great extent (Mulder & Scholtz, 2014). There seems to be a push and pull towards Corporate Social Responsibility (CSR). For foodservices, this means that they are pushed to take more responsibility for the consequences of their policies and practices, but besides that, with more and more people eating less meat, there is a pull towards the growing market of alternative

food options. Currently, the way foodservices can effectively respond to this is a popular topic in research and businesses (Darkow, Foerster, & von den Gracht, 2015). This study will contribute to this question by testing ways foodservices can act responsible by stimulating the choice for vegetarian options without causing unwanted consequences (e.g., getting less customers and lower sales or causing boomerang effects).

Yet, when people feel like their freedom of choice is threatened by an external source, or recognize an attempt to influence, this could lead to reactance (Brehm, 1966). This means that people will not like the requested options, are motivated to restore their freedom and will not choose the requested options (Brehm, 1966). Therefore, it could lead to these negative consequences or boomerang effects. To limit the chances of inducing reactance, freedom of choice should be preserved, and the threat should be subtle and indirect (Brehm, 1966).

One promising strategy that could be used to stimulate the choice for a requested option is changing the way choices are presented (Bacon & Krpan, 2018; Campbell-Arvai, Arvai, & Kalof, 2014; Guthrie, Mancino, & Lin, 2015). With using this strategy, the choice for the requested option is made easier, but the choice for other options is not restricted (Campbell-Arvai et al., 2014). Several ways to do this are found effective in stimulating the choice for vegetarian options (Bacon & Krpan, 2018; Campbell-Arvai et al., 2014; Visschers & Siegrist, 2015). Whereas the usage of norms is found effective in stimulating pro-environmental behaviour as well (Goldstein, Cialdini, & Griskevicius, 2008; Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007), it is never tested in the context of stimulating the choice for vegetarian options. In this study we will, by testing the effectiveness of several subtle and indirect ways to suggest a norm while perceiving freedom of choice in stimulating the choice for vegetarian options.

The expectation is that using these strategies is more effective in stimulating the choice for vegetarian options than the usage of restrictions, because with using restrictions, freedom of choice is threatened. Lombardini and Lankoski (2013) indeed found that restrictions could lead to non-compliance, and a possible explanation they give for this is reactance. Yet, the role of reactance is never tested directly, but in this study we will. It is interesting to find out whether reactance indeed influences the effectiveness of strategies in stimulating the choice for vegetarian options, and whether there are ways to avoid the activation of reactance. Therefore, the research question of this study is:

*How can the choice for a vegetarian option be stimulated by the menu without inducing reactance?*

## **2. Theoretical Background**

### **2.1. Reducing Meat Consumption: The Importance and CSR**

The biggest need for reduction in meat consumption comes from its effect on the environment. According to Tilman and Clark (2014), with an increase of incomes, people's diets change. This, among other things, is reflected by a high demand for meat, which leads to an increase in GHG emission. They say that a vegetarian diet can reduce GHG emission by 55% compared to such income-dependent diets with a high demand for meat. However, adopting a vegetarian diet is unacceptable for most people at this time (Green et al., 2015). But even by moderating meat consumption, GHG emission can be reduced with 30% compared to an income-dependent diet (Tilman & Clark, 2014). The majority of people eating meat in moderation would have a more positive impact on the environment than only a group of people eating no meat at all (Spencer, Cienfuegos & Guinard, 2018). So, consumption habits regarding meat should be adjusted on a large scale to really make a change on the impact on the environment (Green et al., 2015; Horgan, Perrin, Whybrow, & Macdiarmid, 2016; Ranganathan et al., 2016).

The role of companies in the process of shifting people towards a more sustainable diet is emphasized (Mulder & Scholtz, 2014; Ranganathan et al., 2016). Foodservices recognize the growing importance of sustainability for their businesses (Darkow et al., 2015), and there is a push and pull towards CSR (Micheletti & Stolle, 2008). First, responsibility concerning sustainability is often demanded by multiple parties, such as authorities, customers and employees. Second, when strategies are used to anticipate to this demand, it can lead to competitive advantages on the long term (Darkow et al., 2015; Micheletti & Stolle, 2008). The way foodservices can effectively respond to the growing importance of sustainability is currently examined in research and in businesses (Darkow et al., 2015). In this study we will too, by examining how they can effectively stimulate the choice for vegetarian options.

### **2.2. The role of Reactance**

In general, there seems to be resistance to the idea of reducing personal meat consumption from a customers' perspective (Macdiarmid, Douglas, & Campbell, 2016). Resistance is a response to the pressure to make changes, which can result in non-acceptance or non-compliance (Knowles & Linn, 2004). Resistance is often assigned to personal or situational factors. With reducing meat consumption, resistance is likely to arise from several personal or

situational aspects. First, habits and routines make it hard to decrease it (Lea, Crawford, & Worsley, 2006; Pohjolainen, Vinnari, & Jokinen, 2015). This can lead to a type of resistance also known as inertia (Knowles & Linn, 2004). Furthermore, people are not well aware of (Lea et al., 2006), or sceptical about the link between meat consumption and climate change (Lea et al., 2006; Macdiarmid et al., 2016) and health issues (Pohjolainen et al., 2015). This scepticism can also be seen as a type of resistance called distrust (Knowles & Linn, 2004).

Next to situational or personal factors, resistance can also be triggered by an external source, which is then called reactance (Brehm, 1966). Reactance, as described by Brehm (1966), is a motivational state that results from a threat of behavioural freedom. It can occur when freedom of choice is perceived to be threatened and when the attempt to influence is recognized. This can then lead to affective, motivational and behavioural resistance, meaning that people will not like the requested option, are motivated to restore freedom and will not choose the requested option. Moreover, people will like the alternative options even more (Brehm, 1966).

So, with an external threat to one's freedom of choice, like foodservices trying to stimulate the choice for a vegetarian option, there is a great chance on triggering reactance (Knowles & Linn, 2004). But reactance is less likely to occur when freedom of choice is preserved, and the nature of the threat is subtle and indirect (Brehm, 1966). Therefore, we will first look at subtle and indirect ways to stimulate the choice for vegetarian options while preserving freedom of choice, namely changing the way choices are presented and using norms. Then we will look at restrictions, whereby freedom of choice is threatened. In this study the effectiveness of these strategies in stimulating the choice for vegetation options will be compared. Previous research indeed indicates that reactance might play an important role in stimulating the choice for vegetarian options (Campbell-Arvai et al., 2014; Lombardini & Lankoski, 2013), but this was never tested directly. Therefore, we will look at the effect of reactance while using these strategies as well.

### **2.3. Changing the Way Choices are Presented and Using norms**

A strategy that is often recommended to stimulate pro-environmental behaviour is changing the way choices are presented (also called nudges or choice architecture) (Bacon & Krpan 2018; Campbell-Arvai et al., 2014; Guthrie et al., 2015). Because consumer choices are mostly based on habits (Wood & Neal, 2009), unconscious processes, environmental cues (Wansink & Sobal, 2007) and judgemental heuristics (Campbell-Arvai et al., 2014), this strategy, that responds to this, can be very effective. The advantages of this strategy, while



keeping reactance in mind, are that first, while it is made easier to make certain choices, it does not restrict other choices (Campbell-Arvai et al., 2014). Therefore, freedom of choice is preserved. Second, because it utilizes unconscious processes (Campbell-Arvai et al., 2014), the attempt to influence often is discrete and unnoticed (Schonewille & Koornstra, 2010). Ozdemir and Caliskan (2015) reviewed the literature about the way choices are presented on a menu and concluded that it can have considerable effects on people's choices. With regard to stimulating the choice for vegetarian options, Bacon and Krpan (2018) found that recommending a vegetarian option on a menu by outlining it and giving vegetarian options a descriptive name could lead to more choices for vegetarian options.

Another very promising way of presenting choices to stimulate pro-environmental behaviour, like choosing vegetarian options, is by suggesting that these choices fit the norm. This generally leads to acceptance of these choices (Guthrie et al., 2015; Wansink, 2015), because consumers are likely to prefer what is normal or popular (Wansink, 2015). A distinction can be made between two types of norms, namely descriptive and injunctive norms. Descriptive norms tell us something about how other people usually act in similar situations. Injunctive norms tell us something about how people should behave in such situations (Hewstone, Stroebe, & Jonas, 2012). For example, research found that stating that other people reuse their towels in a hotel room, which is a descriptive norm, stimulated the reuse of towels among hotel guests (Goldstein et al., 2008). Also, Schultz et al. (2007) found that using a descriptive norm by informing people about the average energy usage of a neighbourhood led to a decline in energy usage among people who had a relatively high energy usage. Yet, for people who had a relatively low energy usage, a boomerang effect was found. This problem was solved by including an injunctive norm, showing a happy face when energy usage was relatively low. So, the usage of norms can be very effective in stimulating pro-environmental behaviour, and therefore, in stimulating the choice for vegetarian options as well. Yet, the effectiveness of using norms in this context has never been tested, and therefore in this study we will.

To avoid inducing reactance, the attempt to influence should be subtle and indirect (Brehm, 1966). One way to present options as a norm subtle and indirect is by increasing the offer of these options (Wansink, 2015). Increasing the vegetarian offer to stimulate the choice for these options would have several other advantages as well, that make it practically applicable. First, the offer of a foodservice should be adjusted to the needs and desires of the target group to increase a foodservices' success (Mooney, 1994). Therefore, increasing the offer responds to people indicating that the offer of vegetarian food is too limited (Klumper,

2017; Lea et al., 2006). Besides that, offering choices between alternatives (i.e., vegetarian options) can avoid reactance (Knowles & Linn, 2004). Therefore, one menu tested in this study is one with an increased offer of vegetarian options compared to a common real-life situation.

Additionally, a subtle and indirect way to present vegetarian options as a norm is by not indicating them as vegetarian. While pointing out certain foods with an indication can stimulate the choice for it (Guéguen, Jacob, & Ardiccioni, 2012; Visschers & Siegrist, 2015; Wagner, Howland, & Mann, 2015), Guthrie et al. (2015) state that sometimes it might have paradoxical effects. With regard to stimulating the choice for vegetarian options, Bacon & Krpan (2018) indeed found that splitting a menu in separate sections, indicating that one section only includes vegetarian dishes, decreased the choices for vegetarian options. This, they say, is probably because it makes it look like it is something special, not meant for people who are not vegetarian. To reduce this effect, Bacon and Krpan (2018) only indicated vegetarian options by putting a (V) behind it. Interestingly however, some restaurants choose not to indicate vegetarian options at all. Looking at the paradoxical effect of giving indications (Bacon & Krpan, 2018; Guthrie et al., 2015), giving no indication at all might be even more effective in suggesting that choosing a vegetarian option is normal than indicating vegetarian options with a (V). To test this, a menu with no indication is compared to a menu with a (V) as indication for vegetarian food.

Last, Campbell-Arvai et al., (2014) found that using default-based nudges on a menu is very effective in increasing the choice for vegetarian options. Defaults are the options people get when they do not explicitly ask for other options (Campbell-Arvai et al., 2014). In their study, Campbell-Arvai et al. (2014) used defaults by presenting a menu including only vegetarian options, and by giving people the possibility to look at another menu including options with meat, but only if they asked. The problem with this strategy however, as Campbell-Arvai et al. (2014) say themselves, is that with using defaults sometimes come concerns about freedom of choice. This, they say, is because some people think using defaults does constrain choices, is unfair, and choosing the alternatives is made too inconvenient. Therefore, Campbell-Arvai et al. (2014) recommend that decision makers should always have easy access to alternatives and the freedom to choose them. Therefore, it is interesting to see if possibly there are ways of stimulating the choice for vegetarian options similarly to the way they did, since this was very effective, but whereby decision makers do have easier access to alternatives. For instance, by including only vegetarian options on a menu to suggest that choosing these is the norm, but with giving people the opportunity to add meat to these

options. Then, by displaying the options of meat that could be added on the menu, choosing them can be made more accessible. The effectiveness of such a menu in stimulating the choice for a vegetarian option will be tested and compared to the other menus that suggest a norm as well, making the first hypotheses of this study:

**H1:** Various ways of presenting vegetarian options as a norm on a menu can be effective in stimulating a vegetarian food choice in various degrees.

## **2.4. Restrictions and the Mediating role of Reactance**

From an (animal) ethical point of view, restrictions on meat consumption would be an arguable strategy to change behaviour as well (Cliteur & Vink, 2014). Restrictions are imposed limits and can be implemented directly by prohibiting or eliminating the choice for meat (Lombardini & Lankoski, 2013). At this time, prohibiting meat consumption completely is not a feasible solution (Cliteur & Vink, 2014), but initiatives are taken to reduce meat consumption by restricting it to some extent. The international campaign “Meat Free Monday”, for example, led to introduction of a meat free day on for instance a lot of schools and businesses (Meat Free Monday, 2018). This is also the case at the Radboud University, where “Meat Free Monday” was introduced. However, this led to criticism, because people think their freedom of choice is being restricted (ANS, 2015). Since little was known about the effects of such restrictions, Lombardini and Lankoski (2013) studied the effects of introducing a vegetarian day on schools. They found that it leads to non-compliance, meaning that less students participated in school lunch, less food was taken, and more food was thrown away.

In this study, a menu with only vegetarian options will be tested as well and will be compared to the usage of norms, to see which strategy is more effective in stimulating the choice for vegetarian options. Hereby, only looking at food choice is not interesting, since with restrictions people have no other choice than to choose a vegetarian option. Therefore, we have to test the effectiveness in stimulating the choice for a vegetarian option as a broader concept as Lombardini & Lankoski (2013) did, including whether people are willing to eat somewhere as well. To compare the effectiveness of restrictions and norms in stimulating the choice for vegetarian options, therefore, we will look at the effect on willingness to eat at a restaurant. Most importantly, we will also look at which menu leads to the most compliance, meaning that people want to eat at a restaurant and choose a vegetarian option. The expectation, based on Lombardini and Lankoski (2013), is that restrictions will be less

effective in stimulating the choice for a vegetarian option than the usage of norms. This leads to the following hypotheses:

**H2a:** Using norms on a menu will lead to more willingness to eat at a restaurant than using restrictions.

**H2b:** Using norms on a menu will lead to more compliance than using restrictions.

One possible explanation Lombardini and Lankoski (2013) give for the non-compliance they found is reactance. Others imply that reactance has a large impact on the effectiveness of strategies to stimulate the choice for vegetarian options as well (Campbell-Arvai et al., 2014; Cliteur & Vink, 2014). Yet, this has never been tested directly, and thus, in this study we will. The expectation is that restrictions will lead to more reactance since they threaten freedom of choice and therefore are more likely to induce reactance (Brehm, 1966; Campbell-Arvai et al., 2014; Cliteur & Vink, 2014; Lombardini & Lankoski, 2013). Changing the way choices are presented by using norms to stimulate the choice for vegetarian options preserves freedom of choice and is more subtle and indirect. Therefore, based on Brehm's theory of reactance (1966), we expect this to lead to less reactance. Also, we assume that reactance partly explains the effect of menus on food choice, willingness to eat at a restaurant and compliance, leading to the final hypotheses:

**H3a:** Using norms on a menu will lead to less reactance than using restrictions.

**H3b:** Reactance influences food choice, willingness to eat at a restaurant and compliance.

**H3c:** The effect of menus on food choice, willingness to eat at a restaurant and compliance is mediated by reactance.

All hypotheses are summarized in a conceptual model as can be seen in Figure 1. In short, the effect of different menus on food choice, willingness to eat at a restaurant and compliance, a combination of those, will be tested. Also, we will test whether different menus lead to differences in reactance, and whether reactance affects food choice, willingness to eat at a restaurant and compliance. For the effect of menu on food choice, willingness to eat at a restaurant and positive outcome, the mediating role of reactance is investigated as well.

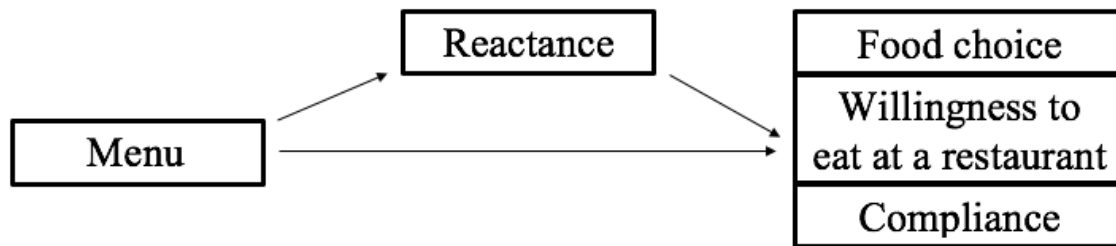


Figure 1. Conceptual model

### 3. Method

The way this research was conducted, as was approved by the Ethics Committee of the Faculty of Social Sciences (ECSW-2018-052), will now be described. Hereby, the choices that have been made regarding the methodology are explained and justified.

#### 3.1. Design

In this study, a between-subjects experimental design with menu as a factor (*all vegetarian vs. increased offer with indication vs. increased offer without indication vs. optional adding meat*) was conducted. Reactance was included as a mediator. An experimental design was chosen because it is suitable for observing the effect of a manipulated independent variable (Field & Hole, 2003). The choice for a between-group design was made to avoid practice, fatigue and other carry-over effects (Field & Hole, 2003). The target population of this study was Dutch people above the age of 18, with the exception of vegetarians/vegans and people with severe allergies. The first because in the Netherlands, according to law you are seen as an adult at the age of 18 (Art. 1:233 BW, 2015) and therefore you are able to make your own decisions. The second because this could influence the outcomes of this study without it being an effect of the manipulation.

#### 3.2. Research Material

For this study, four different menus were designed using Word, which can be seen in Appendix A. The design of the menus was based on the design used by Bacon and Krpan (2018). The offer on the menus was based on the offer of the restaurants “Happy Italy”, “Café de Muis” and “De Gelagkamer”. These restaurants share the common feature that they are low-budget. A lot of young people (students) participated in this study, and they often eat at

such restaurants (FoodService Instituut, 2017). Therefore, using these types of restaurants fit the scenario that was outlined. Another thing these restaurants had in common was that all their menus consisted of vegetarian dishes for approximately one-third. Focussing on the main courses, three categories emerged from the menus. These categories, pizza, pasta and so-called others, were used in this study as well.

Because research shows that for the types of restaurants this study was based on, people think six choices per category is ideal (Johns, Edwards, & Hartwell, 2013), six dishes per category were selected from the menus. A small pre-test ( $N=20$ ) was done to find out which dishes were most popular. These were used in this study to make it less likely that people were influenced by matters of taste. People were asked to make a top six list of vegetarian dishes and dishes with meat per category, with their number one getting a score of 6, their number two getting a score of 5 etcetera. The six vegetarian dishes with the highest sum scores were selected for the all vegetarian menu and the optional adding meat menu. On the optional adding meat menu, the six most popular kinds of meat (i.e., the kinds that were part of the dishes with meat with the highest sum scores) were included on the menu as the options that could be added. Also, for two vegetarian dishes on the optional adding meat menu it was possible to replace them with meat since they were not suitable for adding meat. On the increased offer menus, the four vegetarian dishes with the highest sum scores per category and the two dishes with meat with the highest sum scores were included. This ratio was chosen because it's the opposite from the actual meat-vegetarian ratio offered by the restaurants this study was based on. On the increased offer with indication menu vegetarian dishes were indicated by placing a (V) behind them. On the increased offer without indication menu, there was no indication whether a dish was vegetarian or not. Apart from the proposed cause, all menus were kept as identically as possible to minimize the risk of random factors influencing the experiment (Field & Hole, 2003). Variation in the placement of dishes with meat minimized the influence of order of presentation. Also, with conducting the menus, variety of ingredients was taken into account to reduce the influence of dislike for certain ingredients.

Another pre-test ( $N=30$ ) was done to test the material. First, to check whether the three menus that were supposed to suggest a norm (i.e., the increased offer with indication menu, the increased offer without indication menu and the optional adding meat menu) differed in the extent to which they did. Second, to check whether the menus were more successful in suggesting descriptive or injunctive norms. To test this, a within-subject design was used. The order of the menus was randomized to avoid systematic effects (Field & Hole, 2003). Based

on questions formulated by Jacobson, Jacobson and Hood (2015), the descriptive norm statement was: “In the restaurant where this menu is presented, it is normal to order a vegetarian dish” and the injunctive norm statement was: “In the restaurant where this menu is presented, ordering a dish with meat is disapproved”. People responded on a 5-point Likert scale (1=strongly disagree, 5=strongly agree). It is important to note that prior to this check, there were no specific expectations regarding the variance to which each menu presents a specific norm.

A MANOVA showed that there was a significant main effect of menu ( $F(1.90,55.05)=7.44, p=.002, r=.45$ ). The optional adding meat menu ( $M=3.70, SE=0.13$ ) scored significantly higher on suggesting norms than the increased offer without indication menu ( $M=3.07, SE=0.16$ ) ( $CI_{.95}[-1.10,-0.17], p=.005$ ). The increased offer with indication menu ( $M=3.30, SE=0.14$ ) did not differ from the optional adding meat menu ( $CI_{.95}[-0.81,0.01], p=.054$ ) and the increased offer without indication menu ( $CI_{.95}[-0.16,0.62], p=.414$ ) (Figure 2). Additionally, a significant main effect of type of norm was found ( $F(1,29)=131.76, p<.001, r=.91$ ). Overall, the menus were more successful in suggesting a descriptive norm ( $M=4.21, SE=0.12$ ) than an injunctive norm ( $M=2.50, SE=0.14$ ) (Figure 2). No significant effect was found for the interaction between menu and type of norm ( $F(1.68,48.77)=.17, p=.806, r=.08$ ).

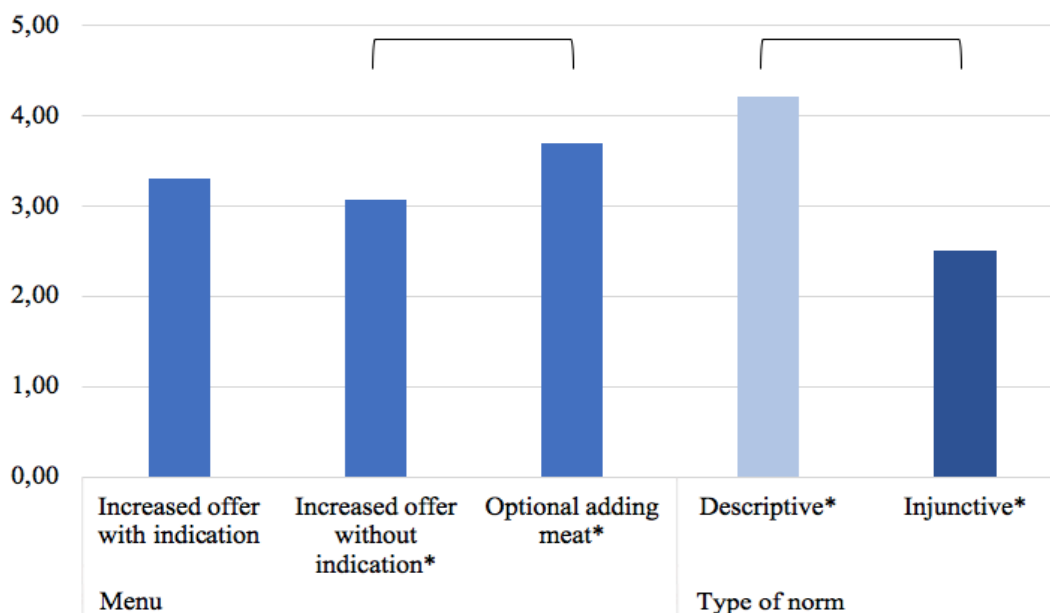


Figure 2. The effectiveness of different menus in suggesting norms and of menus in suggesting different types of norms (N=30) (\* $p<.005$ )

### 3.3. Measures

All variables in this experiment were manipulated or measured using an online survey that was in Dutch. The whole instrument that was used for measurement can be found in Appendix B (translated to English for this paper). Following here is a list of variables that were measured, including an explanation of how they were measured.

*Willingness to eat at the restaurant:* after seeing the menu, people were first asked how much they would like to eat at the restaurant where the menu is presented. They could answer on a scale from 0 (not at all) to 10 (very much).

*Food choice:* participants were asked to indicate which dish they would like to choose. This by clicking on that dish on the menu. For the all vegetarian menu and both increased offer menus, it was only possible to choose one dish. Participants that chose more than one option received an error message saying that they could only pick one. For the optional adding meat menu, it was possible to choose multiple dishes since people had to be able to add meat to their choice. To keep the way the question was formulated from influencing the (number of) choices people made, the question was formulated the same for all conditions. This was: “click on whatever you would like to order”, without specifying the number of choices that should be made. For analyses, food choice was divided into two categories (0 = meat, 1 = vegetarian).

*Reactance:* reactance was measured by perceived threat of freedom and anger, based on Dillard and Shen (2005). Cognitive response was measured as well by asking participants to write down whatever was in their minds after seeing the menu (Dillard & Shen, 2005), but due to time constraints this qualitative data was not included in the present paper. A total of 8 items measured perceived threat of freedom and anger. The items were translated in Dutch, and the word “message” was replaced by the word “menu”. For example, one item to measure threat of freedom was: “the menu threatened my freedom to choose,”. An example for measuring anger was “I felt angry while viewing this menu”. Participants were presented with a 5-point Likert scale (1 = totally disagree, 5 = totally agree).

Factor analysis was used to find out which items related to each other (Field, 2000). The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis (KMO=.87). Using the Kaiser-criterion and looking at the Scree Plot, it showed that reactance consisted of two sub-components with an eigenvalue of respectively 4.54 and 1.41. These sub-components together explained 66.71% of the variance. Oblique rotation showed that, as intended by Dillard and Shen (2005), the items measuring perceived threat of freedom loaded on one factor and the items measuring anger loaded on the other. Therefore, threat of freedom



and anger were constructed each using those 4 items. This was expected and makes perfect sense, indicating that content and factorial validity is high (Field & Hole, 2003). Reliability measures showed that the threat of freedom scale (Cronbach's  $\alpha=.84$ ) and the anger scale (Cronbach's  $\alpha=.91$ ) were highly reliable. In the analysis, reactance was therefore always measured using threat of freedom and anger separately.

*Past behaviour regarding meat consumption:* based on earlier research (Bacon & Krpan, 2018), past behaviour regarding meat consumption was included in this study as well (i.e., the frequency of eating meat during the previous seven days). This by asking participants to use a slider to indicate the number of times they ate meat for dinner for the past seven days, from 0 to 7. To mask that the main interest of this study regards meat consumption, people were also asked about past behaviour regarding other food categories such as vegetables, potatoes, rice, pasta, fish, eggs and dairy.

*Dietary restrictions:* people were asked to fill in whether they had any allergies, dietary requirements/restrictions, or whether there were other reasons why they would not eat specific food. Given the variety of possible answers, this was an open-ended question.

*Demographic variables:* last, people were asked to fill in their what gender, age and level of education was. This to check the distribution of the sample and to check whether participants were equally divided among the different conditions based on these variables.

### **3.4. Procedure**

Participants for this study were collected using a convenience sample and the snowball method. First, people from the researcher's network were asked to participate by posting a recruitment message on social media platforms (Facebook and LinkedIn) or through WhatsApp. This message included a link which led them to a structured online survey on the Qualtrics platform. Then, the snowball method was used by asking participants to ask their network to participate as well. As an incentive, the people that recruited most participants received a gift card of €15 or €5 from a web shop. Also, one €5 gift card was raffled among all participants. The university participants system, where students get credits for participating in studies, was used to collect participants as well. Students received 0.50 credits after finishing the survey. The link was usable from April 18 till May 18. To avoid threats of validity, no changes were made in the instrument during this time (Field & Hole, 2003). Because of the possibility to participate online, there was a lower chance on reactivity and there were no experimenter effects. This ruled out threats to validity of these kinds (Field & Hole, 2003).

When clicking on the link, people were first extensively informed about the study (Appendix B). They were told that the study was about food choices, that it took about five minutes to complete the survey, that there were no right or wrong answers and that responses would be handled confidentially and anonymous. They were also informed about the incentive. Last, they had to agree with participation explicitly. Only if they agreed, they could start. After agreeing, participants were told to imagine that they wanted to go out to eat with some friends or family that evening but did not know where yet. They were told that they found a restaurant and had to look at the menu to check whether this restaurant was suitable for dinner. Then they saw one of the four menus and then they had to fill in the questionnaire (Appendix B). To rule out as many random influences as possible, all participants were randomly assigned to one of the conditions (Field & Hole, 2003). After finishing, they were thanked for participation and they were debriefed about the aim of this study on social media after all data was analysed.

### **3.5. Analysis**

To analyse the data, IBM SPSS Statistics version 25 was used. All steps taken during analysis were documented in the syntax to guarantee that results could be checked and analysis could be repeated. Participants under the age of 18 ( $N=2$ ), vegetarians/vegans ( $N=15$ ) and people with allergies that could interfere with the results ( $N=4$ ) were excluded from analysis. Since Qualtrics did not record responses that were incomplete, and people could not finish the questionnaire without answering all questions, there were no missing values that had to be deleted. All remaining participants ( $N=329$ ) were manually divided based on which menu they were exposed to. Then, the data was ready for main analysis.

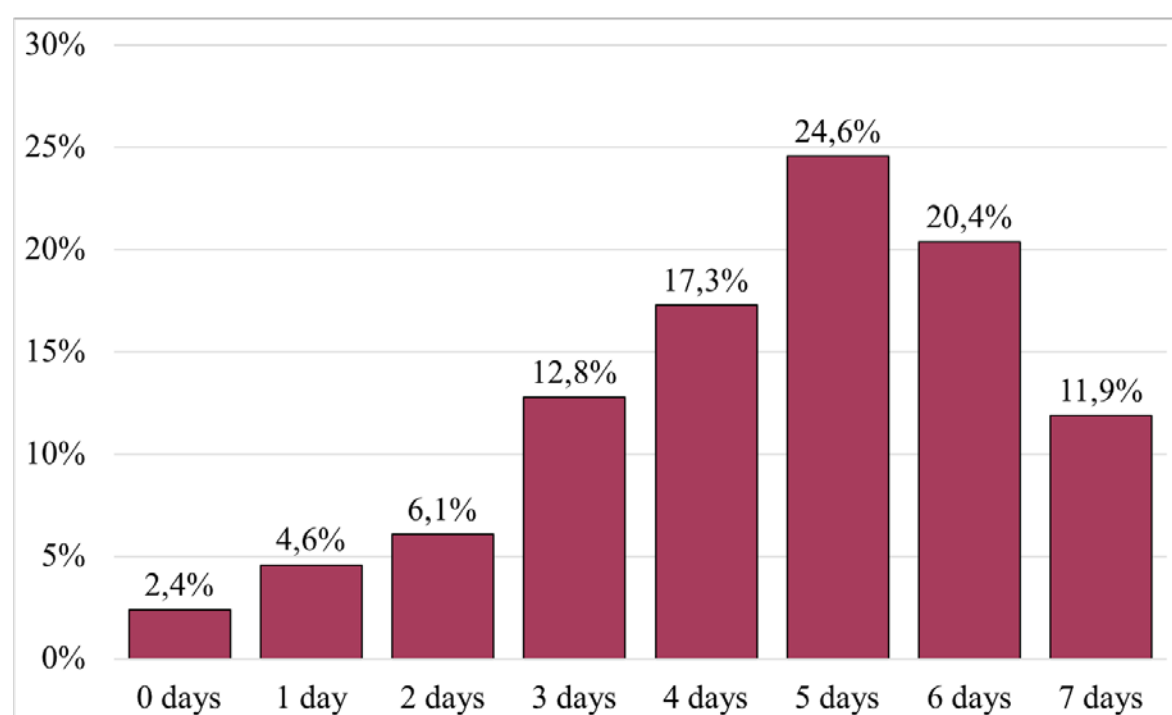
First, an ANCOVA was used to test whether various ways of suggesting a norm would lead to differences in food choice (H1). Then, an ANOVA was used to test whether the different menus led to differences in willingness to eat at a restaurant (H2a) and compliance (i.e., people wanting to eat at the restaurant and choose a vegetarian option) (H2b). To test whether different menus would lead to differences in reactance, consisting of threat of freedom and anger, a MANOVA was used (H3a). Regression analyses were conducted to test the influence of reactance on food choice, willingness to eat at a restaurant and compliance. They were also used to test hypothesis 3c, whether reactance would mediate the effect of menus on the dependent variables.

## 4. Results

The results of this study will now be discussed. First, we will address the sample and randomization check. Then, the hypotheses will be tested. For all analysis .05 was used as the critical value of significance.

### 4.1. Sample and Randomization Check

The majority of the sample ( $N=329$ ) were women (69.90%). Participants were aged between 18 and 81 ( $M=32.30$ ,  $SD=15.81$ ). The level of education was relatively high among the sample. Most people did wo (42.60%), followed by hbo (33.70%), mbo/havo/vwo (17.30%), mavo/vbo/vmbo (4.60%), and others (1.80%). Looking at participants' past behaviour regarding meat consumption (i.e., how many times they ate meat for the past seven days) (Figure 3), we see that a lot of flexitarians participated in this study.



*Figure 3.* Descriptive summary of participants' past behaviour regarding meat consumption (i.e., the number of times they ate meat for the past seven days) ( $M=4.53$ ,  $SD=1.74$ ,  $N=329$ )

According to power analysis based on Bacon & Krpan's study (2018), 60 participants per condition were needed to achieve a power of .80 and to detect a medium effect size ( $r=.30$ ). Participants were distributed almost equally among the all vegetarian menu ( $N=84$ ), the increased offer with indication menu ( $N=80$ ), the increased offer without indication menu ( $N=83$ ) and the optional adding meat menu ( $N=82$ ). A randomization check was done to

check if groups differed on variables that could influence the outcomes of the analysis and interfere with the manipulation (i.e., gender, age, level of education and past behaviour regarding meat consumption). According to Levene's Test, equal variances can be assumed for all these variables ( $p's > .175$ ). A One-Way Independent ANOVA showed that groups did not significantly differ in gender, age, and level of education ( $p's > .231$ ). The groups did differ in past behaviour regarding meat consumption ( $p = .036$ ). Bonferroni post hoc test revealed a significant difference in past behaviour regarding meat consumption between the all vegetarian menu group ( $M = 4.87$ ,  $SE = 0.17$ ) and the optional adding meat menu group ( $M = 4.13$ ,  $SE = 0.20$ ) ( $CI_{.95} [0.02, 1.45]$ ,  $p = .039$ ). The increased offer with ( $M = 4.69$ ,  $SE = 0.20$ ) and without indication ( $M = 4.41$ ,  $SE = 0.20$ ) did not differ from any other menus on past behaviour regarding meat consumption ( $p's > .253$ ).

Previous research showed that there is an effect of past behaviour regarding meat consumption on food choice (Bacon & Krpan, 2018), and therefore, in this study it should be included as a covariate in case it correlates with the dependent variables. Although adding a covariate on which groups differ does not meet the assumptions for ANCOVA, in this study we can do so because people were randomly assigned to conditions, and there could be no effect of menu on past behaviour regarding meat consumption (Miller & Chapman, 2001). Analysis showed that there were significant correlations between past behaviour regarding meat consumption and food choice ( $r = -.20$ ,  $p < .001$ ) and compliance ( $r = -.18$ ,  $p = .001$ ), so it was included as a covariate in the analyses regarding these variables. Past behaviour regarding meat consumption did not correlate with willingness to eat at a restaurant ( $r = -.08$ ,  $p = .153$ ), threat of freedom ( $r = .02$ ,  $p = .674$ ) and anger ( $r = .04$ ,  $p = .490$ ). Therefore, in the analyses regarding these variables, it was not necessary to include past behaviour regarding meat consumption as a covariate.

#### **4.2. The Effect of Norms on Food Choice**

To test the first hypotheses, whether different ways of suggesting a norm vary to the degree of effectiveness in stimulating the choice for a vegetarian option, an ANCOVA was used with menu as a factor (*increased offer with indication vs. increased offer without indication vs. optional adding meat*) and food choice as dependent variable. A standardized variable of past behaviour regarding meat consumption was included as a covariate. Also, an interaction term (menu by past behaviour) was included to check the assumption of equal regression coefficients. Since the interaction term was not significant ( $p = .991$ ), this assumption was met. Levene's Test showed that equal variances cannot be assumed ( $p = .001$ ), meaning that result

might lack accuracy (Field & Hole, 2003). Since the nonparametric Kruskal-Wallis Test does not allow us to add a covariate, the F-tests are reported nevertheless. First, it showed that there was a significant main effect of menu on food choice ( $F(2,239)=5.95$ ,  $p=.003$ ,  $r=.22$ ), meaning that food choice indeed differed for different menus. Pairwise comparisons indicated that people who saw the optional adding meat menu ( $M=0.71$ ,  $SE=0.05$ ) were significantly more likely to choose a vegetarian option than people in the increased offer with indication menu ( $M=0.46$ ,  $SE=0.05$ ) ( $CI_{.95}[0.07,0.43]$ ,  $p=.002$ ). The increased offer without indication menu ( $M=0.62$ ,  $SE=0.05$ ) did not significantly differ in food choice from the increased offer with indication menu ( $CI_{.95}[-0.02,0.33]$ ,  $p=.100$ ) and the optional adding meat menu ( $CI_{.95}[-0.27,0.08]$ ,  $p=.563$ ). This means that hypothesis 1 can be partly accepted, since not all menus significantly differed in effect on food choice, but people who saw the optional adding meat menu were more likely to choose a vegetarian option than the people who saw the increased offer with indication menu. Figure 4 provides a descriptive summary of food choice by menu and in total.

The covariate, past behaviour regarding meat consumption, had a significant effect on food choice as well ( $F(1,239)=20.45$ ,  $p<.001$ ,  $r=.28$ ). Regression analysis showed that the more frequently people ate meat in the past seven days, the less likely they were to choose a vegetarian option ( $b=-0.14$ ,  $p<.001$ ).

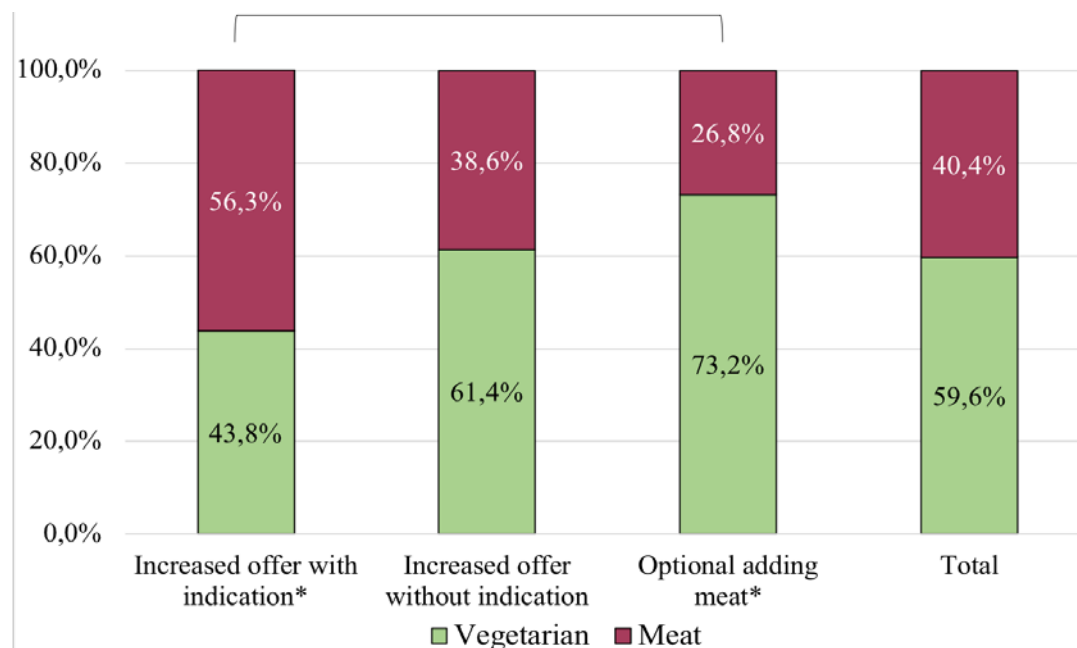


Figure 4. Descriptive summary of food choice by menus that suggest a norm and food choice in total (N=245) (\* $p=.002$ )

### 4.3. Comparing the Effectiveness of Norms and Restrictions

According to hypothesis 2a, menus that suggest a norm would lead to more willingness to eat at a restaurant than a menu that restrict freedom of choice regarding meat consumption.

Figure 5 provides a descriptive summary of willingness to eat at a restaurant for the whole sample. The hypothesis was tested using an ANOVA with menu as a factor (*all vegetarian vs. increased offer with indication vs. increased offer without indication vs. optional adding meat*) and willingness to eat at a restaurant as a dependent variable. Levene's Test indicates that homogeneity of variance can be assumed ( $p=.374$ ). Looking at the results, no significant effect of menu on willingness to eat at a restaurant was found ( $F(3,325)=1.44$ ,  $p=.231$ ,  $r=.11$ ), meaning that hypothesis 2a will be rejected.

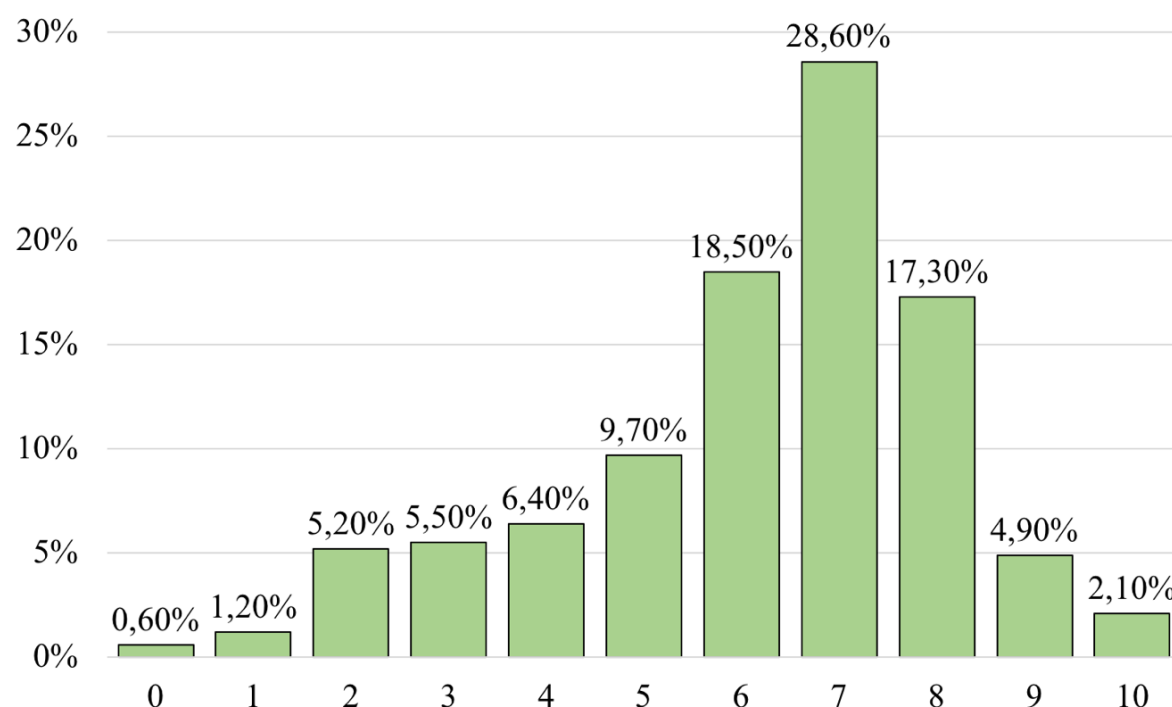


Figure 5. Descriptive summary of participants' willingness to eat at a restaurant, measured on a scale from 0 to 10 (N=329).

An ANCOVA was used to test which menu led to the most compliance (H2b), meaning that people would want to eat at the restaurant and would choose for a vegetarian option.

Therefore, a new variable was made with all people that wanted to eat at the restaurant (i.e., they had a score of  $>5$  on willingness to eat at a restaurant) and chose a vegetarian option in the compliance category (1) and others in the non-compliance category (0). The standardized variable of past behaviour regarding meat consumption was added as a covariate and the

interaction term (menu by past behaviour) was added to check the assumption of equal regression coefficients. The non-significant effect of the interaction term ( $p=.980$ ) indicated that this assumption was met. Levene's Test showed that the assumption of homogeneity of variance was met as well ( $p=.075$ ). The results of the ANCOVA showed there was a significant main effect of menu on compliance ( $F(2, 321)=5.18, p=.002, r=.21$ ). Comparing the different menus, the all vegetarian menu ( $M=0.64, SE=0.05$ ) scored significantly higher on compliance than the increased offer with indication menu ( $M=0.35, SE=0.06$ ) ( $CI_{.95}[-0.09,0.49], p=.001$ ). The optional adding meat menu ( $M=0.57, SE=0.06$ ) scored significantly higher on compliance than the increased offer with indication menu as well ( $CI_{.95}[-0.02,0.43], p=.026$ ). The increased offer without indication menu ( $M=0.51, SE=0.05$ ) did not differ from the other menus on compliance ( $p's>.190$ ). This is not in line with the expectation as formulated in hypothesis 2b. Figure 6 shows the percentage of participants in the compliance and in the non-compliance category, per menu and in total.

The covariate, past behaviour regarding meat consumption, had a significant effect on compliance as well ( $F(1,321)=10.70, p=.001, r=.18$ ). Regression analysis showed that the more frequently people ate meat in the past seven days, the less likely they were to comply ( $b=-0.09, p=.001$ ).

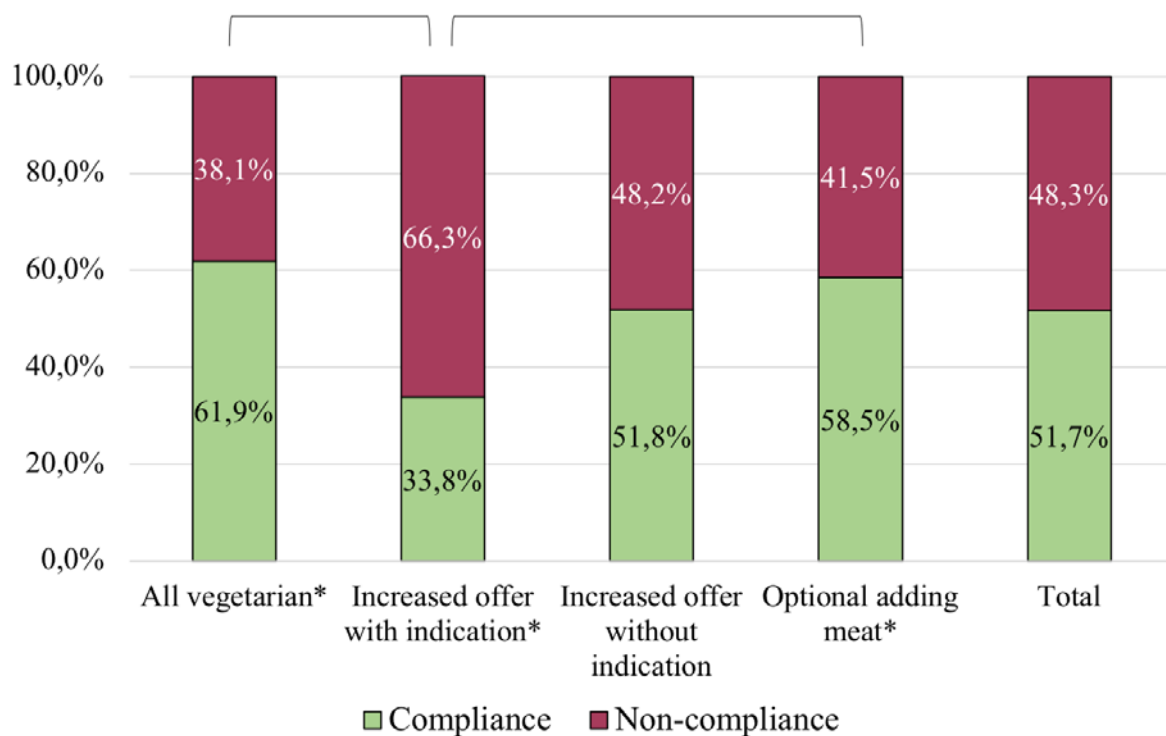


Figure 6. Descriptive summary of compliance (i.e., people wanted to eat at a restaurant and chose a vegetarian option) by menu and compliance in total (N=329) (\* $p<.026$ )

#### 4.4. Reactance

Hypotheses 3a stated that menus that suggest a norm would lead to less reactance than the menu that restricts freedom of choice regarding meat consumption. This was tested using a MANOVA with menu (*all vegetarian vs. increased offer with indication vs. increased offer without indication vs. optional adding meat*) as a factor and threat of freedom and anger as dependent variables. Box's Test shows that covariance matrices of the dependent variables were equal across groups ( $p=.509$ ) and Levene's Test indicates that the homogeneity of variance assumption was met for both variables ( $p's>.056$ ). No significant effect of menu on the combination of dependent variables was found ( $F(6,648)=1.23, p=.289, r=.10$ ). This means that reactance, consisting of threat of freedom and anger, did not differ for menus, and that therefore, hypothesis 3a is rejected. Figure 7 shows the descriptive summary of reactance consisting of threat of freedom and anger for the whole sample.

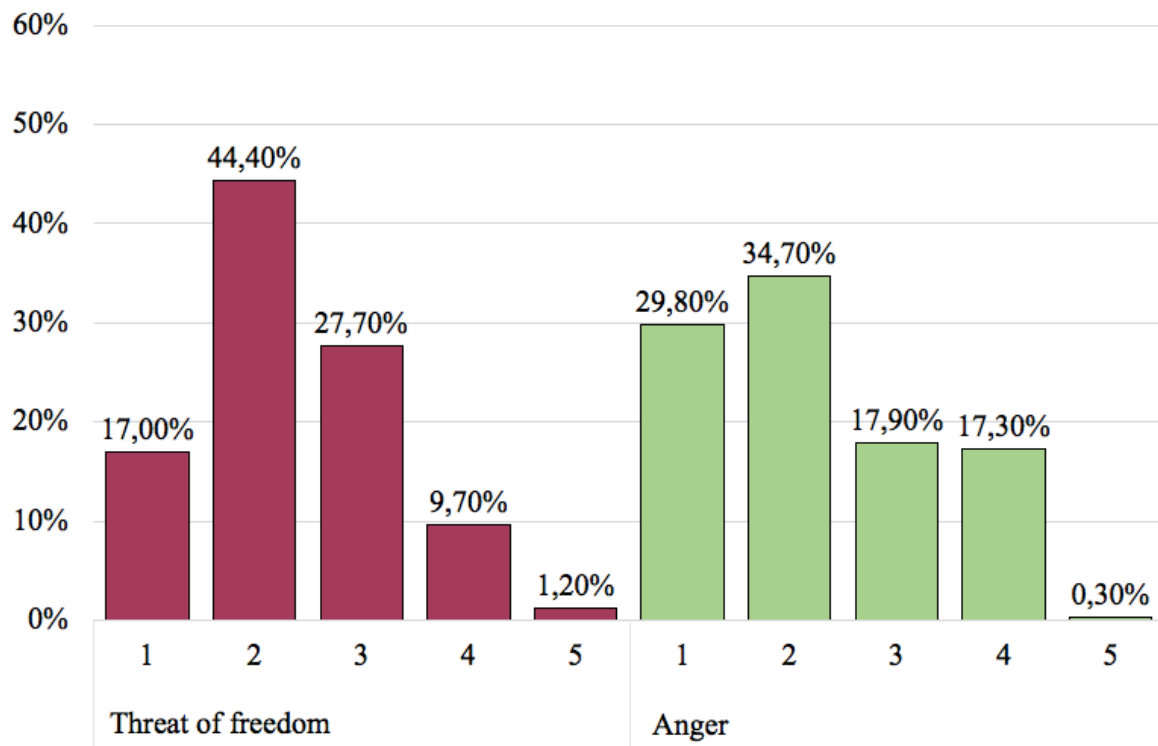


Figure 7. Descriptive summary of participants' reactance, consisting of threat of freedom and anger, measured on a scale from 1 to 5 (N=329) (Threat of freedom: M=2.25, SE=0.05) (Anger: M=2.14, SE=0.06)

According to hypothesis 3b, reactance would influence food choice, willingness to eat at a restaurant and compliance. For food choice, the all vegetarian menu had to be excluded from



analyses, since people had no choice but to choose a vegetarian option. Regression analyses, then, showed that threat of freedom ( $b=0.01$ ,  $t(243)=0.19$ ,  $p=.853$ ) as well as anger ( $b=-0.01$ ,  $t(243)=-0.42$ ,  $p=.677$ ) did not have a significant effect on food choice. Including the all vegetarian menu, threat of freedom ( $b=-0.88$ ,  $t(327)=7.06$ ,  $p<.001$ ) and anger ( $b=-1.08$ ,  $t(327)=-11.68$ ,  $p<.001$ ) did have a significant effect on willingness to eat at a restaurant, in the expected direction. Threat of freedom ( $R^2=.13$ ,  $F(1,327)=49.85$ ,  $p<.001$ ) and anger ( $R^2=.29$ ,  $F(1,327)=137.45$ ,  $p<.001$ ) explained a significant proportion of the variance in willingness to eat at a restaurant. The same goes for the effect of threat of freedom ( $b=-0.09$ ,  $t(327)=-2.80$ ,  $p=.005$ ) and anger ( $b=-0.16$ ,  $t(327)=-5.90$ ,  $p<.001$ ) on compliance. Threat of freedom ( $R^2=.02$ ,  $F(1,327)=7.85$ ,  $p=.005$ ) and anger ( $R^2=.09$ ,  $F(1,327)=34.82$ ,  $p<.001$ ) explained a significant proportion of the variance in compliance as well. It shows that hypothesis 3b can be accepted for the effect of reactance on willingness to eat at a restaurant and compliance, but not for the effect of reactance on food choice.

Last, we will test whether reactance mediates the effect of menu on the dependent variables. Model 4 of the PROCESS Macro for SPSS by Hayes was used to check whether reactance mediated the effect of menu on willingness to eat at a restaurant. The PROCESS output shows that the indirect effect of menu on willingness to eat at the restaurant is not significant for threat of freedom ( $b=-0.02$ ,  $[-0.10,0.06]$ ,  $SE\ B=0.04$ ) as well as for anger ( $b=.02$ ,  $[-0.09,0.12]$ ,  $SE\ B=0.05$ ), and therefore, no mediation is found. Since PROCESS does not accept dichotomous variables as a dependent variable, for food choice and compliance we used the criteria of Baron & Kenny (1986). Since no significant effect of menu on threat of freedom and anger was found ( $p=.289$ ), according to their criteria, there is no mediation. This means that hypothesis 3c can be rejected as a whole.

## 5. Conclusion and Discussion

### 5.1. Conclusion

The aim of this study was to find out how foodservices can effectively stimulate the choice for vegetarian options without inducing reactance. The importance of this question comes from the negative impact of excessive meat consumption on the environment, health (RIVM, 2017) and animal welfare (Wakker Dier, n.d.), from the growing importance of CSR (Micheletti & Stolle, 2008), and from the expected influence of reactance (Campbell-Arvai et al., 2014; Cliteur & Vink, 2014; Lombardini & Lankoski, 2013). Changing the way choices are presented, and more specifically, the usage of norms seems to be a promising strategy to

stimulate people to choose a vegetarian option. Restrictions on the other hand, seem to be less promising. This might be due to the mediating effect of reactance. Therefore, we tested the effectiveness of suggesting norms and using restrictions in stimulating the choice for vegetarian options. Hereby, we looked at the effect of menus on food choice, willingness to eat at a restaurant and compliance (i.e., people are willing to eat at a restaurant and choose a vegetarian option) and examined the role of reactance.

First, looking at menus that suggest a norm, the optional adding meat menu was more effective in stimulating the choice for a vegetarian option than the increased offer with indication menu. No differences between the increased offer without indication menu and the other menus were found. Second, comparing norms and restrictions shows that regardless of which menu people saw, it did not lead to differences in willingness to eat at a restaurant. Interestingly however, as well as the optional adding meat menu, the all vegetarian menu led to more compliance than the increased offer with indication menu, indicating that restrictions can be effective too. Results regarding reactance show that people who experience more reactance are less likely to eat at a restaurant and less likely to comply. Yet, the different menus tested in this study did not lead to differences in reactance, and reactance did not mediate the effect of menus on food choice, willingness to eat at a restaurant, and compliance. Therefore, answering the research question of this study, the all vegetarian menu and the optional adding meat menu will be more effective in stimulating the choice for a vegetarian option than the increased offer with indication menu. The role of reactance does not explain the effectiveness of these menus.

## **5.2. Discussion**

So, first of all, an important insight of this study is that, looking at the menus that suggested a norm, giving people the option to add meat is the most effective in stimulating the choice for a vegetarian option. This could be concluded from its effect on food choice as well as on compliance. As we have seen before, the optional adding meat menu seemed to be the most effective in suggesting a norm as well (Figure 2). Its effectiveness in stimulating the choice for a vegetarian option might be due to this. Therefore, it might be concluded that, as expected based on the scientific literature (Goldstein et al., 2008; Guthrie et al., 2015; Schultz et al., 2007; Wansink, 2015), suggesting a norm can have a positive effect on stimulating the choice for a vegetarian option. The increased offer with indication was less effective in stimulating the choice for a vegetarian option. Therefore, as expected based on Bacon and Krpan (2018) and Guthrie et al. (2015), indications might have a negative impact on the

effectiveness of menus in stimulating the choice for vegetarian options. Bacon and Krpan found that indicating certain options as vegetarian by placing them into a separate category on the menu was the least effective in stimulating the choice for vegetarian options compared to their other menus. Yet, where they expected to rule this out by only indicating that options are vegetarian using a (V), this study shows that this could have a negative impact on stimulating the choice for vegetarian options as well. So, in addition to Guthrie et al., who state that indications on healthy food could have paradoxical effects, results show that the same goes for indications on vegetarian food. Therefore, more and more restaurants giving no indication that certain options are vegetarian at all, as for example “Happy Italy” and “De Gelagkamer” do, might be a promising development in stimulating the choice for vegetarian options.

Second, the all vegetarian menu was effective in stimulating the choice for a vegetarian option as well, as could be concluded from its effect on compliance. Besides this, restrictions did not lead to less willingness to eat at a restaurant compared to the other menus in this study. This is contrary to expectations, since Lombardini and Lankoski (2013) found that restrictions led to non-compliance. A possible explanation they gave for the non-compliance they found is reactance. Therefore, we looked at the role of reactance as well, and we found that it could indeed influence willingness to eat at a restaurant and compliance. Yet, the all vegetarian menu, that restricted freedom of choice, did not induce reactance more than the menus that suggested a norm. Since a perceived threat of freedom of choice usually leads to reactance (Brehm, 1966), it indicates that people did not perceive this when the all vegetarian menu was presented to them. A possible explanation for this is that Lombardini and Lankoski found restrictions leading to non-compliance in Finland in 2013, while due to developments in the Netherlands in the past few years, like more and more people becoming flexitarians (Keuchenius & van der Lelij, 2015) and a decrease in meat consumption (NOS, 2018), it might not lead to non-compliance in this context. In practice, this means that initiatives like “Meat Free Monday” (2018) can be very promising, and prohibiting meat consumption, like discussed by Cliteur and Vink (2014), on the long term may be a possible solution to reduce meat consumption. Yet, we do have to keep in mind that indications seem to have paradoxical effects on stimulating the choice for vegetarian options, and that the all vegetarian menu tested in this study did not include any indications. A suggestion for future research might be to compare the effect of restrictions with and without indications to see if indeed, this influences its effectiveness in stimulating the choice for a vegetarian option.

Unfortunately, we can only compare the menus tested in this study directly with each other. Therefore, results are interesting when choosing to put one of the tested menus in

practice, but research with other reference frames has to reveal what the effects are compared to other menus. Still, while looking at food choice, we can compare the results of this study with other studies to some extent. First, we can compare the norm-menus in this study to the default-menus (including appealing dishes) tested in Campbell-Arvai's (2014) study. The reason for testing menus that suggest norms in this study was to see whether we were still able to stimulate the choice for vegetarian options while giving decision makers easier access to alternatives and the freedom to choose them, as Campbell-Arvai et al. recommended themselves. As we can see though, the menus used by Campbell-Arvai et al. led to a higher percentage of people choosing a vegetarian option than the menus in this study (Figure 8). Since this study also showed that restrictions do not seem to lead to less compliance, this is not surprising. Still, the added value of this study in relation to Campbell-Arvai et al. is that using norms instead of defaults might be more practically applicable for foodservices and seems to be effective in stimulating the choice for vegetarian options to some extent as well (e.g. compared to the information only and control menu from Campbell-Arvai et al.).

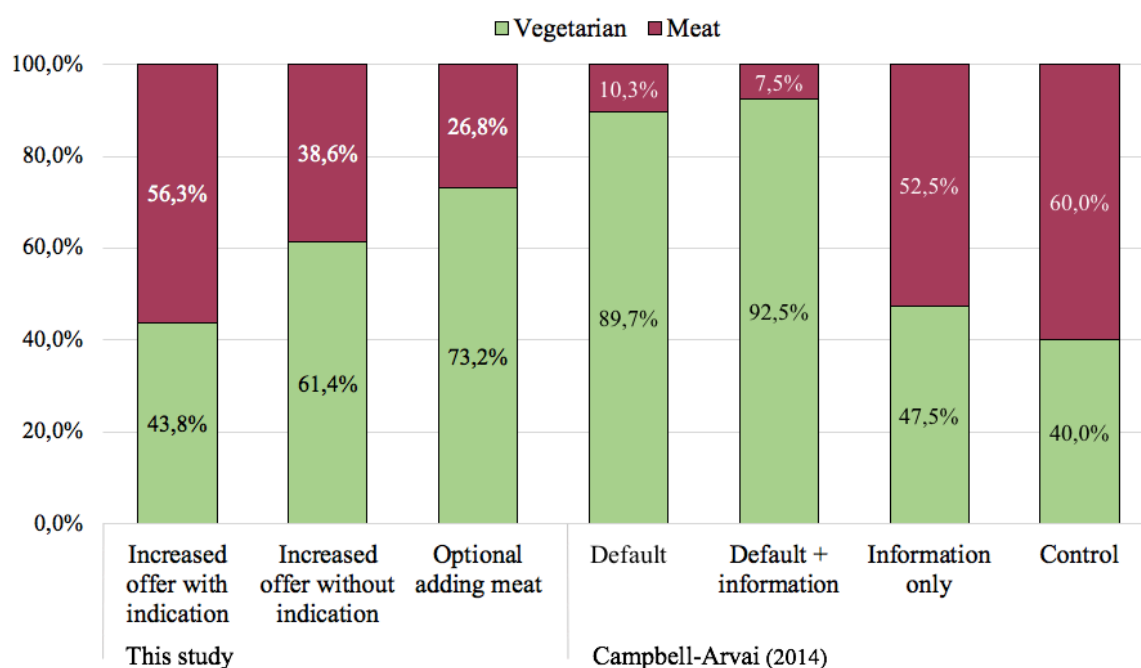


Figure 8. Food choice by norm-menus used in this study and menus used by Campbell-Arvai (2014)

Comparing the norm-menus to the menus tested by Bacon & Krpan (2018), we see that the menus in this study led to a higher percentage of people choosing a vegetarian option (Figure 9). This means that the strategies used in this study probably are more promising than

the strategies used in theirs. This might (partly) be due to the absence of an indication in the form of a (V), as discussed before.

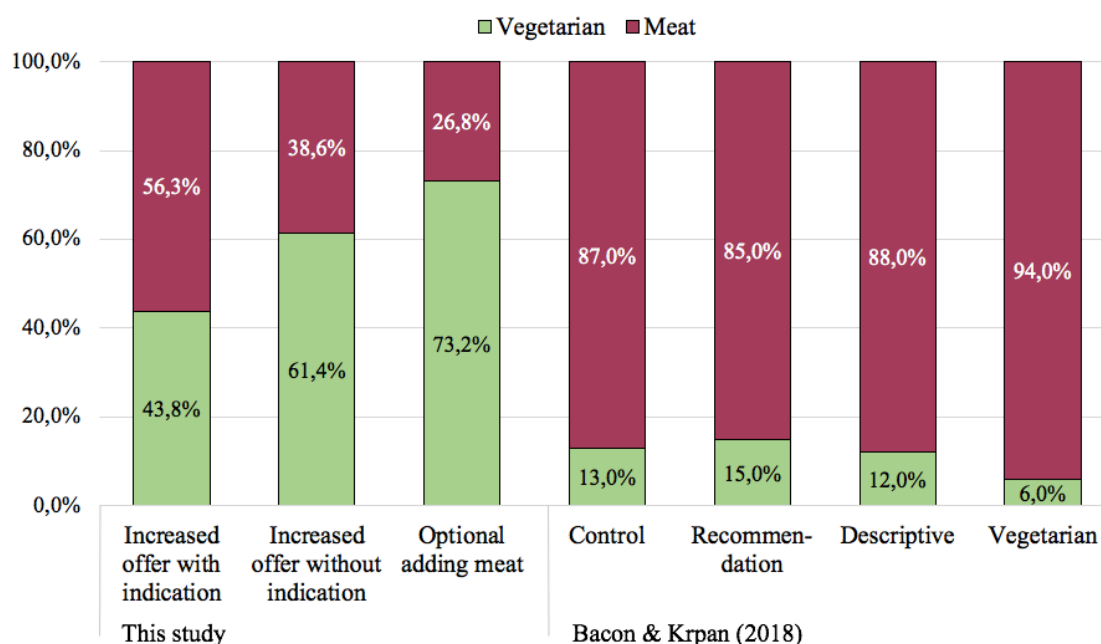


Figure 9. Food choice by norm-menus in this study and menus used by Bacon & Krpan (2018)

Yet, the results found in this study might be partly explained by the sample. It consisted mainly of woman, younger and higher educated people. Probably because of this (RIVM, 2016), participants' past behaviour regarding meat consumption showed that a lot of flexitarians participated. Because of the measurements used in this study, we cannot draw conclusions on changes in behaviour on a personal level. Past behaviour regarding meat consumption did have an effect on food choice and compliance, with people who ate less meat being more likely to choose a vegetarian option and being more likely to comply. Therefore, we have to be careful not to overestimate the overall effects of menus on food choice and compliance.

In this study, no interaction effect of menu and past behaviour regarding meat consumption on stimulating the choice for vegetarian options was found, meaning that the effectiveness of menus in stimulating the choice for vegetarian options did not differ for infrequent and more frequent meat eaters. This while Bacon and Krpan (2018) found that surprisingly, for infrequent meat eaters their menus were less effective in stimulating the choice for a vegetarian option than for frequent meat eaters. This might mean that for

infrequent meat eaters, or so-called flexitarians, the menus used in this study were more effective in stimulating the choice for vegetarian options. Results show that menus with the largest offer in vegetarian options are the most effective. As stated before, the advantage of this is that it responds to the needs and desires of this group of infrequent meat eaters (Klumper, 2017; Lea et al., 2006), which might explain the effectiveness of the menus in stimulating the choice for vegetarian options for this group. Yet, the lack of frequent meat eaters in the sample might explain why no interaction effect was found, and the results may not apply for them. Results regarding reactance could differ based on the sample as well, since for men and older people, reactance is more likely to be induced (Woller, Buboltz, & Loveland, 2007).

So, because of the growing number of flexitarians (Keuchenius & van der Lelij, 2015) and the, despite this, small amount of people that sometimes choose a vegetarian option at a restaurant (Klumper, 2017), this is an interesting group to focus on while investigating how to stimulate the choice for vegetarian options by a restaurant's menu. Yet, for practice, this means that regarding the results of this study, the possible lack of generalizability should be considered. For low-budget restaurants, on which the material used in this study was based, the results of this study might be generalizable to some extent because students (i.e., younger, higher educated people) often go to these kinds of restaurants (FoodService Instituut, 2017). Yet, a suggestion for future research is to reconduct this study with more frequent meat eaters and people who are more likely to induce reactance (regarding this issue) to see if the results found in this study apply to them as well.

Besides this, although no mediating effect of reactance was found, there might be other factors that influence the effectiveness of the menus in stimulating the choice for vegetarian options that are not taken into account. This, for example, manifest itself in people's cognitive responses, where stated that, among others, they did not like the design of the menus or did not like the food that was on it for other reasons than being (mostly) vegetarian. Also, the role of prices should be considered since this might have an important effect on food choice and willingness to eat at a restaurant as well. Besides this, eating meat is seen as important in social processes, as it can be seen as a way of expressing gender, power, religion, culture and identity (Leroy & Preat, 2015). Therefore, social processes, that usually differ per country, type of restaurant or type of customers, can influence the results. Before implementing the menus tested in this study on a large scale, these other factors that might influence their effectiveness in stimulating the choice for vegetarian options should be examined. Probably the most interesting next step is to reconduct this study in a real-life

situation as well, to see if indeed and under what circumstances the menus are effective in stimulating the choice for vegetarian options.

In conclusion, using an all vegetarian menu or an optional adding meat menu seems to be promising in stimulating the choice for a vegetarian option. In particular, it can stimulate people who regularly do not eat meat to choose a vegetarian option while being out for dinner as well. The usage of these menus should be tested in real-life situations to see if indeed, they are effective in stimulating the choice for vegetarian options. Using these menus, then, could contribute to achieving a widespread change in behaviour, namely a reduction of meat consumption, which will have a positive impact on the environment (Green et al., 2015; Horgan et al., 2016; Ranganathan et al., 2016; RIVM, 2017), people's health (RIVM, 2017), and animal welfare (Wakker Dier, n.d.).

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## Appendix A, menus:

### All vegetarian menu

# Menu

## Pizza

### Margherita

Tomatensaus, mozzarella en verse oregano

### Contadina

Tomatensaus, cherrytomaatjes, rucola en krullen Parmezaanse kaas

### Noma

Tomatensaus, ricotta salata kaas, gegrilde aubergine, mozzarella en basilicum

### Gusto

Tomatensaus, rucola en een mix van gegrilde paprika, aubergine en courgette

### Delizioso

Tomatensaus, mozzarella, geroosterde rode paprika en verse oregano

### Ai funghi

Tomatensaus, mozzarella, champignons en verse knoflook

## Overig

### Huisgemaakte hartige taart

Met diverse soorten groenten, aardappel, ui, spinazie en verschillende soorten kaas

### Preitaartje

Rijkelijk gevuld met prei, ui en kaas

### Vegetarische schnitzel

Met keuze uit zigeuner- / peper- / champignon- of satésaus

### Gevulde paprika

Met diverse soorten groenten, ui, kidneybonen, rijst en diverse soorten kaas

### Gefrituurde geitenkaas

Met zoete saus

### Falafelburger

Geserveerd met muntsaus, gemarineerde komkommer, tomaat en ijsbergsla

## Pasta

### Bianca

Knoflook, peterselie, rode peperljes en olijfolie

### Pomodori Secchi

Tomatensaus, rucola, zongedroogde tomaat, pijnboompitten, cherrytomaatjes en Parmezaanse kaas

### Funghi

Roomsaus, champignons en peterselie

### Siciliana

Tomatensaus, buffelmozzarella, basilicum, cherrytomaatjes en Parmezaanse kaas

### Ravioli Verdi

Gevulde pasta met ricotta en spinazie, roomsaus, geitenkaas, rucola en een mix van paprika, aubergine en courgette

### Ravioli Caprese

Gevulde pasta met zongedroogde tomaat, roomsaus, mozzarella, Parmezaanse kaas en basilicumpesto

## Menu

### Pizza

#### **Margherita (V)**

Tomatensaus, mozzarella en  
verse oregano

#### **Contadina (V)**

Tomatensaus, cherrytomaatjes, rucola en  
krullen Parmezaanse kaas

#### **Gusto (V)**

Tomatensaus, rucola en een mix van  
gegrilde paprika, aubergine en courgette

#### **Fiamma**

Tomatensaus, mozzarella, pittige salami en  
rode peperlijes

#### **Ai funghi (V)**

Tomatensaus, mozzarella, champignons en  
verse knoflook

#### **Pollo con extra**

Tomatensaus, mozzarella, rode uien,  
gebakken kipfilet, groosterde rode paprika  
en verse spinazie

### Overig

#### **Preikaartje (V)**

Rijkelijk gevuld met prei en kaas

#### **Varkenshaas**

Met champignonroomsaus of  
peperroomsaus

#### **Vegetarische schnitzel (V)**

Met keuze uit zigeuner- / peper- /  
champignon- of satésaus

#### **Gevulde paprika (V)**

Met diverse soorten groenten, ui,  
kidneybonen, rijst en diverse soorten kaas

#### **Kogelbiefstuk**

Van de grill met kruidenboter

#### **Fa la felburger (V)**

Geserveerd met muntsaus, gemarineerde  
komkommer, tomaat en ijsbergsla

### Pasta

#### **Bianca (V)**

Knoflook, peterselie, rode peperlijes en  
olijfolie

#### **Pomodori Secchi (V)**

Tomatensaus, rucola, zongedroogde  
tomaat, pijnboompitten, cherrytomaatjes  
en Parmezaanse kaas

#### **Carbonara**

Roomsaus, Pancetta spek, ei en  
Parmezaanse kaas

#### **Bolognese**

Bolognesesaus, rundergehakt, selderij,  
wortel, ui, Parmezaanse kaas en peterselie

#### **Sciliana (V)**

Tomatensaus, buffelmozzarella, basilicum,  
cherrytomaatjes en Parmezaanse kaas

#### **Ravioli Caprese (V)**

Gevulde pasta met zongedroogde  
tomaat, roomsaus, mozzarella,  
Parmezaanse kaas en basilicumpesto

## Menu

### Pizza

#### Margherita

Tomatensaus, mozzarella en  
verse oregano

#### Contadina

Tomatensaus, cherrytomaatjes, rucola en  
krullen Parmezaanse kaas

#### Gusto

Tomatensaus, rucola en een mix van  
gegrilde paprika, aubergine en courgette

#### Fiamma

Tomatensaus, mozzarella, pittige salami en  
rode peperljes

#### Ai funghi

Tomatensaus, mozzarella, champignons en  
verse knoflook

#### Pollo con extra

Tomatensaus, mozzarella, rode uien,  
gebakken kipfilet, groosterde rode paprika  
en verse spinazie

### Overig

#### Preitaartje

Rijkelijk gevuld met prei, ui en kaas

#### Varkenshaas

Met champignonroomsaus of  
peperroomsaus

#### Vegetarische schnitzel

Met keuze uit zigeuner- / peper- /  
champignon- of satésaus

#### Gevulde paprika

Met diverse soorten groenten, ui,  
kidneybonen, rijst en diverse soorten kaas

#### Kogelbiefstuk

Van de grill met kruidenboter

#### Falafelburger

Geserveerd met muntsaus, gemarineerde  
komkommer, tomaat en ijsbergsla

### Pasta

#### Bianca

Knoflook, peterselie, rode peperljes en  
olijfolie

#### Pomodori Secchi

Tomatensaus, rucola, zongedroogde  
tomaat, pijnboompitten, cherrytomaatjes  
en Parmezaanse kaas

#### Carbonara

Roomsaus, Pancetta spek, ei en  
Parmezaanse kaas

#### Bolognese

Bolognesesaus, rundergehakt, selderij,  
wortel, ui, Parmezaanse kaas en peterselie

#### Siciliana

Tomatensaus, buffelmozzarella, basilicum,  
cherrytomaatjes en Parmezaanse kaas

#### Ravioli Caprese

Gevulde pasta met zongedroogde  
tomaat, roomsaus, mozzarella,  
Parmezaanse kaas en basilicumpesto

## Optional adding meat menu

# Menu

## Pizza

### Margherita

Tomatensaus, mozzarella en  
verse oregano

### Contadina

Tomatensaus, cherrytomaatjes, rucola en  
krullen Parmezaanse kaas

### Noma

Tomatensaus, ricotta salata kaas, gegrilde  
aubergine, mozzarella en basilicum

### Gusto

Tomatensaus, rucola en een mix van  
gegrilde paprika, aubergine en courgette

### Deliziosa

Tomatensaus, mozzarella, geroosterde  
rode paprika en verse oregano

### Ai funghi

Tomatensaus, mozzarella, champignons en  
verse knoflook

## Overig

### Huisgemaakte hartige taart

Met diverse soorten groenten, aardappel,  
ui, spinazie en verschillende soorten kaas

### Preitaartje

Rijkelijk gevuld met prei en kaas

### Vegetarische schnitzel

Met keuze uit zigeuner- / peper- /  
champignon- of satésaus

### Gevulde paprika

Met diverse soorten groenten, ui,  
kidneybonen, rijst en diverse soorten kaas

### Gefrituurde geitenkaas

Met zoete saus

### Falafelburger

Geserveerd met muntsaus, gemarineerde  
komkommer, tomaat en ijsbergsla

## Pasta

### Bianca

Knoflook, peterselie, rode peperljes en  
olijfolie

### Pomodori Secchi

Tomatensaus, rucola, zongedroogde  
tomaat, pijnboompitten, cherrytomaatjes  
en Parmezaanse kaas

### Funghi

Roomsaus, champignons en peterselie

### Scillana

Tomatensaus, buffelmozzarella, basilicum,  
cherrytomaatjes en Parmezaanse kaas

### Ravioli Verdi

Gevulde pasta met ricotta en spinazie,  
roomsaus, geitenkaas, rucola en een mix  
van paprika, aubergine en courgette

### Ravioli Caprese

Gevulde pasta met zongedroogde  
tomaat, roomsaus, mozzarella,  
Parmezaanse kaas en basilicumpesto

### Optioneel:

+ Rundergehakt

+ Pancetta

+ Ham

Schnitzel van vlees i.p.v. vegetarische schnitzel

+ Gegrilde kip

+ Gebakken kipfilet

+ Salami

Burger van vlees i.p.v. falafelburger



## **Appendix B, instrument:**

Thank you for participating in this study. This helps me to obtain my master's degree in (pro) social communication at Radboud University.

This research concerns food choices. It's about your opinion and therefore there are no wrong answers. Completing the questionnaire will take about 5 minutes.

Your data will be treated confidentially, and you will remain anonymous.

For questions or comments, you can send an e-mail to: [Julie.de.vaan@student.ru.nl](mailto:Julie.de.vaan@student.ru.nl)

By taking part in this study you have a chance on winning one of three bol.com gift cards. By sharing this questionnaire with others, you increase your chances of winning. You can read exactly how this works after completing the questionnaire.

By clicking on the arrow at the bottom right you agree to participate in this research and you can start. You remain free at all times to stop participation without any consequences.

Imagine that you want to go out for dinner tonight with some good friends or family, but you still don't know where. That is why you are looking for a restaurant in the neighbourhood and you find one. To determine whether this restaurant is suitable, you view the menu in advance. Next, you will see this menu. Based on this menu you can indicate how much you would like to eat at this restaurant. You will also be asked to choose the dish that you would order. After that, a number of supplementary and concluding questions will be asked.

\* The menu is showed \*

Indicate on a scale from 0 to 10 how much you would like to eat at this restaurant. 0 means not at all, 10 means very much.

(To fill in 0 you first have to move back and forth the slider)

Click on what you would like to order.

\* Menu with possibility to click on dish(es) \*

Indicate to what extent you agree with the following statements:

The menu threatened my freedom of choice.

The menu tried to make a choice for me.

The menu tried to manipulate me.

The menu tried to exert pressure on me.

Totally disagree - disagree - neutral/don't know - agree - totally agree.

Indicate to what extent you agree with the following statements:

Did you feel angry when you saw the menu?

Did you get annoyed when you saw the menu?

Did you find the menu annoying?

Did the menu irritate you?

Totally disagree - disagree - neutral/don't know - agree - totally agree.

What did you think while seeing the menu?

Do not think about this question too long, write down what first comes to mind.

Do you have certain dietary requirements, allergies or do you not eat certain food for other reasons?

Indicate for each of the following food categories how often you have used it at dinner last week. If you don't know exactly, make an estimated guess based on your eating habits. (To fill in 0 you first have to move back and forth the slider).

Vegetables

Potatoes

Rice

Pasta

Meat

Fish

Eggs

Dairy

What is your gender?

man

Woman

Other

What is your age?

What is your current or last completed level of education?

None

Primary education

Mavo/vbo/vmbo

Mbo/havo/vwo

Hbo

Wo

Other

Thank you for participating in this study. By sharing this questionnaire with others, you increase your chances of winning a bol.com gift card!

The one that attracts the most participants wins a gift card of €15. The second prize is a gift card of €5. Furthermore, a gift card of €5 will be raffled among all participants. All participants are asked to fill in who asked them to participate in this study below. The more often your name is mentioned, the greater your chances on winning a prize.

Do you want to win one of these gift cards? Then enter your name and e-mail address below.

Ask your network to complete the questionnaire as well to increase your chances!

Please note: this question and the question below are not linked to your previous answers in order to guarantee anonymity. Your e-mail address will only be used to contact you regarding the gift voucher and will not be linked to data or used for any other purpose.

Name

E-mail address

Who asked you to participate in this study?

Note: you fill in this question to increase the chance that the person who asked you to fill in this questionnaire will win a prize.

The researcher

Otherwise, namely: