The power of nudging

A field study on the effect menu card design on healthy food choices and consumer evaluation

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Abstract

Background: Past research has shown that four dimensions of menu card design can influence sales of certain food items. That is menu item position, menu card characteristics, menu item description and menu item label. However, what has gone largely unexplored is the effect of these dimensions combined on promoting healthy food items. This study experimentally tested the effects of menu item position, menu card characteristics and menu item description on healthy food choices and consumer evaluation.

Methods: In a real life restaurant, the three dimensions of menu design were tested with a constructive design, which means that in every consecutive condition one more manipulation was added to that specific condition. During the four experimental conditions 21.199 guests ordered lunch, 10.064 ordered a starter and 19.152 guests ordered a main course in the restaurant. A random sub-sample of 522 participants filled in a survey about their choices, health perception and satisfaction.

Results: The results of the field experiment are ambiguous. For the soups and the vegetarian main courses, an uplift in sales is found. For the other food items, there is no common trend. Overall, it seems like the healthy food items became more prominent on the menu card and made it more clear to guests which items were healthy. Nevertheless, the attractiveness of the menu card went down. The results of the customer survey show that menu card manipulations do have a positive effect on the choice of healthy items. However, adding more manipulations at the same time do not lead to a greater effect on the choice of healthy items. Finally, health consciousness did not impact the effect on the choice of healthy items.

Discussion: What factors or influences makes the results of this study different from the results of similar studies presented in the theoretical background? First of all, many of the previous studies do not focus on nudging of healthy items. This can be more difficult than nudging regular food options. Another explanation for the ambiguousness of the results can be the location of the nudge, a restaurant. Numerous participants of the survey made a remark saying that in their daily life they eat healthy, and are less intended to so in an out of home environment. In a restaurant environment, guests want to have a so-called “guilty pleasure” and do not want to think about healthy eating.

Keywords: System 1 thinking, nudging, choice architecture, menu design, health perception, health consciousness
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1. Introduction

In the early 20th century, the primary dietetic concern was chronic under-nutrition. However, during the last decades, the focus has shifted towards obesity as an emerging global problem (Wells, 2012). Obesity can be defined as a condition "where a pathological excess of body fat is present in an individual" (Wabitsch, 2000, pp. 8). The rapid increase of over-nutrition has not been accompanied by an equal decrease in under-nutrition numbers (FAO, 2011; Wells, 2012). Globally, overweight and obesity cause more deaths than underweight. A high energy intake is the main cause of obesity and can be caused by the lack of balance between calories that are expended and those that are consumed. This high level of energy intake is caused by two global trends. First, people consume more food products with a high energy density and products that are high in fat than they did before. Second, people engage less in physical activity due to several reasons, such as changing possibilities of transportation (Lassen et al., 2014). Obesity increases the risk for several diseases. Heart diseases and strokes are one of them, and this was the main cause of death in 2012. Besides, other diseases that can be caused by obesity are diabetes, osteoarthritis, and certain types of cancer (Joshipura et al., 2001; Boffetta et al., 2010; Lassen et al., 2014; WHO, 2015). According to the World Health Organization (2015), the total number of obesity cases more than doubled between 1980 and 2014. In 2014, globally, more than 600 million adults were obese which makes up 13% of the world’s adult population. Besides adults, a large group of children are overweight or obese.

In order to stimulate a healthy lifestyle, several measures are taken by policy makers, e.g. labels with nutritional information and taxes on unhealthy food (Thunström and Nordström, 2012). It is assumed that information creates awareness of the health benefits and can lead to changed behaviour. However, as shown by research in psychology and economics, a great deal of behaviour is based on habits and desires instead of on deliberate reasoning (Kahneman, 2003). Environmental cues and triggers can be of great influence in changing behaviour. This effect is often underestimated, because these cues and triggers influence people unconsciously (Mela, 2001; Rozin and Tuorila, 1999; Wansink, 2004). Nudging can be a valuable tool to encourage healthy food choices by using environmental cues and triggers to nudge people towards healthy choices. Nudging can be defined as "any aspect of the choice architecture that alters people's behaviour in a predictable way, without forbidding any options or significantly changing their economic incentives" (Thaler and Sunstein, 2008, Regulation, 2011, pp. 263). A classic example is that of donor registrations. Countries with an opt-in system, in which only people who explicitly gave consent are donor, have less donor registrations than countries with an opt-out system. With an opt-out system, everyone is automatically registered as a donor, but active refusal is needed if they do not want to be registered (Thaler and Sunstein, 2008).

The increased consumption of foods with a high energy density and high fat percentage can partly be dedicated to the out of home consumption trend. In the US, out of home consumption increased by 640 billion US dollars the past four decades (National Restaurant Association, 2014). This trend is also found in the Netherlands. In 2015, the out of home consumption increased by 643 million euros compared to the year before (Food Service Institute, 2016). However, consuming food outside home, e.g. in a restaurant or canteen, is often connected to a lower intake of nutrients as well as a higher intake of energy. Therefore, eating outside home is causing a less healthy diet, creates wrong dietary habits and
increases the chances of weight gain. Food consumed in restaurants is taking up a larger share of the daily food energy intake than before. Thus, restaurants are good places to encourage healthier food choices to fight the huge obesity increase (Lassen et al., 2014). Healthiness has become increasingly important in the restaurant industry, partly because of governmental concerns and consumer demand for healthy foods. Restaurants need to serve healthy options on their menu to survive in the sector (Hur and Jang, 2015). Besides, they are seen as “a public keeper of health” (Hur and Jang, 2015, pp. 1) by different industries and therefore need to focus on healthy meals (Lee et al., 2014; Wansink and Love, 2014; Yoon and George, 2012).

Despite the fact that many research has been done on nudging, there are still knowledge gaps that need further research. Most studies focus on nudging in non-food settings, such as donor registrations (Johnson and Goldstein 2003), or other medical situations (Volandes and Abbo 2007). Only a limited number of nudging studies focuses on promoting healthy eating. There are some studies that focus on default nudges (Henry and Borzekowski, 2015), even as portion size nudges (Rolls, Morris, & Roe, 2002; Diliberti et al., 2004; Freedman and Brochado, 2010; Levitsky & Pacanowski; Rozin et al., 2003) and nudges that focus on the reorganization of the physical environment (Keller et al., 2015; Van Kleef et al., 2012; Kongsbak, et al., 2016; Rozin et al., 2011; Thunström and Nordström, 2013; Wansink and Hanks, 2013). This study will focus on the choice architecture, specifically on the design of restaurant menus. Despite the research that has been done on food-related nudges, results are ambiguous. According to Kongsbak et al. (2016) this is due to the complexity of the determinants for food choices. Therefore, more research needs to be done regarding food nudges. Besides this, the current study will be done in a real life restaurant with hundreds of guest every day. This adds to the existing literature, because little research is performed in an out of home environment other than school canteens or laboratories (Henry and Borzekowski, 2015).

Restaurant menus are seen as a tool to ensure the success of a restaurant. Therefore, these menus are getting more important, and more research is done on the effects of restaurant menus (Antun and Gustafson, 2005). A great deal of research has been done on different aspects of restaurant menus, i.e. menu planning (Kivela, 2003), menu pricing (Iglesias and Guillen, 2002; Raab et al., 2009), menu analysis (Taylor and Brown, 2007) and menu design. Restaurants can design their menus in various ways. The design of a menu can have an influence on the behaviour of restaurant guests regarding the items ordered. According to Ozdemir and Caliskan (2015), the design of a menu has four dimension that can be manipulated to stimulate behavioural change; menu item position, menu item description, menu item label and menu card characteristics. However, most studies focus on one of the dimensions. Menu item position was investigated by Sobol and Barry (1980), Bowen and Morris (1995), Kincaid and Corsun (2003), Reynolds et al. (2005), Choi et al (2010). And Dayan and Bar-Hillel (2011). Menu item description was the subject of the studies of Schoemaker et al. (2005), McCall and Lynn (2008), Hwang and Lorenzen (2008) amongst others. Wansink et al. (2001/2005), Lockyer (2006) and Guéguen and Jacob (2012) studied the effect of menu item labels. Finally, menu card characteristics are investigated by Reynolds et al. (2005), Choi et al., (2010) and Guéguen et al. (2012). Choi et al. (2010) focus on menu item position as well as on menu card characteristics in their study. Even as Guéguen et al. (2012), who combined the same two dimensions in their study. A combination of more than two dimensions has not been researched before. Therefore, this study tries to
combine the three dimensions to bridge the gap in the existing knowledge. Besides, the studies mentioned above, investigate the effect of menu design on sales, while the current study specifically focusses on choice of healthy items. This study does not focus on increasing the sales of high margin items, but intends to stimulate healthy eating.

Another gap in the existing literature is related to the concept of health consciousness. It is likely that nudges encouraging healthier menu choices work, when consumers are less health conscious regarding their diet. This assumption is based on the findings of Ellison et al. (2013). In their study, Ellison et al. (2013) find that health conscious consumers already possess knowledge with respect to nutritional values and are more likely to choose a healthy item without an incentive. Some research has been done on health consciousness. However, there is a lack of research studying the moderating role of health consciousness on the effect of a choice architecture nudge on consumers’ purchase intention and attitude. The role of healthy consciousness in predicting attitudes and purchase intention of organic products is studied (Chen, 2009; Michaelidou and Hassan, 2008). Health consciousness as a moderator can possibly have an influence on the effectiveness of a nudge that is stimulating healthy eating. This needs to be explored further.

The goal of this study is to contribute to the knowledge of the effect of manipulating three dimensions of a restaurant menu on consumers’ healthy choices and attitudes. The hypotheses of this study are tested in a quasi-experimental field study in a real life a la carte restaurant, in the Netherlands. In addition to the three dimensions that are studied, it is examined how consumers experience and evaluate being nudged and whether health conscious consumers respond differently to the menu card manipulations. The design of the study is constructive. In the first condition only menu item position will be manipulated by placing the healthy items on top of the category list. Condition two adds a second manipulation to the menu card related to the characteristics, e.g. a green box around the healthy items. The third experimental condition adds another manipulation related to menu item description, that is the headline ‘Licht en vers’ (light and fresh). A better understanding of the different dimensions and health consciousness can help marketers, entrepreneurs and managers to make informed decisions about nudging tools in an out of home environment. Restaurants can serve the public interest by stimulating healthier lifestyles. This influence can be significant since restaurants are seen as a public health keeper (Hur and Jang, 2015) and because restaurants are places where currently foods are consumed with a high energy density and high fat percentage (Lassen et al., 2014).
2. Theoretical background and hypotheses

This section integrates relevant literature on consumers’ choice behaviour, nudging in general and menu card nudges. It also provides a conceptual framework and a set of field testable hypotheses. It is in this study’s interest to consult previous research to find out how consumers think and what can influence their decision-making process.

2.1 Modes of thinking

Human beings have two modes of thought. These two cognitive processes are called system 1 and system 2. System 1 is the mode in which decision are taken fast, automatic, effortless and led by emotions. Moreover, these decisions can be taken out of habit and are difficult to control. System 2 operates much slower, and a lot of deliberation has been done. This type of thinking is more effortful and more rational (Kahneman, 2003). According to Schneider and Shiffrin (1977), there are two ways human beings can process; affective and cognitive. Affective reactions occur in an automatic way, while the cognitive reactions are more controlled (Shiv and Fedorekhin, 1999).

Research has shown that individuals do not always make rational decisions. A lot of decision biases occur during the decision making process. This means that humans do not always make a decision that maximize the utility of their choice. Consumers often make such suboptimal choices, which are not good for them or not the best choices they can make. These suboptimal choices are caused by systematic cognitive biases, incomplete information, emotions and the limits of our cognitive capacity. The occurrence of suboptimal choices can be minimized by the use of small changes in the choice environment (Ratner et al., 2008). These interventions are called: libertarian paternalism “a weak form of paternalism that guides consumers to be better off without necessarily restricting their choices” (Thaler and Sunstein, 2003, Ratner et al., 2008, pp. 384). Nudging can be classified under the header ‘libertarian paternalism’.

Suboptimal choices by consumers can be attributed to personal characteristic as well as characteristics of the decision. While most people think that these suboptimal decisions are always caused by the personal characteristics, this is not true. Related to personal characteristics, people can be unmotivated, irrational or unable to decide. However, even when people are motivated to make an optimal choice, external factors related to the decision making process or task can lead to a suboptimal choice (Ratner et al., 2008).

Possible reasons why people make a suboptimal decision are discussed next. Some decisions are made over and over again, e.g. the amount of food they consume multiple times a day. The impact of each decision separately has almost no influence on the outcome. However, people only think about the marginal value of such decisions instead of the cumulative effect (Ratner et al., 2008). Eating a lot of (unhealthy) food during Christmas for example is not necessarily bad for you, since it is only for two days. But, eating in the same manner every day can have serious effects on your health.

Other aspects that can lead to a suboptimal choice are trade-offs. When a consumer faces a trade-off, there are two decisions that can be made. With the first option, the costs of the decision are felt in the short term, while the rewards are felt in the long term. The second option leads to rewards in the short term and costs in the long term (Ratner et al., 2008). An example can be the following: A hungry consumer who is trying to follow a diet is asked by a friend if he would like to have a piece of chocolate pie. Eating the pie leads to short term
rewards (no more hunger), but will have costs for the long term (not very beneficial for a diet). On the other side, refusing the pie means that the consumer is still hungry and is feeling the costs, while the rewards of losing weight are noticeable in the long term. Often, people will go for the option where the rewards are felt in the short term. This is called the present bias. According to O'Donoghue and Rabin (1999), “people place disproportionate weight on outcomes in the present compared to outcomes in the future”.

Finally, self-control problems can lead to suboptimal choices. According to Gulf and Pesendorfer (2001) self-control can be defined as “the ability to resist temptation” (pp. 1411). In relation to purchasing behaviour, self-control can make people decide to buy an essential item instead of doing an impulse purchase. When a person has self-control problems, this leads to suboptimal decision-making (Baumeister et al., 2008).

Even though a lot of reasons exist for consumers to make suboptimal choices, there are measures that can stimulate consumers to choose differently. One of the measures that can accomplish this change of behaviour is nudging. As mentioned before, nudging falls under the header libertarian paternalism and provides consumers with an incentive that will lead to a change in behaviour. Nudging is described in more detail in the next section.

2.2 Nudging
According to Thaler and Sunstein (2008), a nudge is ‘an aspect of choice architecture that alters people’s behaviour in a predictable way without forbidding any options or significantly changing their economic incentives. The choice architecture plays an important role in the decision-making process. Besides, it can provide an environment in which freedom of choice is preserved while at the same time people can be nudged in a certain direction to improve their health (Ackerman, 2014). To encourage healthy food consumption, a change in the environment is often provided as a good option. This because the environment strongly influences overeating and weight gain. To change the environment, a cue in the environment is provided to unconsciously influence consumers in their choice. This changing of the choice environment is often called ‘nudging’ (Giesen et al., 2013). Nudging focusses on the decisions that are made in system 1 mode, the automatic and unconscious decisions (Thaler and Sunstein, 2008).

There are numerous nudges that can be used to alter people’s behaviour. For example, the BEN Centre (Centre for Behavioural Economics and Child Nutrition Program) at Cornell University introduced six measures in a lunchroom in order to nudge students towards healthier food choices. This measures are: “manage portion sizes, increase convenience, improve visibility, enhance taste expectations, utilize suggestive selling and set smart pricing strategies. These principles will then transcend into the following improvements: 1) increased fresh fruit and vegetable consumption, 2) increased consumption of low-fat white milk, and 3) decreased consumption of high-fat and high-calorie foods” (Ackerman, 2014, pp. 11-12). Other possible nudges based on behavioural economics are product placement, package size and fixed-cost pricing (e.g. all you can eat). These nudges can steer people towards healthy choices instead of the unhealthy choices (Ackerman, 2014).
2.2.1 Portion size changes
The past 30 years, portion sizes and food packaging have slowly but constantly increased (Hannum et al., 2004; Nestle, 2002; Young and Nestle, 2002; Wansink et al., 2005). The increased portion and package sizes have an effect on the actual consumption. An increased portion size goes hand in hand with increased consumption (Wansink, 1996; Wansink et al., 2005). Consumers determine consumption norms by portion sizes, which means that when the sizes increase, the consumption norms change as well (Kahn and Wansink, 2004; Wansink et al., 2005). What is presented in a bowl or on a plate is seen by consumer as the "normal" amount of consumption (Birch et al., 1987; Fisher et al., 2003; Roll et al., 2000; Wansink et al., 2005). Some people use visual cues to determine whether they are finished eating, such as an empty plate. Those people are more likely to consume more when the portion size is increased, because they will keep consuming until everything is eaten (EPM-Communications, 2003; Wansink et al., 2005). So, if their portion size would have been smaller, they would have been saturated when finishing the smaller portion and would have a lower energy intake. The visual cue as a benchmark is a relatively automatic process and does not require much deliberation (system 2).

Portion size interventions can be used to stimulate consumers to eat less, which will influence their caloric intake in a positive manner. It can reduce the probability of overconsumption (Vermee et al., 2014). Changes in the environment can reduce portion distortion. Portion distortion can be described as the difficulty people experience in defining normal portion sizes (Bryant and Dundes, 2005). Offering a variety of portion sizes is an example of an environmental nudge used to stimulate consumers to choose a smaller portion to prevent overconsumption (Vermee et al., 2011). In their study, a small portion size was introduced in a cafeteria setting. Results show that 10% of the visitors of the cafeteria replaced a large portion size with a small size.

2.2.2 Default nudge
The choice architecture can change the default option. People tend to choose the default option (Morgan et al., 2015), because 1) it does not require much effort, 2) implied endorsement; people think the default is selected because of its merits and 3) it present the decision maker with a reference point (Dinner et al., 2011). Default changes can be seen as a nudge because it allows people to choose alternatives. It preserves their freedom of choice and influences their behaviour at the same time (Thaler and Sunstein, 2008). Often a default option is present in the choice architecture. This default option is meant for consumers who cannot decide for themselves. If consumer would always make rational choices, a default option would not have any effect on the choices that are made. This, because consumer would choose the option that is best for them, regardless of the default. However, research shows that there is a so-called "status-quo bias" (Samuelson and Zeckhauser, 1988; Kahneman et al., 1991; Thaler and Sunstein, 2008). This concept was developed by Samuelson and Zeckhauser (1988) and is defined as the tendency to stick with the current or default option even when superior options are available. This status-quo bias, originally a decision error, can be used to stimulate healthy choices, i.e. by making the healthy options the default (Downs et al, 2009). In their study, Wisdom et al (2010) made it easier for customers to choose a healthy option from the menu card. This was done by placing the healthier items separately on a pamphlet at the back of the menu. Hereby, the healthy items were made implicit default options. Results showed that participant were more likely to choose healthy if it was more convenient.
2.3 Menu design

According to Ozdemir and Caliskan (2015), who reviewed the existing literature on menu design, menu card manipulations can be organized in four different categories; menu item position, menu card characteristics, menu item description and menu item label. The design of menus can have an effect on the choices people make. Menus can have two separate functions. Related to menu design, a menu is a tool to for restaurants to communicate the foods and beverages offered (Jones and Mifli, 2001). Ozdemir (2012, pp. 191) defines menu design as “the creation of an attractive menu card that not only provides information, but also directs customers’ attention to the items that the foodservice establishment wants to sell more”. Keeping in mind that restaurants are seen as a public keeper of health, more and more restaurants focus on directing customers towards choosing healthy items (Hur and Jang, 2015). The current study will use three dimensions described by Ozdemir and Caliskan (2015) to formulate the hypotheses that are tested, i.e. menu item position, menu card characteristics and menu item description.

2.3.1 Menu item position

The term menu item position can be defined by the “location of the menu item both on the menu card or board, and in a menu category list” (Ozdemir and Caliskan, 2015). Related to menu item position, three topics have been studied. First of all, the effect of a replacement of an item on the restaurant menu on sales has been investigated. Secondly, the relationship between the position of a menu item in a list and the customer’s choice is a topic that has been studied. Finally, the literature has focussed on the parts of a menu card where more eyes are drawn to and are given the most attention.

Previous research on the relation between menu item position and item sales has led to different findings. Some researchers did not find a significant impact on sales, while other researchers found an increase in sales caused by the item position. In 1980, Sobol and Barry tried to study the effect of menu item on sales. This is one of earlier attempts to study this effect. In their study, entree location on a menu board was linked to item sales. Sobol and Barry (1980) found a positive influence on item sales, caused by the placement of starters on a menu board. However, other research found different results regarding the location of the items on the menu. Kincaid and Corsun (2003) investigated the effect of the centre page of a menu. Therefore, in the experimental condition page two and three were switched. However, this did not lead to a change in sales of the items on the centre page. Bowen and Morris (1995) tracked item sales before changing the menu and during the treatment. The treatment consists of relocating the menu items to place where it is expected that consumer put most of their attention, the upper right corner.

Regarding the location of an item within a category list, it is stated that items placed on top of a category list will be chosen more often than items placed elsewhere. A great deal of research has been done on menu item position to support this statement. Dayan and Bar-Hillel (2011) demonstrated that it is beneficial to place items in the beginning of the category list. In a lab setting, four conditions are tested, in which the order of the items differed. In every condition, the items placed on top of the list were selected most by consumers. Moreover, Choi et al. (2010) also tested the effect of the position of items in a menu category list on sales. According to the results, people are more likely to order items that are at the bottom or top of the list, rather than placed in the middle. Wansink and Love (2014) support
this by phrasing that the first items on a menu are trigger items and that consumers are far more likely to choose a healthy starter or main course when it is presented first.

This above mentioned affect can be attributed to the primacy and recency bias (Ozdemir and Caliskan, 2015). Memory plays a big part in the occurrence of these biases. The first and last items on a list are easier to recall. Therefore, primacy and recency biases have an effect on choice behaviour (Mantonakis et al., 2009). Specifically, the first two items and the last item on a list are remembered best (Panitz, 2000).

According to Glenberg et al. (1980), items that presented first are better recalled than items that presented in the middle or bottom of a list. This effect can be attributed to the cumulative rehearsal of the first items. Hence, the information of these items is transferred to long term memory. After the first few items, the consumer suffers from information overload. This means that the items that are processed in the overload stage are not transferred to long term memory and are not as well remembered as the first few items. This is supported by Mantonakis et al. (2009) who stated that the information that is presented first has a greater effect on consumers than information that is presented later on. The primacy effect is also called the “first impression effect”.

### 2.3.2 Menu card characteristics

The characteristics of a menu card refer to ‘features of menu card including copy, colour, paper, typeface, size, photo, and use of boxes (Bowen & Morris, 1995; Kincaid & Corsun, 2003; Kwong, 2005; Reynolds et al., 2005). Consumer psychology has demonstrated that an item can only be chosen by a consumer if it is in the consideration set (Kershaw, 2009; Burton et al., 2006). Restaurant visitors mostly do not consider all the items on a restaurant menu. Some visitors will have a particular item in mind they search for on the menu card, e.g. spareribs or schnitzel. If this is the case, healthier options are not in the consideration set and are not very likely to be chosen (Kolodinsky et al., 2009). For the healthy items to be considered, attention needs to be shifted towards those items. ‘Salience builders’ such as different fonts, font colour, or font size, can help to shift attention. Depictions of the healthy dishes on the menu card can help to shift attention towards these items. This approach is supported by several researchers. Wansink and Love (2014) support the notion of using illustrations to shift attention towards healthy items. Another method that can be used to attract the eye of the consumer is the use of a box around items that need extra attention. Hensdill (1998) tested this hypothesis and found that menu items that come in a box, are presented with a picture or are presented in different colours can increase the sales of that particular item. This statement can also be supported by Kershaw (2009). Besides, the use of uppercase letters, a larger font, an italic or bold font and an exotic font can initiate a similar effect. Even though a great deal of research is done on menu card characteristics, findings are ambivalent. Choi et al. (2010) demonstrated that presenting menu items in boxes increases sales of those items. Boxes on a menu card create sweet spots where customers’ attention is drawn to at first gaze. On the other hand, Reynolds et al. (2005) reported no effect. Boxes were placed around two items on the menu card either right above the centre or right under the centre of the page.
2.3.3 Menu item description

According to Ozdemir and Caliskan (2015, pp. 193), menu item description refers to ‘providing relevant and sufficient information about menu items on a menu card’. Previous literature tried to gain insight in the information customers expect to be on a menu. Another topic of research is the effect of descriptions of menu items on their sales. According to Mills and Thomas (2008), consumers would like to see three types of information on menus. Dietetic information, such as calories and fat, product information, such as ingredients, and food preparation information, such as the method and quality are demanded by consumers. In addition, information on ingredients and nutrition (salt, energy and fat percentage) composition have proven to be valuable to consumers as well (Mackison et al., 2009). Another relevant finding is that consumers would like to see a correct reflection of the dish of their expectations with the description presented on the menu card (Hartwell and Edwards, 2009). With respect to providing nutritional information, the effect can work both ways. Hwang and Lorenzen (2008) demonstrate that customers would like to see information about for example calories and fat percentage. This information is important for consumers because it can assist them in making healthier choices. Increasingly, restaurant visitors, either health conscious or not, want to be able to make informed choices, and nutritional information is needed to do so (Mills and Thomas, 2008; Mackison, Wrieden and Anderson, 2009). However, providing too much nutritional information can have a negative influence on item choice, because of the overload it creates amongst customers. Moreover, they show that to be able to indicate the healthier options on a menu card, an adequate amount of nutritional information is needed to assist them in selecting these items (Roberto et al., 2010; Yoon and George, 2012). In the current study, several items will be set apart under the headline ‘Licht en vers’ (light and fresh). Items placed under that headline are the ones lowest in calories. Setting items apart on a menu card has proven to be effective to stimulate sales of those items. However, the items should not be labelled as ‘Healthy’ (Wansink and Love, 2014). The word healthy is associated with less tasty by many consumers (Raghunathan et al., 2006; Horgren and Brownell, 2002). Therefore, the current study uses ‘Licht en vers’ (light and fresh) which is assumed to activate the perception of health of those items and thereby provide it with enough nutritional information. Perception of health is elaborated upon in the next section.

Several studies paid attention to the relationship between menu item description and item choices. Shoemaker et al (2005) found that detailed menu descriptions abolish the effect of price increases on menu items and therefore have a positive impact on item selection. Besides, McCall and Lynn (2008) reveal that more complex descriptions are preferred over less complex description. The complexity of the dish description raises the number of customers choosing that particular dish. Wansink and Love (2014) show that the description of an item can affect people’s belief of the taste. For example, a seafood filet is seen as tastier if it is described as ‘Succulent Italian Seafood Filet’ (pp. 141).

2.3.4 Menu item label

“Naming menu items with evocative labels instead of regular names” (Ozdemir and Caliskan, 2015, pp.194), that is menu item labelling. There are mixed opinions on the question whether names on labels influence the item choices customers make. According to Wansink et al. (2001), suggestive labelled menu items have higher sales than regular labelled menu items. Descriptive and evocative names are used on menus of a large amount of restaurants. These descriptive names can lead to an increase in sales of those items by
27% (Wansink et al., 2001). Also, the evaluation of the menu item after consumption is more positive for items with a suggestive name (Wansink, et al., 2005). Some words can help persuade customers to choose a particular item, such as ‘tender’, ‘golden’ and ‘natural’ (Lockyer, 2006). Other effective words than can be used on a menu card are ‘Chef’s Recommendation, House Specialty, or a Traditional Favourite’ (Wansink and Love, 2014, pp. 140). This type of words make the items look like the consumption norm and popular and this idea will stimulate sales (Wansink et al., 2005).

2.4 Perception of health
A certain colour can carry a certain symbolic meaning with it, although it appears to be without any content. The symbolic meaning is generally similar amongst different countries and cultures (Elliot et al, 2007). Black, for instance, is a symbol for evilness in many cultures (Sherman and Clore, 2009). The associations that accompany these colours are activated upon sight and influence perceptions (Schuldt, 2013). Many countries make use of the typical traffic light colours green, orange/yellow and red. Based on shared knowledge across countries, green means ‘go’. In some cases, these colours are used to indicate healthy, intermediate and unhealthy food products (Schuldt, 2013). Before consumers make a food or restaurant choice, trade-offs need to be taken into account. On the one side there are short term goals, such as pleasure and enjoyment while on the other hand there are the long term goals, such as health and fitness goals (Chernev and Gal, 2010; Fishbach and Dhar, 2005). When decisions about food are made, the colour green can activate the ‘go’ association and lead to healthier perceptions of the food, even if it is unhealthy. Besides this, the colour green is associated with healthiness, which will promote the healthier view of the food product even more (Schuldt, 2013). This knowledge can play an important role in the current research, because it makes use of the colour green to promote healthy food choices. However, the exact effect cannot be tested, because of the design of the study. This will be further elaborated upon the in the discussion.

2.5 Health consciousness as a moderator
Approximately 30 years ago, the market for healthy products started to develop. Since then, this market has been growing and even nowadays, this market is growing rapidly. Certain consumer segments demand healthy products and the benefits they provide. The group of consumers that is focussed on a healthy lifestyle is becoming larger (Divine and Lepisto, 2005) and are called ‘health conscious consumers’. According to (Michaelidou and Hassan, 2008, pp. 4), “health conscious consumers are aware and concerned about their wellness and are motivated to improve and/or maintain their health, and quality of life to prevent ill health by engaging in healthy behaviours and being self-conscious regarding health”. Health conscious consumers have an interest in the healthiness of the food they consume and engage in physical activity (Kraft and Goodell, 1993). Moreover, they possess an intrinsic motivation which contributes to a good health (Dutta-Bergman, 2004). According to Magnusson (2003), health consciousness is a predictor of attitudes, intentions and actual purchase of healthy food products.

In their study, Ellison et al. (2013) state that the ambiguousness of results of different nudging studies can be attributed to the differences in type of people that are involved. It is possible that nudges have more influence on some groups of people than on others. Health
conscious consumers for example, are actively pursuing a healthy lifestyle, which means they have more knowledge about nutrition. Therefore, it is assumed that nudges do not change behaviour of healthy conscious people, because they already know and choose the foods that fit in their healthy lifestyle. On the other hand, for less health conscious consumers the nudge can provide new information or insights which lead to a change in behaviour. Contrary, according to Burton and Creyer (2004), even food professionals have trouble estimating calories correctly in an out of home environment. Therefore, they state that behaviour of health conscious consumers can change when they are presented with the correct nutritional information or with nudges that push them in the right direction. Despite this last assumption, the current study assumes the impact of menu design on healthy item choice to be greater for less health conscious consumers.

2.6 Conceptual framework
This study supports the notion that menu design can have an influence on sales of selected menu items. Especially placing items on top of a category list, using (green) boxes, a headline and different font sizes are measures that are expected to have an influence on the choice of consumers. Based on this, hypotheses are formulated and tested.

Contrary to a great deal of researcher focusing on the effect of so-called ‘sweet spots’ of a menu card on sales, the current study takes a different approach. The focus of this study is on the location of an item within a category list. Therefore, it is stated that items placed on top of a category list will be chosen more often than items placed elsewhere. The statement is based on the findings of Dayan and Bar-Hillel (2011), Choi et al. (2010) and Wansink and Love (2014), who found positive effects on sales by placing their target items on top of the category list. Target items in this study are healthy options.

Regarding menu card characteristics, the current study assumes that shifting attention towards healthy options by the use of a green box will stimulate sales when presented on top of the category list. Reynolds et al. (2005) did not find an effect on sales when they used boxes to stimulate sales of those items. However, the boxes Reynolds et al. (2005) used were placed on the sweet-spots of the menu card. The current study will place the boxes on top of the category list. Another menu card characteristic that is used in the current study is font size. According to Kolodinsky et al. (2009) font size is a salience builder, which can help to shift attention towards particular items. This is supported by Kershaw (2009), who states that the use of a larger font can lead to increased sales of that item.

Setting items apart on a menu card has proven to be an effective measure to stimulate the sales of those items (Wansink and Love, 2014). Besides, consumers demand an adequate amount of nutritional information. It is assumed that the headline ‘Licht en vers’ (light and fresh) will provide this information for consumers. This is based on the assumption that the headline will trigger a higher perception of healthiness of the items presented under the headline.

The constructive design of the study makes it impossible to test the individual factors of menu design that can have an influence of consumers’ choice. However, a comparison between the different conditions can be made. Therefore, the following hypotheses are formulated;
**H1:** Menu design has a positive influence on the choice of healthy items on a menu card

**H2:** The more changes are made to the menu design (sequence, (green) box, font size, subheading) the greater the positive influence on the choice of healthy items

Health consciousness as a moderator on the effect of menu card design on sales of healthy items has not been study before. Therefore, there is no detailed support for the chosen hypothesis with respect to health consciousness. However, Ellison et al (2013), found that nudges have a larger impact on consumer who are not very health conscious. Health conscious consumers are more likely to choose healthy items without any manipulation because of their knowledge and motivation. In line with the study of Ellison et al. (2013), the following hypothesis is formulated;

**H3:** The less health consciousness people are, the stronger the effect of menu design on choice for a healthy item.

The conceptual model, based on the above mentioned hypotheses is visually presented in Figure 1.

![Figure 1. Conceptual framework](image-url)
3. Methodology

3.1 Field experiment

Setting and context. The experiment was conducted for 12 weeks and took place from the 18th of April 2016 till the 10th of July 2016. Restaurant 'de Cantharel' is a large restaurant, which can accommodate hundreds of people every night. The restaurant is known for its use of regional ingredients of traditional suppliers, and has its own vegetable and herbs garden. The menu offered at the restaurant is comprised of dishes that are served throughout the year and of dishes that are served in a particular season. The restaurant is open every day from 10.00u till 22.00u. Guests can have lunch at the restaurant from 10.00 till 17.00 and dinner from 17.00 until 22.00. Van der Valk has two separate dining rooms. On a busy day, the guests that choose the live cooking buffet eat in a separate dining room than the guests that choose to eat a la carte. On a quieter day the guests are seated on separate sides of the same dining room.

Study design. A quasi experimental field study with four experimental conditions was used to study the effect of changing the restaurant menu on the sales of the dishes. In these four conditions, a different manipulation of the menu card was used. The design of the study is constructive, which means that in every condition a manipulation will be added (Table 1). In the first condition the healthy options of the menu card are placed at the top of the item category list. This manipulation is related to the dimension ‘menu item position’. The second condition places the healthy items on top of the category list and makes use of a green box around the healthy items. The third condition adds the headline ‘Licht en vers’ (light and fresh) to the menu card. That means that the menu card in the third condition will have the healthy items placed on top and a box around it, and placed under the headline ‘Licht en vers’ (light and fresh). A green background will be added to the green box in condition three. Another addition is that the healthy items are in a larger font size than the other items. The fourth condition is the control condition. For this condition, the current (March, 2016) restaurant menu will be used. Examples of the menu designs are displayed in Appendix 1. The number of items presented in the green box cannot be too large. If the items in de box are chosen more often than without a green box, and there are many items presented in this box, the effect will diminish if the number of items in the box gets larger. Therefore, the green boxes cannot contain more than four healthy items.

<table>
<thead>
<tr>
<th>Table 1. Manipulations and dimensions of the experimental conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Control condition</strong></td>
</tr>
<tr>
<td>-----------------------</td>
</tr>
<tr>
<td>Condition 1</td>
</tr>
<tr>
<td>Condition 2</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Condition 3</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Justification of healthy choices. According to the Dutch non-profit organization ‘het Voedingscentrum’, all kinds of meat can be assigned to of the following three categories: preferred meats, an in-between category, and exceptions. The preferred meat category
entails amongst others steak, entrecote, chicken, tournedos and pork tenderloin. The types of fish that can be categorized as preferred are: salmon, mackerel, lobster, shrimp and eel. Furthermore, restaurant Van der Valk de Cantharel provided information on the ingredients of every item on the menu card. Quantities of every ingredient were provided as well. Based on the ingredient information, nutritional information i.e. amount of calories was determined. This was done for every item on the menu card to compared the healthiness of the different items on the menu card. The meat and fish categories ‘het Voedingscentrum’ provided were used as well to determine the healthiest items on the menu card. The sequence of the items on the menu card is determined by the amount of calories. Dishes with the least amount of calories are placed on top of the list, and the dish with the most calories is placed on the bottom of the list. Guests of the restaurant are nudged towards the items placed on top. The nutritional values of the items on the menu card are displayed in Tables 12 till 16 (Appendix 2).

Participants. All the guests that visited the restaurant during the experimental period could be participants of the study. All the food choices were monitored by the cash register data. Before and during the visit to the restaurant, the guests were not conscious of their participation in the study. A sub-sample of this group of participants was selected to fill out a survey. In total the number of guests who visited the Van der Valk restaurant to have lunch during the experimental period consisted of 21.199 guest. With respect to starters this number is 10.064 guests and 19.152 guest visited the restaurant to have dinner during the experimental period.

Measures. Cash register sales data was collected during the different experimental conditions. The key dependent variables were consumer purchases of the healthy items. The number of healthy items that are sold were recorded by the computer based sales system of the Van der Valk restaurant. The records were collected on conditional basis during a period of 12 weeks.

Data analysis. The main outcome variable in this study is the choice made by participants and especially if this choice was healthy or not. The relative percentages on the number of healthy items chosen were compared and the results were described and analysed using adjusted residuals.
3.2 Customer survey
During the control condition and the three experimental conditions, a sample of guests eating a la carte at the restaurant were asked to fill in a questionnaire. The guests visited the restaurant either during their stay at the hotel or solely to have a meal. Not all guests of the restaurant filled out the survey, a sub-sample was selected randomly. No reference was made to the intervention that had taken place. Potential participants were asked to fill in the survey by the researcher when they were presented with the bill or while they were waiting for their food. The restaurant guests completed the questionnaire at their table any time they wanted. In total, 522 participants (52.9% women) completed the survey and gave their informed consent. The number of individuals that filled in the questionnaire was 132 in the control condition, 131 in condition 1, 130 in condition 2 and 129 in condition 3. These numbers can be found in Table 2. Participants’ mean age was 52 (SD = 16.01). The questionnaire consists of 12 questions about their choices, satisfaction and several demographic questions. Participants were treated in same manner throughout the four different conditions. Filling in the questionnaire took approximately 5 minutes per participant. Participants were selected on the basis of their choices for either a live cooking buffet or a la carte. Only guests who choose to eat a la carte were eligible for this study.

Table 2. Number of respondents and percentage of women per condition

<table>
<thead>
<tr>
<th>Condition</th>
<th>Number of resp. lunch</th>
<th>Number of resp. diner</th>
<th>Total number of resp.</th>
<th>Percentage women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>69</td>
<td>63</td>
<td>132</td>
<td>49.2</td>
</tr>
<tr>
<td>Condition 1</td>
<td>63</td>
<td>68</td>
<td>131</td>
<td>59.5</td>
</tr>
<tr>
<td>Condition 2</td>
<td>65</td>
<td>65</td>
<td>130</td>
<td>46.9</td>
</tr>
<tr>
<td>Condition 3</td>
<td>64</td>
<td>65</td>
<td>129</td>
<td>55.8</td>
</tr>
<tr>
<td>Total</td>
<td>261</td>
<td>261</td>
<td>522</td>
<td>52.9</td>
</tr>
</tbody>
</table>

Measures. Respondents were first asked to indicate the choices they made with respect to starters and main courses. Next, guests were presented with a set of statements that could be important while eating out of home. On a 5-point scale ranging from ‘completely disagree’ to ‘completely agree’ respondents had to indicate the extent to which they agree with these statements.

One item measured the extent to which consumers felt pressured into choosing the healthy options on the menu card: “I felt like I could choose whatever I wanted”. It is important that the manipulation of the menu card allows guests to choose freely. This supports the concept of libertarian paternalism, which is important criteria for nudging. This item was followed by an items on the easiness of making a choice: “It was easy to make a choice from this menu card”. The attractiveness of the menu card was tested with one item. Even as the amount of healthy dishes offered. Another manipulation check is the item: “It was clear to me which dishes are healthy/healthier”. The menu card in the three conditions should clearly indicate which dishes are healthier than others. The perception of healthiness of the items chosen, was measured with one item: “I made a healthy choice today”.

Two statements focused on contentment of the variety of dishes to choose from, and the number of healthy alternatives on the menu card. These items were measured on a 5-point scale ranging from “extremely dissatisfied” to “extremely satisfied”. The extent to which respondents could be classified as health consciousness was measured with three items...
based on Dutta-Bergman (2004); “It is important for me to eat healthy in a restaurant”, “I try to avoid unhealthy food when I eat in an out of home environment” and “I think about the amount of calories of a dish on the menu when I eat in an out of home environment”. To test the reliability of the scale, the most common measure is used; Cronbach’s alpha. The results of the test show that all the items correlate with the total score from the questionnaire, which is needed for a reliable scale and that none of the values are lower than .3 which would make them not correlate well with the scale overall. Deletion of any of the items leads to a lower value of Cronbach’s alpha. A Cronbach’s alpha value in the range of 0.7 and 0.8 is good. Cronbach’s alpha for these three items is 0.725 which means that the items represent a reliable scale for the construct of health consciousness. Because of the reliability of the health consciousness scale, a new item is created with the average of the values of these three items.

Furthermore, several studies investigated demographics characteristics of healthy conscious consumer. According to Divine and Lepisto (2005), men are less likely to maintain a healthy lifestyle than women. Besides, age is proven to be a predictor as well. Older people are more likely to focus on a healthy lifestyle and eat accordingly. Divine and Lepisto (2005) finding that gender is a predictor of health consciousness is supported by Ellison et al. (2013). They found that women are more health conscious and order less caloric meals in restaurants. On the other hand, no significant results were found for education and age. Based on these findings, gender and age are included in this study. Other demographics that are included in the questionnaire are the occasion for eating at this restaurant and the company they dined with. Finally, participants were asked if they dinned in the restaurant before and if this was on a regular basis.

Data analysis. A logistic regression was performed with choice of a healthy item as a dependent variable and condition as an independent variable. Health consciousness was added as a moderator. Ratings on freedom of choice, menu attractiveness and satisfaction were analysed using analyses of variance (ANOVA) with these ratings as dependent variables and condition as independent variables. If the scores of the different conditions differed significantly, a Games-Howell post hoc test was performed. All analyses were performed using SPSS statistical software (SPSS version 22.0).
4. Results

4.1 Field experiment

During the experimental period, the healthiest items on the menu card were stimulated by different menu card manipulations. Restaurant Van der Valk provided their cash register data per condition to find the results of those menu card manipulations. The results are presented in a descriptive manner.

For the lunch items, the guests were nudged towards the following four items: Carpaccio, Vis hors d’oeuvre, Caesar Salade and Handgemaakt desembrood. In the control condition, 11,1% of the guests chose a healthy lunch item, while 64,0% chose an unhealthy lunch item. The other 24,9% of the guests did not eat a la carte, but selected the lunch buffet.

In condition 1, the percentage of guests that chose a healthy lunch item increased to 12,2%, whereas the percentage of guests that chose unhealthy items decreased to 62,3%. This is an increase of 9,9% in the share of healthy choices, compared to the control condition. The increase in the share of healthy items in condition 1 compared to the control condition is significant, $p = .048$. The share of unhealthy choices decreased with 2,7%. This decrease in share of the unhealthy choices compared to the control condition is significant, $p = .042$.

In the second condition, where the green box was put around the healthy items, 10,3% of the guests chose a healthy lunch item, compared to 65,4% of the guests choosing an unhealthy item. This is a decrease of 7,2% in the share of healthy choices compared to the control condition. However, this decrease was not significant compared to the control condition, $p = .193$. With respect to the unhealthy items, an increase of 2,2% in the share of unhealthy choices can be found compared to the control condition, which was also not significant $p = .170$.

The third condition, which involves green boxes around the healthy items and a headline, present us with an even lower percentage of healthy choices, 10,3%. This is a decrease of 8,1% in the share of healthy choices compared to the control condition. This decrease in the share of healthy choices was not significant, $p = .154$. With respect to the unhealthy choices, the share increased with 1,9%, compared to the control condition, to make up 65,2% of the guests’ choices. However, this increase was non-significant, $p = .226$. Figure 2 presents the percentages of the healthy and unhealthy choices for the different conditions. An overview of the changes in the shares can be found in Table 3.
Figure 2. Healthy and unhealthy lunch items sold during the experimental period for the control condition and the three experimental conditions

<table>
<thead>
<tr>
<th>Dish</th>
<th>Condition 1</th>
<th>Sig.</th>
<th>Condition 2</th>
<th>Sig.</th>
<th>Condition 3</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy lunch items</td>
<td>+9.9%</td>
<td>.048*</td>
<td>-7.2%</td>
<td>.193</td>
<td>-8.1%</td>
<td>.154</td>
</tr>
<tr>
<td>Unhealthy lunch items</td>
<td>-2.7%</td>
<td>.042*</td>
<td>+2.2%</td>
<td>.170</td>
<td>+1.9%</td>
<td>.226</td>
</tr>
</tbody>
</table>

*** p<0.01, ** p<0.05, * p<0.1

Regarding starters, the restaurants guests were nudged towards the following starters; Biologisch drie minuten eitje, Hollandse garnalen, Broodplankje and Carpaccio. The soups that were marked as healthy were the Groentebouillon and the Tomatensoep. In the control condition, 56.7% of the guests chose a healthy starter, while 14.8% chose an unhealthy starter. From the remainder of the guests who ordered a starter, 19.4% chose a healthy soup and 9.1% chose an unhealthy soup. Together, these percentages add up to 100. Taken both the starters and the soups together, 76.1% of the guests ordered a healthy item versus 23.9% who made an unhealthy choice.

In condition 1, where the sequences of the dishes changed, 56.4% of the guests ordered a healthy starter compared to 16.5% who ordered an unhealthy starter. Compared to the control condition, the share of healthy starters decreased with 0.5%. However, this difference is not significant, p = .829. The share of unhealthy starters increased with 11.6%, which differed marginally from the share in the control condition, p = .072. With respect to the soups, the share of the healthy soups decreased with 6.7% compared to the control condition (p = .212) while the share of unhealthy soups decreased as well with 1.1% (p = .827).

In the second condition, where the green box was put around the healthy items, 52.7% of the guests chose a healthy starter. Compared to the control condition, this share decreased with 7.1% (p = 0.005). With respect to the unhealthy starters, the share decreased with 2.7% compared to the control condition (p = .723), to make up 14.4% of the guests’ choices. The percentage of guests that ordered a healthy soup is 20.3% in condition 2. This is an increase in share of 4.6% compared to the control condition (p = .407). The unhealthy soups were
also chosen more often, 12.5%. This is an increase in share of all starters of 37.4% compared to the control condition (p = .000).

The third condition, which involves green boxes around the healthy items and a headline, presents us with a percentage of 51.8% for healthy starters. This is a decrease in share of 8.6% compared to the control condition. This is a significant decrease compared to the share in the control condition, p = .000. The share of unhealthy starters increased with 7.4% to make up 15.9% of the starter choices. This increase in share is not significant compared to the control condition, p = .278. With respect to the soups; 19.7% of the guests chose a healthy soup, which is an increase in share of 1.6% compared to the control condition (p = .757). Regarding unhealthy soups; 12.6% chose an unhealthy soup. This is an increase of 38.5% in the share of all starters compared to the control condition (p = .000). Figure 3 and 4 show the percentages of the healthy and unhealthy choices for the different conditions. An overview of changes in the shares can be found in Table 4 and 5.

Figure 3. Healthy and unhealthy starters sold during the experimental period for the control condition and the three experimental conditions

Table 4. Percentage change in the share of sales of starters of the three conditions compared to the control condition

<table>
<thead>
<tr>
<th>Dish</th>
<th>Condition 1</th>
<th>Sig.</th>
<th>Condition 2</th>
<th>Sig.</th>
<th>Condition 3</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy starters</td>
<td>-0.5%</td>
<td>.829</td>
<td>-7.1%</td>
<td>.005**</td>
<td>-8.6%</td>
<td>.000***</td>
</tr>
<tr>
<td>Unhealthy starters</td>
<td>+11.6%</td>
<td>.072*</td>
<td>-2.7%</td>
<td>.723</td>
<td>+7.4%</td>
<td>.278</td>
</tr>
</tbody>
</table>

*** p<0.01, ** p<0.05, * p<0.1
Healthy and unhealthy soups sold during the experimental period for the control condition and the three experimental conditions

Table 5. Percentage changes in the share of sales of soups of the three conditions compared to the control condition

<table>
<thead>
<tr>
<th>Dish</th>
<th>Condition 1</th>
<th>Sig.</th>
<th>Condition 2</th>
<th>Sig.</th>
<th>Condition 3</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy soups</td>
<td>-6.7%</td>
<td>.212</td>
<td>+4.6%</td>
<td>.407</td>
<td>+1.6%</td>
<td>.757</td>
</tr>
<tr>
<td>Unhealthy soups</td>
<td>-1.1%</td>
<td>.857</td>
<td>+37.4%</td>
<td>.000***</td>
<td>+38.5%</td>
<td>.000***</td>
</tr>
</tbody>
</table>

For the meat main course, the dishes Biefstuk, Boerenvarkenshaas, Duitse Biefstuk, and Tournedos are marked as the healthiest. With respect to the vegetarian dishes; Loempia Cantharel, Gebakken sliptong (2 pieces and unlimited), Zalmfilet and Pasta Gamba’s are the dishes the guests were nudged towards. In the control condition, 27.5% of the guests chose a healthy meat main course, while 45.8% chose an unhealthy meat main course. From the remainder of the guests who ordered a main course, 15.3% selected a healthy vegetarian main course and 11.4% selected an unhealthy vegetarian main course. Together these percentages add up to 100%. Taken all main courses together, 42.8% of the guests ordered a healthy item versus 57.2% who made an unhealthy choice.

In the first condition, where the sequence of the dishes changed, 26.0% of the guests ordered a healthy meat main course. That means that the share of this type of main course decreased with 5.5%, p = .059. With respect to the unhealthy meat main courses, 43.4% of the guests chose this type of main course, which is a decrease in share of 5.2% compared to the control condition, p = .009. Furthermore, 17.7% of the guests chose a healthy vegetarian main course, this increased the share with 15.7%. This is a significant increase compared to the control condition, p = .001 The share of unhealthy vegetarian main courses increased as well with 14.0% to make up 13.0% of the guest who choose this type of main course, p = .008.

Condition 2, where the green box was put around the healthy items, shows that 26.4% of the guests chose a healthy meat main course. This is a decrease in share of 4.0%, p = .226. With respect to the unhealthy meat main courses, the share decreased with 5.9% compared to the control condition and makes up 43.1% of the guests (p = .012). The guests that ordered a healthy vegetarian main course make up 17.3% of the guests. This is an increase
in share of 13.1% compared to the control condition (p = .008). On the other hand, 13.1% of the guests ordered an unhealthy vegetarian main course. Compared to the control condition, the share for this type of main course increased with 14.9% (p = .011).

The third condition, which involves green boxes around the healthy items and a headline, 26.2% of the guests chose a healthy meat main course. This is a decrease in share of 4.7% compared to the control condition, p = .145. The share of unhealthy meat main courses decreased as well with 5.0% to make up 43.9% of the main course choices (p = .022). With respect to the vegetarian main courses; 17.7% of the guests chose a healthy vegetarian main course, which is an increase in share of 15.7% compared to the control condition. This is a significant difference compared to the control condition, p = .001. Regarding unhealthy vegetarian main courses; 12.6% chose an unhealthy item. This is an increase of 10.5% in the share of all main courses compared to the control condition, p = .064. Figure 5 and 6 present the percentages of the healthy and unhealthy choices for the different conditions. An overview of changes in the shares can be found in Table 6 and 7.

Figure 5: Healthy and unhealthy meat main courses sold during the experimental period for the control condition and the three experimental conditions

Table 6. Percentage changes in the share of sales of meat main courses of the three conditions compared to the control condition

<table>
<thead>
<tr>
<th>Dish</th>
<th>Condition 1</th>
<th>Sig.</th>
<th>Condition 2</th>
<th>Sig.</th>
<th>Condition 3</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy meat main courses</td>
<td>-5.5%</td>
<td>.059*</td>
<td>-4%</td>
<td>.226</td>
<td>-4.7%</td>
<td>.145</td>
</tr>
<tr>
<td>Unhealthy meat main courses</td>
<td>-5.2%</td>
<td>.009*</td>
<td>-5.9%</td>
<td>.012**</td>
<td>-5%</td>
<td>.022**</td>
</tr>
</tbody>
</table>

*** p<0.01, ** p<0.05, * p<0.1
Figure 6. Healthy and unhealthy vegetarian main courses sold during the experimental period for the control condition and the three experimental conditions.

Table 7. Percentage changes in the share of sales of vegetarian main courses of the three conditions compared to the control condition.

<table>
<thead>
<tr>
<th>Dish</th>
<th>Condition 1</th>
<th>Sig.</th>
<th>Condition 2</th>
<th>Sig.</th>
<th>Condition 3</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy vegetarian main courses</td>
<td>+15,7%</td>
<td>.001***</td>
<td>+13,1%</td>
<td>.008***</td>
<td>+15,7%</td>
<td>.001***</td>
</tr>
<tr>
<td>Unhealthy vegetarian main courses</td>
<td>+14%</td>
<td>.008***</td>
<td>+14,9%</td>
<td>.011**</td>
<td>+10,5%</td>
<td>.064*</td>
</tr>
</tbody>
</table>

*** p<0.01, ** p<0.05, * p<0.1
4.2 Customer survey

4.2.1 Lunch group

General descriptives and randomization checks
Overall, 121 men and 140 women participated in the customer survey during the lunch. Across conditions gender was equally balanced ($\chi^2(3, 260) = 3.089, p = .378$). The mean age of the participants in the lunch group was 50 years (SD = 15.798). There were significant differences in the mean age of participants ($\chi^2(195, 255) = 229.795, p = .045$), and the occasion that brought the participants to the restaurant ($\chi^2(6, 255) = 22.992, p = .001$). There were also differences across conditions in the company they have dinner with ($\chi^2(9, 259) = 20.179, p = .017$), but no differences in the frequency of visiting the restaurant ($\chi^2(15, 175) = 13.482, p = .565$). Finally, there were differences in the health consciousness of the participants ($\chi^2(36, 260) = 61.26, p = .005$). An overview of the different numbers per condition can be found in Table 8. Even though age, occasion, company and health consciousness differed significantly between conditions, regression shows that the effects of the variables that differ across conditions do not have a significant effect on the dependent variable, $p = .711$, $p = .218$ and $p = .619$ respectively. Therefore, the differences among the conditions with respect to these variables do not influence the results severely.

Table 8. Overview of demographics of survey participants in the lunch group

<table>
<thead>
<tr>
<th></th>
<th>Control condition</th>
<th>Condition 1</th>
<th>Condition 2</th>
<th>Condition 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (% female)</td>
<td>47.8%</td>
<td>61.9%</td>
<td>55.4%</td>
<td>50%</td>
</tr>
<tr>
<td>Age (mean)</td>
<td>52.4</td>
<td>51.7</td>
<td>57.6</td>
<td>54.9</td>
</tr>
<tr>
<td>Occasion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>%family</td>
<td>46.3%</td>
<td>44.4%</td>
<td>50.8%</td>
<td>70.5%</td>
</tr>
<tr>
<td>% business</td>
<td>35.8%</td>
<td>27%</td>
<td>21.5%</td>
<td>3.3%</td>
</tr>
<tr>
<td>%friends</td>
<td>17.9%</td>
<td>28.6%</td>
<td>27.7%</td>
<td>26.2%</td>
</tr>
<tr>
<td>Company</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% alone</td>
<td>5.9%</td>
<td>4.8%</td>
<td>3.1%</td>
<td>0%</td>
</tr>
<tr>
<td>% with other adults</td>
<td>69.1%</td>
<td>82.5%</td>
<td>87.7%</td>
<td>71.9%</td>
</tr>
<tr>
<td>%with other adults/children</td>
<td>22.1%</td>
<td>9.5%</td>
<td>6.2%</td>
<td>28.1%</td>
</tr>
<tr>
<td>%with children</td>
<td>2.9%</td>
<td>3.2%</td>
<td>3.1%</td>
<td>0%</td>
</tr>
<tr>
<td>Frequency of visiting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>%once every two weeks</td>
<td>10.7%</td>
<td>0%</td>
<td>4.2%</td>
<td>4.4%</td>
</tr>
<tr>
<td>%once a month</td>
<td>14.3%</td>
<td>11.1%</td>
<td>16.7%</td>
<td>8.9%</td>
</tr>
<tr>
<td>%once every two months</td>
<td>10.7%</td>
<td>7.4%</td>
<td>16.7%</td>
<td>22.2%</td>
</tr>
<tr>
<td>%once every quarter</td>
<td>16.1%</td>
<td>22.2%</td>
<td>12.5%</td>
<td>17.8%</td>
</tr>
<tr>
<td>%once every half year</td>
<td>26.8%</td>
<td>29.6%</td>
<td>16.7%</td>
<td>24.4%</td>
</tr>
<tr>
<td>%once every year or less</td>
<td>21.4%</td>
<td>29.6%</td>
<td>33.3%</td>
<td>22.2%</td>
</tr>
<tr>
<td>Health consciousness (% yes)</td>
<td>69.6%</td>
<td>71%</td>
<td>52.3%</td>
<td>62.5%</td>
</tr>
</tbody>
</table>

Menu manipulation effects on number of healthy items ordered
In the control condition 19 out of 63 participants chose a healthy lunch item. This makes up 27.5% of the participants. The majority of the participants, 72.5%, chose an unhealthy lunch item. In the first condition, where the healthy items are placed on top of the menu card, 31.7% of the participants chose a healthy lunch item. The remaining 43 out of 63 participants selected an unhealthy lunch item, i.e. 68.3%. In the second condition, where the green box around the healthy items was added, 12 out of the 65 participants chose a healthy item. This is equal to 18.5% of the participants in this condition. The third condition, which included the
headline 'Licht en vers' (light and fresh), 34 out of the 65 participants (53.1%) chose a healthy lunch item. The numbers and percentages are visually depicted in Figure 7.

![Figure 7](image)

**Figure 7.** Choices for unhealthy and healthy lunch items during the experimental period for the control condition and the three experimental conditions

One model was tested by a logistic regression. This logistic regression is performed to test the influence of the different menu card lay outs on the dependent variable, healthy choice. The dependent variable is the binary variable choice for a healthy item. The model is described below.

In the first model, condition is included in the binary logistic as an explanatory variable. The residual chi-square is 5.886 \( p = .015 \), which means that the addition of one or more lay out changes to the menu card significantly affects the predictive power of the model. To test the extent to which the model first the data, the Hosmer and Lemeshow Goodness-of-Fit test is performed, and shows us that the model does not fit with the data, \( \chi^2 = 12.067 \) \( p = .002 \). Condition is likely to make a good predictor for the model with a score of 5.846, \( p = .016 \). The Wald statistic in the output table shows us that there is a main effect of condition on the choice of healthy items with a Wald chi-square score of 5.757, \( p = .016 \). So, the null hypothesis that there is no effect of menu card design on the choice for a healthy item can be rejected. The alternative hypothesis is confirmed for model 1 which means that menu design has a positive influence on the choice for a healthy item on the menu card. A chi-square test is performed to test if more menu card manipulations lead to a larger positive influence on the choice for a healthy team. The results show that the adjusted residual for condition 1 is -0.2 for healthy choices and 0.2 for unhealthy choice. For condition 2, these number are -2.8 for healthy choices and 2.8 for unhealthy choices. Finally, the number for conditions 3 are 4.0 and -4.0 respectively. This means that only in the third condition, significantly more people chose healthy than would be expected by the model (>2.0). The probability that these values are due to chance is less than 5%, so they are significant. In the other 2 conditions, less people than expected made a healthy choice. Therefore, hypothesis 2 can be rejected. The addition of more menu card manipulations did not lead to a larger positive influence on the choice for a healthy item.
The second model that is tested by means of a binary regression includes again condition as an explanatory variable. However, this time health consciousness was included in the analysis as a moderator. This was done by using an interaction term. This model has a residual chi-square of 5,897 \( (p = .052) \), which means that the addition of one or more layout changes and health consciousness as a moderator do not significantly affect the predictive power of the model. To test the extent to which the model fits the data, the Hosmer and Lemeshow Goodness-of-Fit test is performed, \( \chi^2 = 17,851 \ (p = .007) \). Similar to the first model, this model also does not fit with the data. Both condition and the interaction condition \( \times \) health consciousness are likely to make good predictors for the model with scores of 5,846, \( p = .016 \) and 4,619, \( p = .032 \) respectively. However, the Wald statistic shows that there is no main effect of condition in this model, with a Wald score of 1.352, \( p = .245 \). Besides, there is also no interaction effect of condition and health consciousness with a Wald score of .011, \( p = .916 \). This means that hypothesis 1 can be rejected, which means that for this model menu design did not have a positive influence on the choice for a healthy item on the menu card. Therefore, hypothesis 2 can also be rejected. Finally, because there was no interaction effect found, also hypothesis 3 can be rejected. Menu card manipulations do not have a larger effect on healthy choices for people who are less health conscious.

### Menu manipulation effects on how consumers evaluate menu card

Table 9. Mean (SD) of effects of menu card manipulations (ANOVA)

<table>
<thead>
<tr>
<th></th>
<th>Control condition (N=132)</th>
<th>Condition 1 'healthy items on top' (N=131)</th>
<th>Condition 2 'green box' (N=129)</th>
<th>Condition 3 'headline' (N=129)</th>
<th>( p )-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>I felt like I could choose whatever I wanted*</td>
<td>4.65 (.590)</td>
<td>4.73 (.482)</td>
<td>4.50 (.992)</td>
<td>4.38 (1.106)</td>
<td>.075</td>
</tr>
<tr>
<td>It was easy to make a choice from this menu card*</td>
<td>4.62 (.571)</td>
<td>4.29 (.658)</td>
<td>4.34 (1.116)</td>
<td>4.36 (.880)</td>
<td>.110</td>
</tr>
<tr>
<td>The menu card looked attractive*</td>
<td>4.44 (.817)</td>
<td>4.17 (.730)</td>
<td>3.89 (1.086)(^a)</td>
<td>3.94 (1.042)(^a)</td>
<td>.003</td>
</tr>
<tr>
<td>There were enough healthy dishes to choose from*</td>
<td>4.35 (.744)</td>
<td>4.11 (.675)</td>
<td>3.95 (1.069)</td>
<td>4.08 (.914)</td>
<td>.088</td>
</tr>
<tr>
<td>It was clear to me which dishes on the menu card are healthy/healthier*</td>
<td>3.99 (.899)</td>
<td>3.57 (.777)(^a)</td>
<td>4.05 (1.069)(^b)</td>
<td>4.08 (1.117)(^b)</td>
<td>.012</td>
</tr>
<tr>
<td>I made a healthy choice today*</td>
<td>3.75 (1.226)</td>
<td>3.27 (.919)(^a)</td>
<td>3.63 (1.274)</td>
<td>3.86 (1.186)(^b)</td>
<td>.031</td>
</tr>
<tr>
<td>The number of different dishes to choose from**</td>
<td>4.16 (.914)</td>
<td>4.21 (.652)</td>
<td>4.34 (.859)</td>
<td>4.24 (.830)</td>
<td>.646</td>
</tr>
<tr>
<td>The number of healthy dishes on the menu**</td>
<td>4.09 (.712)</td>
<td>4.02 (.813)</td>
<td>4.19 (.877)</td>
<td>3.89 (1.071)</td>
<td>.268</td>
</tr>
<tr>
<td>Health consciousness</td>
<td>2.96 (1.021)</td>
<td>2.68 (.880)</td>
<td>3.29 (1.196)(^b)</td>
<td>3.09 (1.094)</td>
<td>.111</td>
</tr>
</tbody>
</table>

*1- completely disagree, 5 – completely agree
**1 – extremely dissatisfied, 5 – extremely satisfied
Items sharing the letter \( a \) differ significantly from the control condition
Items sharing the letter \( b \) differ significantly from condition 1

According to Table 9, there are no significant differences between the experimental conditions with respect to the freedom of choice, \( F(3,259) = 2. 325, p = .075 \). This means that despite the menu card manipulations, participants experienced freedom of choice. With respect to the easiness of making a choice, there were no significant difference across the
different conditions, $F(3,259) = 2.030, p = .110$. Also, the opinion on if there were enough healthy dishes to choose from did not differ significantly between the different conditions, $F(3,257) = 2.202, p = .088$. The opinion on the number of different dishes to choose from did not differ significantly between the different conditions, $F(3,257) = .554, p = .646$. Finally, there were no differences on satisfaction with respect to the number of healthy dishes on the menu, $F(3,256) = 1.321, p = .268$.

On the other hand, some of the items of the questionnaire showed significant differences between the experimental conditions. The attractiveness of the menu card differed significantly across the different conditions $F(3,257) = 4.482, p = .003$. The Games-Howell Post Hoc test indicates that the control condition and condition 2 differed significantly on the attractiveness of the menu card ($p = .007$). Besides, the control condition and condition 3 also differed significantly on the attractiveness of the menu card ($p = .016$). The menu card looked more attractive in the control condition than any of the other experimental conditions. This can be due to the boxes that were placed around the healthy items in condition 2 and the headlines that were used in condition 3. There is no significant difference between condition 1, where there were also no boxes, and the control condition, ($p = .204$). This can be due to the slight changes that were made to the menu card, only sequence changes were made.

Another significant difference is on how clear it was to the participants which dishes on the menu card are healthy/healthier, $F(3,258) = 3.716, p = .012$. The outcomes of the Post-Hoc test show that the control condition and condition 1 differed significantly on this aspect, $p = .027$. It was clearer to the participants in the control condition which dishes on the menu card were healthy than in condition 1. This is a remarkable outcome since the difference between the two menu cards were only sequential changes. There were no differences between the control condition and condition 2 and 3, $p = .984$ and $p = .953$ respectively. There were also significant differences between condition 1 and condition 2 and 3, $p = .026$ and $p = .019$ respectively. The menu card in condition 2 and 3 made it more clear to the participants which dishes were healthier.

Another difference concerns the item on the perception of the healthiness of the chosen dish, $F(3,256) = 3.010, p = .031$. According to the Post Hoc test, condition 1 and the control condition differed significantly on this aspect on a $p > .010$ scale, $p = .058$. Participants in the control condition were better able to indicate if they made a healthy choice or not than in condition 1. Furthermore, there is a significant difference between condition 1 and condition 3, $p = .015$ which means that participants in condition 3 were better able to estimate if they had made a healthy choice or not.

Finally, there is a marginal difference between the health consciousness of the participants in the different conditions, $F(3,260) = 3.779, p = .011$. According to the Post Hoc test, there are no significant differences between the control condition and any of the experimental conditions, $p = .334$, $p = .319$ and $p = .878$ respectively. There is a difference between condition 1 and condition 2, $p = .007$. Participants in condition 2 were more health conscious than participants in condition 1. However, as described before regression shows that the effect of health consciousness on the choice of a healthy item is not significant, $p = .619$. So, these factors do not seem to be related.
4.2.2 Starter and main course group

General descriptives and randomization checks

Even though the experiment was announced to be not suitable for guests who ordered a live cooking buffet, five participants indicated to have eaten from the buffet and were removed from the dataset. This left 261 participants in the analysis. Overall, 125 men and 136 women participated in the customer survey during the dinner time. Across conditions gender was not equally balanced ($\chi^2(3,260) = 7.960, p = .047$). The mean age of the participants in the lunch group was 50 years (SD = 15.798). There were no significant differences in the mean age of participants ($\chi^2(201,255) = 213,816, p = .047$). On the other hand, there were significant differences on the occasion that brought the participants to the restaurant ($\chi^2(6,249) = 16,143, p = .013$) and on the company they have dinner with ($\chi^2(9,253) = 34,634, p =.000$). Finally, there were differences in the health consciousness of the participants ($\chi^2(36,260) = 58,977, p =.009$).

An overview of the different numbers per condition can be found in Table 10. Even though gender, occasion, company and health consciousness differed significantly between the experimental conditions, regression shows that the effects of the variables that differ across conditions do not have a significant effect on the dependent variable, $p =.549, p =.900, p =.282, p =.459$ respectively. Therefore, the differences among the conditions with respect to these variables do not influence the results severely.

Table 10. Overview of demographics of survey participants in the starters and main course group

<table>
<thead>
<tr>
<th></th>
<th>Control condition</th>
<th>Condition 1</th>
<th>Condition 2</th>
<th>Condition 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender (% female)</strong></td>
<td>50.8%</td>
<td>57.4%</td>
<td>38.5%</td>
<td>61.5%</td>
</tr>
<tr>
<td><strong>Age (mean)</strong></td>
<td>46.5</td>
<td>45.4</td>
<td>58.4</td>
<td>50.9</td>
</tr>
<tr>
<td><strong>Occasion</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>%family</td>
<td>78.3%</td>
<td>56.7%</td>
<td>79.4%</td>
<td>78.3%</td>
</tr>
<tr>
<td>%business</td>
<td>10%</td>
<td>10.4%</td>
<td>4.8%</td>
<td>1.7%</td>
</tr>
<tr>
<td>%friends</td>
<td>11.7%</td>
<td>32.8%</td>
<td>15.9%</td>
<td>20%</td>
</tr>
<tr>
<td><strong>Company</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% alone</td>
<td>0%</td>
<td>3%</td>
<td>3.2%</td>
<td>0%</td>
</tr>
<tr>
<td>% with other adults</td>
<td>49.2%</td>
<td>74.6%</td>
<td>87.3%</td>
<td>7.4%</td>
</tr>
<tr>
<td>%with other adults/children</td>
<td>45.8%</td>
<td>17.9%</td>
<td>9.5%</td>
<td>24.6%</td>
</tr>
<tr>
<td>%with children</td>
<td>5.1%</td>
<td>4.5%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Frequency of visiting</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>%once every two weeks</td>
<td>2.3%</td>
<td>0%</td>
<td>4.2%</td>
<td>2.2%</td>
</tr>
<tr>
<td>%once a month</td>
<td>7%</td>
<td>0%</td>
<td>6.3%</td>
<td>6.7%</td>
</tr>
<tr>
<td>%once every two months</td>
<td>4.7%</td>
<td>26.1%</td>
<td>12.5%</td>
<td>6.7%</td>
</tr>
<tr>
<td>%once every quarter</td>
<td>16.3%</td>
<td>13%</td>
<td>14.6%</td>
<td>15.6%</td>
</tr>
<tr>
<td>%once every half year</td>
<td>34.9%</td>
<td>17.4%</td>
<td>22.9%</td>
<td>24.4%</td>
</tr>
<tr>
<td>%once every year or less</td>
<td>34.9%</td>
<td>43.5%</td>
<td>39.6%</td>
<td>44.4%</td>
</tr>
<tr>
<td><strong>Health consciousness (%yes)</strong></td>
<td>25.4%</td>
<td>38.2%</td>
<td>44.6%</td>
<td>36.9%</td>
</tr>
</tbody>
</table>

Menu manipulation effects on number of healthy items ordered

In the control condition, 17 out of 34 participants chose a healthy starter item. The remaining 50% selected an unhealthy starter. Regarding the main courses, 26 out of the 58 participants who ordered a main course chose a healthy one, i.e. 44.8%. The other 32 participants ordered an unhealthy main course. In this case 55.2% decided to select an unhealthy item. In the first condition, where the healthy items are placed on top of the menu card, 55.3% of the participants chose a healthy starter. Besides, 36.8% of the participants chose a healthy main course. In the second condition, where the green box around the healthy items was
added, 25 out of the 42 participants chose a starter. This is equal to 59.5% of the participants. Regarding main courses, 35 out of 62 participants chose a healthy item, 56.5%. These percentages and number are depicted in Figure 8 and 9. In the third condition, which included the headline ‘Licht en vers’ (light and fresh), 67.4% of the participants chose a starter item. And finally, 39 out of 64 participants chose a healthy main course during the experimental period. This makes up 60% of the participants in the third condition. These numbers are visually presented in Figure 8 and 9.

Figure 8. Choices for unhealthy and healthy starters during the experimental period for the control condition and the three experimental conditions

Figure 9. Choices for unhealthy and healthy main courses during the experimental period for the control condition and the three experimental conditions
Two different models were tested by a logistic regression. This logistic regression is performed to test the influence of the different menu card lay outs on the dependent variable, healthy choice. The dependent variable is the binary variable choice for a healthy item. The two different models are described below.

In the first model, condition is included in the binary logistic as an explanatory variable. The residual chi-square is 3.056, \( p = .080 \), which means that the addition of one or more lay out changes to the menu card marginally affects the predictive power of the model using a \( p < .100 \) significance scale. To test the extent to which the model fits the data, the Hosmer and Lemeshow Goodness-of-Fit test is performed, and shows us that the model fits with the data, \( \chi^2 = .138 \) (\( p = .993 \)). Condition is likely to make a good predictor for the model with a score of 3.041, \( p = .081 \). This is based on a significance scale of \( p < .100 \). The Wald statistic in the output table shows us that there is a marginal main effect of condition (\( p < .100 \) scale) on the choice of healthy items with a Wald chi-square score of 3.007 \( p = .083 \). So the null hypothesis that there is no effect of menu card design on the choice for a healthy item can be rejected. The alternative hypothesis is confirmed for model 1, which means that menu design has a positive influence on the choice for a healthy item on the menu card. A chi-square test is performed to test if more menu card manipulations lead to a larger positive influence on the choice for a healthy item. With respect to starters, the results show no significant values of the adjusted residuals. All the adjusted residuals have a value either \( >-2.0 \) or \( <-2.0 \), i.e. 1.2, 0.6, -0.1 and -1.6 for the control condition, condition 1, condition 2 and condition 3 respectively. When looking at the adjusted residuals for the main course group, we only found a significant adjusted residual for condition 1. However, this shows that significantly less people chose a healthy item than the model would expect. Therefore, hypothesis 2 can be rejected. This means that adding more menu card manipulations did not lead to a larger positive influence on the choice for a healthy item.

The second model that is tested by means of a binary regression includes again condition as an explanatory variable. However, this time health consciousness was included in the analysis as a moderator. This was done by using an interaction term. This model has a residual chi-square of 3.144, \( p = .208 \), which means that the addition of one or more lay out changes and health consciousness as a moderator do not significantly affect the predictive power of the model. To test the extent to which the model fits the data, the Hosmer and Lemeshow Goodness-of-Fit test is performed, \( \chi^2 = 4.043 \) (\( p = .775 \)). Similar to the first model, this model also fits with the data. Both condition and the interaction condition x health consciousness are likely to make good predictors for the model (based on a \( p < .100 \) scale) with scores of 3.041, \( p = .081 \) and 2.716, \( p = .099 \) respectively. However, the Wald statistic shows that there is no main effect of condition in this model, with a Wald score of 0.375 \( p = .540 \). Besides, there is also no interaction effect of condition and health consciousness with a Wald score of 0.087, \( p = .767 \). This means that hypothesis 1 can be rejected, which means that for this model menu design did not have a positive influence on the choice for a healthy item on the menu card. This automatically means that adding more menu card manipulations does not enlarge the effect on the choice of a healthy item. So, hypothesis 2 can also be rejected. Finally, because there was no interaction effect found, also hypothesis 3 can be rejected. Menu card manipulations do not have a larger effect on healthy choices for people who are less health conscious.
Menu manipulation effects on how consumers evaluate menu card

Table 11. Mean (SD) of effects of menu card manipulations (ANOVA)

<table>
<thead>
<tr>
<th></th>
<th>Control condition (N=132)</th>
<th>Condition 1 'healthy items on top' (N=131)</th>
<th>Condition 2 'green box' (N=129)</th>
<th>Condition 3 'headline' (N=129)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>I felt like I could choose whatever I wanted*</td>
<td>4.60 (.814)</td>
<td>4.44 (.557)</td>
<td>4.34 (.989)</td>
<td>4.35 (.771)</td>
<td>.234</td>
</tr>
<tr>
<td>It was easy to make a choice from this menu card*</td>
<td>4.37 (1.021)</td>
<td>4.24 (.831)</td>
<td>4.35 (.891)</td>
<td>4.38 (.913)</td>
<td>.779</td>
</tr>
<tr>
<td>The menu card looked attractive*</td>
<td>4.47 (.863)</td>
<td>4.34 (.704)</td>
<td>4.37 (.894)</td>
<td>4.08 (.889)</td>
<td>.057</td>
</tr>
<tr>
<td>There were enough healthy dishes to choose from*</td>
<td>4.13 (1.100)</td>
<td>3.88 (.769)a</td>
<td>4.11 (.945)</td>
<td>4.40 (.746)b</td>
<td>.013</td>
</tr>
<tr>
<td>It was clear to me which dishes on the menu card are healthy/healthier*</td>
<td>3.71 (1.156)</td>
<td>3.37 (.862)a</td>
<td>3.62 (1.155)</td>
<td>4.32 (.773)bc</td>
<td>.000</td>
</tr>
<tr>
<td>I made a healthy choice today*</td>
<td>3.38 (1.237)</td>
<td>3.75 (1.013)</td>
<td>3.60 (1.199)</td>
<td>3.60 (1.072)</td>
<td>.320</td>
</tr>
<tr>
<td>The number of different dishes to choose from**</td>
<td>4.51 (.716)</td>
<td>4.43 (.679)</td>
<td>4.03 (.951)ab</td>
<td>4.35 (.818)</td>
<td>.004</td>
</tr>
<tr>
<td>The number of healthy dishes on the menu**</td>
<td>3.83 (.976)</td>
<td>4.33 (.660)a</td>
<td>3.71 (.923)b</td>
<td>4.00 (.829)</td>
<td>.000</td>
</tr>
<tr>
<td>Health consciousness</td>
<td>2.70 (1.064)</td>
<td>2.94 (.894)</td>
<td>3.05 (1.110)</td>
<td>2.93 (.999)</td>
<td>.266</td>
</tr>
</tbody>
</table>

*1–completely disagree, 5–completely agree
**1–extremely dissatisfied, 5–extremely satisfied
items sharing the letter a differ significantly from the control condition
items sharing the letter b differ significantly from condition 1
items sharing the letter c differ significantly from condition 2

According to Table 11, there are no significant differences between the experimental conditions with respect to the freedom of choice, \(F(3,260) = 1.431, p = .234\). This means that despite the menu card manipulations participants experienced freedom of choice. With respect of the easiness of making a choice, there were no significant difference across the different conditions, \(F(3,260) = .365, p = .779\). Besides, the opinion about the attractiveness of the menu card did not differ significantly across the different experimental conditions \(F(3,259) = 2.533, p = .057\). Also the perception participants had about the healthiness of the dishes they chose did not differ significantly in comparison between the conditions, \(F(3,258) = 1.175, p = .320\). Finally, there were no differences in the extent to which the participants were health conscious across the different conditions, \(F(3,260) = 1.326, p = .266\).

On the other hand, some of the items of the questionnaire showed significant differences between the experimental conditions. The opinion on if there were enough healthy dishes on the menu card to choose from differed significantly across the different conditions \(F(3,258) = 3.688, p = .013\). The Games-Howell Post Hoc test indicates that condition 1 and condition 3 differed significantly on the above mentioned item (\(p = .001\)). In condition 3, the participants felt more like there were enough healthy dishes on the menu card. There were no differences between the control condition and condition 1, 2 and 3, \(p = .458\), \(p = 1.000\) and \(p = .361\) respectively.

Another significant difference is on the item “It was clear to me which dishes on the menu card are healthy/healthier”, \(F(3,260) = 10.880, p = .000\). The outcomes of the Post-Hoc test show that the control condition and condition 1 differed significantly, \(p = .004\). Participants in condition 1 felt, according to their own opinion, better able to identify the health/healthier items on the menu card than the participants in the control condition. No differences were found between the control condition and condition 2 and 3, \(p = .220\) and \(p = .963\).
respectively. Furthermore, there were significant differences between condition 1 and condition 3, \( p = .000 \). In condition 3, participants were, according to their own opinion, better able to identify the healthy/healthier options on the menu card than in condition 1. Finally, there are significant differences between condition 2 and 3, \( p = .000 \). This means that in condition 3, participants were, according to their own opinion, better able to identify the healthy/healthier options on the menu card than in condition 2.

Another difference concerns the item on the satisfaction of the number of different dishes to choose from, \( F(3,259) = 4.482, p = .004 \). According to the Post Hoc test, condition 2 and the control condition differed significantly from one another (\( p = .009 \)). Participants in the control condition were more satisfied with the number of different dishes to choose from than the participants in condition 2. The differences between the control condition and condition 1 and 3 were not significant, \( p = .928 \) and \( p = .669 \) respectively. Furthermore, condition 1 and condition 2 also differed significantly, \( p = .031 \). Participants in condition 1 were more satisfied than participants in condition 2.

Finally, there is a difference between the experimental condition with respect to the satisfaction on the number of healthy dishes on the menu, \( F(3,257) = 4.669, p = .000 \). The Post Hoc test showed us that the control condition differed significantly from condition 1, \( p = .005 \). Participants in condition 1 were more satisfied with the number of healthy dishes on the menu card compared to the participants in the control condition. There were no significant differences between the control condition and condition 2 and 3, \( p = .913 \) and \( p = .697 \) respectively. There were significant differences between condition 1 compared to condition 2, \( p = .000 \). Participants in condition 2 were more satisfied than participants in condition 1.
5. Conclusions and discussion

A problem that is becoming larger globally is that of obesity. Also, the out of home consumption increased the past couple of years. Food that is consumed in an out of home environment is often high in fat and calories and low in nutritional value. Restaurants are therefore a good location to promote a healthier lifestyle. In this paper, a field study was performed that examined the effects of several menu design manipulations on the choice of a healthy item. The aim of the experiment was to explore whether menu card manipulations (sequence, green box, colour, font size and headlines) would increase the sales of healthy dishes (H1) and if the use of more manipulations at the same time increases the effect on sales of healthy items (H2). Next to this, it was tested whether the effect of menu card manipulations was larger for consumers scoring low on health consciousness (H3).

The results of the field experiment are ambiguous, since there is no pattern found that fits all the different food items (lunch, starters and main course). An uplift in sales of the healthy lunch items is only found in the condition where the sequence of items on the menu card changes. The healthiest items were presented on top of the menu card. With respect to the healthy soups, we find an uplift in sales in the condition with the green box around the healthy items and the condition where the headline ‘Licht en vers’ (light and fresh) was used. For the starters and meat main courses, we see a decrease in the share of healthy items in all the experimental conditions. On the contrary, for the vegetarian main courses, uplifts in sales can be found in every experimental condition, compared to the control condition. According to Key et al., (2006), vegetarians tend to be more health conscious than average and have healthier diets than non-vegetarians. Even though this study assumed that less health conscious individuals are more likely to change their behaviour or choice due to a nudge, conflicting evidence does exist. Burton and Creyer (2004) state that even food professionals can be prone to suboptimal food choices in an out of home environment. Therefore, the behaviour of health conscious consumers can also change when they are presented with nudges to push them in a certain direction. Future research to test if health conscious individuals can be nudged towards healthy choices by making use of menu card manipulations might potentially lead to positive results.

Regarding the dinner group, attractiveness of the menu card did not differ significantly between the different conditions. The satisfaction on the number of healthy dishes on the menu card was higher in the condition that included the headline ‘Licht en vers’ (light and fresh) than in the condition were the sequence of the menu card items changed. This can be caused by a combination of the green boxes and the headline that were used in condition 3 to mark the healthy items. Furthermore, in condition 3 participants were better able to identify the healthy options on the menu card than in condition 1, with only a sequential change and condition 2, with the green boxes. Overall, it can be said that the menu card manipulations made the healthy items on the menu card more prominent.

What factors or influences makes the results of this study different from the results of similar studies presented in the theoretical background? First of all, many of the previous studies do not focus on nudging of healthy items. This can be more difficult than nudging regular food options. This argument is confirmed by Wilcos et al., (2009) who, in their study, show that “individuals are more likely to make indulgent food choices when healthy options are available”. According to the results of the current study, the healthy options are not only available, but also emphasized because of the menu card manipulations. This can be an
explanation for the ambiguous results. Another explanation for the ambiguousness of the results is the association between unhealthy and tasty. Raghunathan et al., (2006) found that items that are presented as healthy are seen as less tasty. The other way around, the less healthy items are, the better the expected taste and the greater the preference for this food item. Consumer believe that healthiness and tastiness are negatively correlated. A final explanation for the ambiguousness of the results can be the location of the nudge, a restaurant. Numerous participants of the survey made a remark saying that in their daily life they eat healthy, and are less intended to do so in an out of home environment. In a restaurant environment, guests want to have a so-called “guilty pleasure” and do not want to think about healthy eating.

As any other research, several aspects could have had an impact of the results of the study. The first limitation is related to the design of the study. A constructive design, which means that in every consecutive condition, one more manipulation was added to that specific condition, was deliberately chosen for this study. However, this design also involves disadvantages. Because of the constructive design, the individual menu card manipulations cannot be tested. On the other hand, previous literature has shown that the effects of nudging studies can be subtle (Marteau et al., 2011; Pasquale, 2015; Ozdemir and Caliskan, 2015). Therefore, it is more likely to a significant effect of nudging if manipulations are combined. Moreover, the effect of the individual manipulations can be found by comparing one condition to a previous condition. Nudging does seem to work in several environments. Most of these effective nudges are meant to stimulate an unhealthy lifestyle, e.g. packaged food or candy presented at a counter. However, the evidence of nudging to improve healthiness is not as strong. The potential effectiveness of nudges to improve our health, can be limited by those ‘unhealthy nudges’. Therefore, regulations might be needed, to limit the effects of the unhealthy nudges before the true effect of healthy nudges can be studied (Marteau et al., 2011).

The second limitation is related to the menu of the restaurant of Van der Valk. During the summer holidays and throughout the year, international guests visit the restaurant. Therefore, some English menus are available for these guests. The presence of the English menu was mentioned after the experimental period has started. Therefore, all the English menus were not manipulated throughout the whole duration of the research. However, the English menus were used very sporadically and were expected not to influence the results largely. Another limitation with respect to the menu card is that some guests ordered dishes that are not on the menu, for example chicken satay. Other guests ordered dishes from the seasonal menu or dishes from pages that were not manipulated, e.g. the so-called ‘Huiskamer’. These dishes were marked as unhealthy in the dataset since those respondents did get to see the healthy items and the corresponding menu card manipulation but decided to choose different after all.

A final limitation is related to the different measures that can be used to determine the healthiness of a dish, for example calories, fat percentage or cholesterol. Only information on the amount of calories was readily available and was used to rate the food items. The ingredient list that was provided by restaurant Van der Valk to calculate the number of calories per dish did not have the corresponding information for two dishes; ‘Ecofield runderburger’ and ‘Aspergesoep’. For these dishes the number of calories could not be determined and were seen as unhealthy items. Even though the aim of this study is to
promote health items on a menu card, the effect of the menu card manipulations could still be tested to justify the use of this method. If certain menu card manipulations are very effective, this information can be used in future research to promote healthy eating even further. Furthermore, the cash register data of the field experiment was lost. Only the data per experimental period was available for research. This made elaborated statistical analyses impossible and made the results descriptive.

Finally, external validity is becoming more important. External validity expresses the ability of research findings to be generalized. A lot of research findings do not have relevance for business, policy makers, consumers of other scientists. This affects the external validity of the research itself. One of the reasons, research findings can lack relevance is because a lot of studies are not performed with real consumes and real behaviour. An example is having a research population with only students. This has an influence on the generalizability of the results to consumers in general (Pham, 2013). The current research however is a field study that is performed in a real life restaurant. This means that the results of the study could be generalized to the broader population of consumers. It also means that the results of this study will have great relevance for restaurants and indirectly fort the consumers of those restaurants.

**Theoretical implications**

Based on the results of the current study there are implications for the theoretical field. First of all, the results of this study extend the existing literature on nudging healthy food items, of which not much literature exists at the moment. Besides, this study adds knowledge, regarding menu card manipulations as a tool to nudge, to the existing literature. The methods used in the current study can be an inspiration and provide learnings for future research. Furthermore, the outcomes of this study, which were not clear cut, but seemed to show a trend with respect to the effect of menu card manipulations on the choice of healthy items, may stimulate researchers to do more research on this topic to see if significant effects can be found. Furthermore, future research can study the durable effect of these menu card manipulations and see if the effect of the nudge is durable or fades out after a while. Finally, even though the results were not always clear cut nor significant, publishing non-significant findings can be important as well. Publishing such articles can provide a comprehensive literature review and not only significant results. Furthermore, other researchers are able to replicate the methods of the study for further research, or learn from methods or nudges that do not work. Finally, publishing non-significant findings is important for theorizing and testing theories (Asendorpf et al., 2013).

**Managerial implications**

The outcomes of this study can help restaurants to stimulate healthy food consumption and a healthier lifestyle on a broader scale and serve public interest. This influence can be significant since restaurants are seen as a public health keeper (Hur and Jang, 2015) and because restaurants are places where currently foods are consumed with a high energy density and high fat percentage (Lassen et al., 2014). However, it can also be ‘misused’ by nudging the most expensive items to boost sales. In that case, the methodology can be beneficial for restaurants to make use of. However, this is unlikely and would not be accepted by society, since it does not lead to healthier food choices in an out of home environment. It might even lead to unhealthier food choices, if the most expensive food items happen to be unhealthy. Finally, it can inspire restaurants to test other nudges or methods to stimulate healthy eating, such as portion size manipulations.
References

Ackerman, S. N. (2014). Cafe nudge project: choice architecture for eating and nudging healthy behaviors (Doctoral dissertation, West Virginia University)


Appendix 1: Menu designs

Lunchkaart de Cantharel
(12.00 – 17.00 uur)

Lunchbuffet met Live-Cooking 15,00
Iedere werkdag van 12.00-13.00, inclusief lunchdranken (koffie, thee, melk en sappenbar)

12 – Uurtje 7,00
Ambachtelijk broodje ‘Cantharel’ met rosbief, huzarensalade en een rundvleeskroket

‘Proeverij van de Veluwe’ 8,00
Biologisch hamburgertje van Ecofields, een mueslibol met 9 maanden gerijpte ham van het Veluwse Wolhaarvarken en een soepje van het seizoen

½ - Ééntje 8,50
Ambachtelijk broodje ‘Cantharel’ met gerookte zalm, makreelsalade en een garnalenkroket

Handgemaakt desembrood 7,00
Met biologische Remeker kaas en een frisse salade

Vis hors-d’oeuvre 9,50
Vissselectie van Hollandse garnalen, gerookte zalm, makreel en forelfilet

Carpaccio van Veluws Hereford Rund 9,50
Met rucola, mayonaise van Aceto Balsamico en oude Wilpenaer

Uitsmijter van vrije uitloop eieren 7,00
Ham, kaas en huzarensalade

Uitsmijter Veluwe van vrije uitloop eieren 7,00
Kaas, spek, tomaat en champignons

Tosti ‘Cantharel’ 6,00
Biologische Remeker kaas en ham van het Veluws Wolhaarvarken met kruidencrème en een frisse salade

Caesar Salade 8,50
Met Romeinse sla, ansjovis, een krokantje van het Wolhaar varken en oude Wilpenaer

Rundvleeskroketten 6,00
Twee rundvleeskroketten met brood, mosterd en een frisse salade

Ambachtelijke garnalenkroketten 9,50
Twee garnalenkroketten met een getoast broodje ‘Cantharel’, cocktailsaus en een frisse salade

Saté van Varkenshaas 9,50
Licht pittige varkenshaasspies van de grill, met een geroosterd broodje ‘Cantharel’, verse frites, atjar en kroepoek

Figure 10. Lay out of menu card in the control condition; menu card March 2016
Lunchkaart de Cantharel
(12.00 – 17.00 uur)

Carpaccio van Veluws Hereford Rund  9,50
Met rucola, mayonaise van Aceto Balsamico en oude Wilpenaer

Vis hors-d’oeuvre  9,50
Visselectie van Hollandse garnalen, gerookte zalm, makreel en forelfilet

Caesar Salade  8,50
Met Romeinse sla, ansjovis, een krokantje van het Veluws Wolhaar varken en oude Wilpenaer

Handgemaakt desembrood  7,00
Met biologische Remeker kaas en een frisse salade

Ambachtelijke garnalenkroketten  9,50
Twee garnalenkroketten met een getoast broodje ‘Cantharel’, cocktailsaus en een frisse salade

Tosti ‘Cantharel’  6,00
Biologische Remeker kaas en ham van het Veluws Wolhaarvarken met kruidencrème en een frisse salade

½ Ééntje  8,50
Ambachtelijk broodje ‘Cantharel’ met gerookte zalm, makreelsalade en een garnalenkroket

‘Proeverij van de Veluwe’  8,00
Biologisch hamburgertje van Ecofields, een mueslibol met 9 maanden gerijpte ham van het Veluws Wolhaarvarken en een soepje van het seizoen

Rundvleeskroketten  6,00
Twee rundvleeskroketten met brood, mosterd en een frisse salade

12 – Uurtje  7,00
Ambachtelijk broodje ‘Cantharel’ met rosbief, huzarensalade en een rundvleeskroket

Uitsmijter Veluwe van vrije uitloop eieren  7,00
Kaas, spek, tomaat en champignons

Uitsmijter van vrije uitloop eieren  7,00
Ham, kaas en huzarensalade

Saté van Varkenshaas  9,50
Licht pittige varkenshaasspies van de grill, met een geroosterd broodje ‘Cantharel’, verse frites, atjar en kroepoek

Figure 11. Lay out of menu card in condition 1; Healthy items on top of the list
Lunchkaart de Cantharel
(12.00 – 17.00 uur)

Carpaccio van Veluws Hereford Rund  9,50
Met rucola, mayonaise van Aceto Balsamico en oude Wilpenaer

Vis hors-d’oeuvre  9,50
Visselectie van Hollandse garnalen, gerookte zalm, makreel en forefilet

Caesar Salade  8,50
Met Romeinsesla, ansjovis, een krokantje van het Wolhaar varken en oude Wilpenaer

Handgemaakt desembrood  7,00
Met biologische Remeker kaas en een frisse salade

Ambachtelijke garnalenkroketten  9,50
Twee garnalenkroketten met een getoast broodje ‘Cantharel’, cocktailsaus en een frisse salade

Tosti ‘Cantharel’  6,00
Biologische Remeker kaas en ham van het Veluws Wolhaarvarken met kruidencrème en een frisse salade

½ - Ééntje  8,50
Ambachtelijk broodje ‘Cantharel’ met gerookte zalm, makreelsalade en een garnalenkroket

‘Proeverij van de Veluwe’  8,00
Biologisch hamburgertje van Ecofields, een mueslibol met 9 maanden gerijpte ham van het Veluwse Wolhaarvarken en een soepje van het seizoen

Rundvleeskroketten  6,00
Twee rundvleeskroketten met brood, mosterd en een frisse salade

12 – Uurtje  7,00
Ambachtelijk broodje ‘Cantharel’ met rosbief, huzarensalade en een rundvleeskroket

Uitsmijter Veluwe van vrije uitloop eieren  7,00
Kaas, spek, tomaat en champignons

Uitsmijter van vrije uitloop eieren  7,00
Ham, kaas en huzarensalade

Saté van Varkenshaas  9,50
Licht pittige varkenshaasspies van de grill, met een geroosterd broodje ‘Cantharel’, verse frites, atjar en kroepoek

Figure 12. Lay out of menu card in condition 2; Healthy items on top of the list and the use of boxes
Lunchkaart de Cantharel  
(12.00 – 17.00 uur)

**Licht en vers**

<table>
<thead>
<tr>
<th>Item</th>
<th>Beschrijving</th>
<th>Prijs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Carpaccio van Veluws Hereford Rund</strong></td>
<td>Met rucola, mayonaise van Aceto Balsamico en oude Wilpenaer</td>
<td>9,50</td>
</tr>
<tr>
<td><strong>Vis hors-d’oeuvre</strong></td>
<td>Visselectie van Hollandse garnalen, geroookt zalm, makreel en forelfilet</td>
<td>9,50</td>
</tr>
<tr>
<td><strong>Caesar Salade</strong></td>
<td>Met Romelins sla, ansjovis, een krokantje van het Wolhaar varken en oude Wilpenaer</td>
<td>8,50</td>
</tr>
<tr>
<td><strong>Handgemaakt desembrood</strong></td>
<td>Met biologische Remeker kaas en een frisse salade</td>
<td>7,00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Beschrijving</th>
<th>Prijs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ambachtelijke garnalenkroketten</strong></td>
<td>Twee garnalenkroketten met een getoast broodje ‘Cantharel’, cocktailsaus en een frisse salade</td>
<td>9,50</td>
</tr>
<tr>
<td><strong>Tosti ‘Cantharel’</strong></td>
<td>Biologische Remeker kaas en ham van het Veluws Wolhaarvarken met kruidencrème en een frisse salade</td>
<td>6,00</td>
</tr>
<tr>
<td><strong>½ – Ééntje</strong></td>
<td>Ambachtelijk broodje ‘Cantharel’ met gerooke zalm, makreelsalade en een garnalenkrok</td>
<td>8,50</td>
</tr>
<tr>
<td><strong>‘Proeverij van de Veluwe’</strong></td>
<td>Biologisch hamburgertje van Ecofields, een mueslibol met 9 maanden gerijpte ham van het Veluwe Wolhaarvarken en een soepje van het seizoen</td>
<td>8,00</td>
</tr>
<tr>
<td><strong>Rundvleeskroketten</strong></td>
<td>Twee rundvleeskroketten met brood, mosterd en een frisse salade</td>
<td>6,00</td>
</tr>
<tr>
<td><strong>12 – Uurtje</strong></td>
<td>Ambachtelijk broodje ‘Cantharel’ met rosbief, huzarensalade en een rundvleeskroket</td>
<td>7,00</td>
</tr>
<tr>
<td><strong>Uitsmijter Veluwe van vrije uitloop eieren</strong></td>
<td>Kaas, spek, tomaat en champignons</td>
<td>7,00</td>
</tr>
<tr>
<td><strong>Uitsmijter van vrije uitloop eieren</strong></td>
<td>Ham, kaas en huzarensalade</td>
<td>7,00</td>
</tr>
<tr>
<td><strong>Saté van Varkenshaas</strong></td>
<td>Licht pittige varkenshaasspies van de grill, met een geroosterd broodje ‘Cantharel’, verse frites, atjar en kroepoek</td>
<td>9,50</td>
</tr>
</tbody>
</table>

*Figure 13. Lay out of menu card in condition 3; Healthy items on top of the list, the use of green boxes, larger font sizes and the headline ‘Licht en vers’ (light and fresh)*
Appendix 2: Nutritional values

Table 12. Amount of calories of the lunch items on the menu card

<table>
<thead>
<tr>
<th>Dish</th>
<th>Number of calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 uurtje</td>
<td>1155</td>
</tr>
<tr>
<td>Proeverij van de Veluwe</td>
<td>913</td>
</tr>
<tr>
<td>Half eentje</td>
<td>891</td>
</tr>
<tr>
<td>Handgemaakt desembrood</td>
<td>634</td>
</tr>
<tr>
<td>Vis hors d’oeuvre</td>
<td>499</td>
</tr>
<tr>
<td>Carpaccio</td>
<td>419</td>
</tr>
<tr>
<td>Uitsmijter</td>
<td>1354</td>
</tr>
<tr>
<td>Uitsmijter Veluwe</td>
<td>1257</td>
</tr>
<tr>
<td>Tosti Cantharel</td>
<td>811</td>
</tr>
<tr>
<td>Caesar salade</td>
<td>545</td>
</tr>
<tr>
<td>Rundvlees kroketten</td>
<td>1004</td>
</tr>
<tr>
<td>Garnalen kroketten</td>
<td>804</td>
</tr>
<tr>
<td>Saté Varkenshaas</td>
<td>1537</td>
</tr>
<tr>
<td>Ecofields runderburger</td>
<td>Ingredient list is missing</td>
</tr>
</tbody>
</table>

Table 13. Amount of calories of the starters on the menu card

<table>
<thead>
<tr>
<th>Dish</th>
<th>Amount of calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broodplankje</td>
<td>382</td>
</tr>
<tr>
<td>Geroopte zalm</td>
<td>463</td>
</tr>
<tr>
<td>Hollandse garnalen</td>
<td>228</td>
</tr>
<tr>
<td>Caesar Salade</td>
<td>545</td>
</tr>
<tr>
<td>Carpaccio</td>
<td>419</td>
</tr>
<tr>
<td>Biologisch 3 min eitje</td>
<td>181</td>
</tr>
<tr>
<td>Halve kreeft</td>
<td>1135</td>
</tr>
</tbody>
</table>

Table 14. Amount of calories of the soups on the menu card

<table>
<thead>
<tr>
<th>Dish</th>
<th>Amount of calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tomaatensop</td>
<td>203</td>
</tr>
<tr>
<td>Groentebouillon</td>
<td>142</td>
</tr>
<tr>
<td>Uiensoep</td>
<td>212</td>
</tr>
<tr>
<td>Aspergesop</td>
<td>Ingredient list is missing</td>
</tr>
</tbody>
</table>

Table 15. Number of calories of the meat main courses on the menu card

<table>
<thead>
<tr>
<th>Dish</th>
<th>Amount of calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suprème van Veluwse scharrelkip</td>
<td>639</td>
</tr>
<tr>
<td>Ragout van biologisch kalf (unlimited)</td>
<td>Ingredient list is missing</td>
</tr>
<tr>
<td>Biologische kalfslevev</td>
<td>605</td>
</tr>
<tr>
<td>Tournedos</td>
<td>445</td>
</tr>
<tr>
<td>Rib-eye steak van Veluws Herefordrunder</td>
<td>854</td>
</tr>
<tr>
<td>Mixed grill</td>
<td>968</td>
</tr>
<tr>
<td>Duitse biefstuk</td>
<td>485</td>
</tr>
<tr>
<td>Biefstuk</td>
<td>297</td>
</tr>
<tr>
<td>Spareribs (unlimited)</td>
<td>1458 (850 grams spareribs incl. bones)</td>
</tr>
<tr>
<td>Boervarkenshaas</td>
<td>435</td>
</tr>
<tr>
<td>Schnitzel van Piggy’s Palace te Bathmen</td>
<td>785</td>
</tr>
</tbody>
</table>
Table 16. Amount of calories of the vegetarian main courses on the menu card

<table>
<thead>
<tr>
<th>Dish</th>
<th>Amount of calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loempia Cantharel</td>
<td>335</td>
</tr>
<tr>
<td>Boerenkaasfondu</td>
<td>920</td>
</tr>
<tr>
<td>Geitenkaas</td>
<td>1192</td>
</tr>
<tr>
<td>Salade de la Mèr</td>
<td>1092</td>
</tr>
<tr>
<td>Duo van lauwwarme kreeft en roergebakken garnalen</td>
<td>781</td>
</tr>
<tr>
<td>Zalmfilet</td>
<td>595</td>
</tr>
<tr>
<td>Gebakken kleine tong (2 pieces or unlimited)</td>
<td>2 pieces: 305  Unlimited: 578</td>
</tr>
<tr>
<td>Vispalet</td>
<td>771</td>
</tr>
<tr>
<td>Gebakken gamba’s</td>
<td>707</td>
</tr>
</tbody>
</table>
Appendix 3: Customer survey

Wat is uw mening over uw lunch/diner vandaag?


Wat heeft u zojuist gegeten? Schrijf al uw keuzes op.
.............................................................................................................................................................................................................................................................................................................
.............................................................................................................................................................................................................................................................................................................
.............................................................................................................................................................................................................................................................................................................

Wat is uw mening over de volgende stellingen? Zet een kruisje in het juiste vakje

<table>
<thead>
<tr>
<th></th>
<th>Helemaal mee oneens</th>
<th>Een beetje mee oneens</th>
<th>Neutraal</th>
<th>Een beetje mee eens</th>
<th>Helemaal mee eens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ik heb het gevoel dat ik kon kiezen wat ik wilde</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ik vond het makkelijk om een keuze te maken van deze menukaart</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>De menukaart zag er aantrekkelijk uit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Er waren voldoende gezonde gerechten om uit te kiezen</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Het was me duidelijk welke gerechten op de menukaart gezond(er)* zijn</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ik heb vandaag een gezonde keuze gemaakt</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hoe tevreden bent u over de volgende aspecten? Zet een kruisje in het juiste vakje.

<table>
<thead>
<tr>
<th></th>
<th>Zeer ontevreden</th>
<th>Een beetje ontevreden</th>
<th>Neutraal</th>
<th>Een beetje tevreden</th>
<th>Zeer tevreden</th>
</tr>
</thead>
<tbody>
<tr>
<td>Het aantal verschillende gerechten om uit te kiezen</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Het aantal gezonde* gerechten op het menu</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In hoeverre zijn de volgende stellingen van toepassing op uzelf? Zet een kruisje in het juiste vakje.

<table>
<thead>
<tr>
<th></th>
<th>Helemaal niet van toepassing</th>
<th>Neutraal</th>
<th>Helemaal van toepassing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ik vind het belangrijk om gezond* te eten in een restaurant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Als ik uit eten ga probeer ik ongezond eten te vermijden</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Als ik uit eten ga denk ik na over de hoeveelheid calorieën van de gerechten op de menukaart</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*In deze vragenlijst wordt meerdere malen de term “gezond” gebruikt. Gezondheid van de gerechten is in dit onderzoek gebaseerd op het aantal calorieën.
Algemene informatie

Geslacht
- o man
- o vrouw

Leeftijd
- ........ jaar

Welke aangelegenheid bracht u naar dit hotel?
- o Familie
- o Zakelijk
- o Vrienden

In welk gezelschap heeft u vandaag gegeten?
- o Alleen
- o Met (een) ander(e) volwassene(n)
- o Met (een) ander(e) volwassene(n) en kinderen
- o Met kinderen
- o Anders namelijk: ...........................................

Heeft u al vaker a la carte bij Van der Valk Cantharel gegeten?
- o Ja
- o Nee (einde vragenlijst)

Hoe vaak eet u bij Van der Valk Cantharel?
- o één keer per twee weken of vaker
- o één keer per maand
- o één keer per twee maanden
- o één keer per kwartaal
- o één keer per half jaar
- o één keer per jaar of minder

Als u nog opmerkingen heeft na het invullen van deze vragenlijst kunt u die hier invullen

.....................................................................................................................................................
.....................................................................................................................................................
.....................................................................................................................................................

Indien u kans wilt maken op de VVV-bon, vul dan onder uw e-mailadres in:

.....................................................................................................................................................