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## **[NUDGING HEALTHIER FOOD CHOICES IN THE SUPERMARKET]**

MSc minor thesis Marketing and Consumer Behaviour

## Summary

It seems to be the case that many people would like to eat healthy, but that not everyone is actually able to adhere to these intentions. At the same time, promoting healthy nutrition behaviours still relies mostly on health education techniques that try to motivate people to adopt more healthy lifestyles. It has been argued that interventions to promote more healthy nutrition practices should therefore try to adjust the environments in which decisions are made. Especially the concept of nudging has become increasingly popular in this regard.

In the last years quite some research has been done regarding the effectiveness and appropriateness of nudges. However, not a lot of studies have examined the opinions and thoughts of consumers about nudging. This study investigated which consumers would like to be helped with their choice in the supermarket, by looking at the relation between the motivation and ability to shop healthily and the personal relevance of nudges in the supermarket. A distinction was made between the perceived ability and the actual ability to make healthy choices, to know whether the intended nudges would reach the consumers who would benefit the most from it. Moreover, this study contributed to the knowledge about the potential of nudging organized by supermarkets.

We expected that the motivation to shop healthily was positively related to the personal relevance of nudging healthier choices, while we expected that the ability to shop healthily was negatively related to the personal relevance of nudging healthier choices. Next to that, we expected that the personal relevance of nudging healthier choices will be higher when the nudge is presented as a benefit for the consumer, as opposed to a nudge that is presented as a benefit for the supermarket.

Two studies were conducted in order to test these hypotheses, using one online administrated survey and one observational study with survey in three Dutch supermarkets. Participants evaluated a series of possible nudges on their personal relevance, and an assessment was made of their motivation and ability to shop healthily. The first study used a self-reported measure for the ability to make healthy choices, while the second study measured the ability to make healthy choices in an objective way. The effect of framing of benefits on the personal relevance of nudging was investigated in the first study, by presenting nudges either as a benefit for the supermarket or as a benefit for the consumer.

The framing of benefits was not found to have an effect on the personal relevance of nudging healthier choices in the supermarket, and the motivation to shop healthily was found to be positively related to the personal relevance of nudging healthier choices in the supermarket. The perceived ability to shop healthily was also found to be positively related to the personal relevance of nudging healthier choices in the supermarket, while the observed ability to shop healthily was not found to be related to the personal relevance of nudging healthier choices in the supermarket. The results further indicate that consumers are unrealistically optimistic about their abilities to shop healthily.

Nudging healthier choices in the supermarket as a means to prevent the population from healthy choices can be an effective strategy. Although it may not specifically attract people who are less capable and less motivated to make healthy choices, nudging healthier choices does not seem to repel these people. Furthermore, nudging healthier choices in the supermarket seems to have the potential to improve customer loyalty among customers who are motivated to make healthy choices. However, further research is needed to confirm this finding, as it cannot be said that an increased personal relevance of nudging healthier choices directly translates into a higher probability of choosing the supermarket involved.

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## 1. Introduction

When people are asked about their motivation to eat healthy, majorities typically indicate that eating healthy is important for them. Although some differences between countries can be found, it seems that consumers in general are very interested in health and healthy eating (Pienak et al., 2008). In the Netherlands, research bureau Motivaction found that 73% of the Dutch population says that it eats healthy most of the time, while 39% would like to eat more healthy (The Netherlands Nutrition Centre, 2015). Other studies found engagement in dietary activities to be applicable to 63% (De Ridder, 2014) and 73% (Wammes et al., 2007) of the Dutch population.

At the same time, the number of overweight people worldwide is increasing steadily (Finucane, 2011), and majorities of populations do not comply to recommendations regarding energy intakes, saturated fat, sodium and fruits and vegetables (Ezzati, 2002). In the Netherlands, the number of overweight people has risen from 27% to 41% over the last 30 years, while the number of obese people in the Netherlands has doubled to 10% (CBS, 2015).

It seems to be the case that many people would like to eat healthy, but that not everyone is actually able to adhere to these intentions. At the same time, promoting healthy nutrition behaviours still relies mostly on health education techniques that try to motivate people to adopt more healthy lifestyles (Brug, 2008).

Research has shown that it is not only motivation that drives healthy eating behaviour. To promote healthy eating, people should be motivated to do so, should preferably be exposed to environments that offer them easy opportunities, and should be confident about their abilities (Brug, 2008). This logic is based on a framework that uses the motivation, opportunities and abilities (MOA) of a person to explain whether this person can act towards a certain goal (MacInnis, Moorman and Jaworski, 1991). Within this Motivation-Opportunity-Ability framework, the ability element has gained increased attention over the last years. It has been argued that the food decisions that we make are not always rational, instead suggesting that the environment we live in has a large influence on many of our unhealthy food choices (Brug, 2008).

Looking at this 'mindless' nature of our food decisions, it has been argued that interventions to promote more healthy nutrition practices should try to adjust the environments in which decisions are made, rather than the present focus on health education (Brug, 2008). Especially the concept of nudging has become increasingly popular in this regard (Kroese et al, 2015). Nudges are described as aspects of the choice architecture that can alter people's behaviour in a predictable way, without reducing freedom of choice or significantly changing economic incentives. Choices intended to be nudged are presented in a more salient or interesting way, presented in a more accessible position, or presented as the default option. To count as a nudge, the intervention must be easy and cheap to avoid. This means that putting healthy food in a more accessible position counts as a nudge, but banning unhealthy food does not (Thaler & Sunstein, 2008).

The purpose of this study is threefold. Firstly, we would like to know whether the personal relevance of nudging in supermarkets is related to the motivation and perceived ability to shop healthily. In other words are consumers more in favour of nudging in supermarkets, when their motivation to make healthy choices is high? Furthermore, are consumers less in favour of nudging in supermarkets when they think that they are capable of making healthy choices in the supermarket themselves?

Secondly, we would like to know to what extent the perceived ability to make healthy choices corresponds with a more objective measure of the ability to make healthy choices. This could provide

policymakers with very useful information, as this could show whether nudges in the supermarket would be approved by consumers that make more unhealthy choices. That is, it could show whether nudges in the supermarket would be approved by consumers who could benefit the most from it.

Recently Junghans et al. (2015) investigated consumers' attitudes and concerns about nudging in the realm of health behaviour. They found that opinions of consumers are mixed about the idea of a government that steers the behaviour of citizens. Furthermore, consumers seemed have a more negative view when it comes to steering behaviour by commercial institutions. They state that there was:

*“a general sense of consensus amongst interviewees in approving actors in designing and carrying out nudges, given that they are dedicated to promoting the wellbeing of consumers and the general public, as counter efforts to companies and marketers whose aim is to increase commercial profits and private gains.”*

In other words, the approval of an actor of nudges seems be a matter of trust in the actor's dedication to promote the wellbeing of consumers. This raises the question how a commercial institution like a supermarket could use and promote nudging in a way that would keep the trust of consumers. Therefore, a third objective of this study is to examine the influence of the framing of benefits of nudging in supermarkets on the personal relevance of nudging in supermarkets. The key question here is whether the key benefit of nudging is for the supermarket (e.g. more profit) or for the consumer (e.g. easier to make a healthy choice). This part of the study is included to help assess the potential of nudging when applied by supermarkets.

To answer the questions posed above, two studies will be conducted. In a first online administrated experiment, the framing of the benefits of a set of nudges will be manipulated. The nudges will be presented as a benefit for the consumer for half of the participants, while the nudges are presented as a benefit for the supermarket for the other half of the participants. Subsequently, we will ask participants to give their opinion on the personal relevance of certain nudges that could be introduced in the supermarket. We will also ask participants for their motivation and perceived ability to shop healthily.

In the second observational supermarket survey and study we will go one step further, making a more objective observation of the ability to eat healthy. Receipts will be asked from customers in the supermarket, which will be used to determine their ability to make healthy choices. The subsequent course of the study will be similar to the first study. We will ask participants for their motivation to shop healthily, and we will ask participants to give their opinion on the personal relevance of certain nudges that could be introduced in the supermarket.

In the last years quite some research has been done regarding the effectiveness and appropriateness of nudges (Loewenstein et al., 2012; Marteau, 2011; Hansen & Jespersen, 2013; Hausman & Welch, 2010). However, not a lot of studies have examined the opinions and thoughts of consumers about nudging (Junghal et al., 2015). This study will contribute to improve the knowledge on this area. We will investigate which consumers would like to be helped with their choice in the supermarket, by testing the hypothesis that the personal relevance of nudges in the supermarket is related to the motivation and (perceived) ability to shop healthily. In addition, by making a distinction between the perceived ability and the actual ability to make healthy choices, we hope to know whether the intended nudges would reach the right consumers. This is relevant for the government and policy makers, as this regards the effectiveness of nudges as an instrument to improve population health.

Thaler and Sunstein (2008) write that both public and private institutions could use nudges to steer people in a better direction. Nudges organized by private institutions can be found in the domains of health care, retirement and environmentalism (Thaler & Sunstein, 2008), but effectiveness and appropriateness of nudging in the food retail domain has not extensively been studied yet (Kroese et al., 2015). Research and public debate seems to focus more on nudging organized by public institutions (Wilkinson, 2013; Marteau, 2011). This study will contribute to the knowledge about nudging organized by supermarkets, thereby contributing to the knowledge about nudging organized by private institutions.

## 2. Theoretical background

### 2.1 The Motivation-Opportunity-Ability framework

Research has shown that it is not only motivation that drives healthy eating behaviour; to promote healthy eating, people should be motivated to do so, should preferably be exposed to environments that offer them easy opportunities, and should have the abilities to do so. It is the combination of individual and environmental factors that determine food choices and eating habits (Brug, 2008). The environmental factors have gained increased interest over the last years, as the influence of the environment on our health behaviour seems larger than originally thought. An increasing body of research shows that the environmental factors are strong enough to influence the ability to adhere to health intentions (Ball et al., 2006; Brug, 2006). Environmental factors can influence our food choices and eating habits in multiple ways. Research has for example shown that the consumption volume is influenced by environmental factors. The environmental factors can inhibit the monitoring of consumption and they can suggest certain consumption norms. Package size, plate shape, lighting, socializing, and product variety are only a few of the environmental factors that have shown to have influence on our consumption volume (Wansink, 2004).

The idea that it is not only motivation that drives healthy eating behaviour can be explained by the framework of *motivation*, *opportunity* and *ability*, which was first introduced by MacInnis, Moorman and Jaworski (1991). They indicated that the effectiveness of communication is driven by the motivation, opportunity and ability to process brand information from an ad. Later on the framework turned to be applicable to other domains, including managerial disciplines like knowledge sharing among employees (Siemsen et al., 2008), public relations effectiveness (Hallahan, 2001) and Internet communications processing (Putrevu, 2003).

The framework also turned out to be useful in the public health domain. Rothschild (1999) modified the MOA framework in a way that would help public health managers, by providing insight in behavioural determinants of nutrition behaviours. Rothschild argues that both motivation, opportunity and ability should be present among people in order to accommodate to a managers' goal. When one or more elements of the set of MOA are lacking, the manager can enhance the probability of achieving desired levels of MOA, by using a specific combination of Education, Marketing and Law.

Recently Bos et al. (2015) employed the MOA framework in order to examine the extent to which heterogeneity in barriers regarding the motivation, the perceived opportunity and the perceived ability to choose low-calorie snacks over high-calorie snacks is associated with the share of low calorie snack choices consumed. Furthermore, the study identified which barrier combinations could

be identified as most prevalent. They found the MOA framework to be very useful in the food choice context, as it encompasses both individual-level and environmental influences on behaviour. This strengthens the idea that this is an adequate framework for this study, as we are also dealing with a food context (the supermarket) and both individual-level and environmental influences on behaviour (the motivation to make healthy choices versus the influence of the choice environment). In the coming paragraphs the elements of the MOA framework will be further described.

The Motivation element means arousal in the direction of the goal (MacInnis, Moorman, and Jaworski 1991). Individuals are motivated to behave when they know that their self-interest will be served, therefore the self-interest is a strong component of motivation. Broadly spoken, the motivation is the willingness to act (Rothschild, 1999). Opportunity means having the chance to act. A lack of opportunity includes situations in which the individual wants to act but is unable to do so because there are no available alternatives at hand (Rothschild, 1999). For example, children living in urban environments who would like to play outside are not always able to do so, as there is often no safe space available to play outside. The ability to act is the third element of the framework, and is referred to the individual skill or proficiency to solve problems. For the public health domain, this entails breaking a bad habit, or to counter the arguments of peers (Rothschild, 1999). Another relevant determinant of ability comes from the self-efficacy theory, which entails that the beliefs about one's own ability to execute tasks, strongly influences the actual performance on these tasks. These effects are especially present with regard to health behaviours (Luszczynska et al., 2005).

Rothschild (1999) argues that an external competitor can impede the ability of the target to behave, even when there is sufficient motivation and no lack of opportunities. Take for example the scenario in which a student who is motivated to drink a low amount of alcohol at a certain party. There are both alcoholic and non-alcoholic drinks available this evening. At a certain point of time the student wants to switch from alcoholic drinks to non-alcoholic drinks. However, he is not able to resist the pressure of his peers to continue drinking alcohol. The peers are the external competitors in this scenario, something that has impeded the student to behave in line with his motivation.

A similar scenario could be imagined in the context of the supermarket. For a person who is motivated to shop healthily, several 'competitors' could present themselves. Take for instance the differences in benefits of healthy and unhealthy foods. Whereas choosing unhealthy foods may lead to an immediate appeal to our innate preferences for sweet, fat and salty, the benefits of healthy foods are less certain. Instead, the individual is promised a lower probability of diseases that might happen at an undetermined time in the future (Dewnowski, 1997; Rothschild, 1999). The ability to make healthy food choices therefore includes resisting the direct temptation of unhealthy foods.

Other potential competitors of the intention to make healthy food choices are the environmental factors. The high availability and accessibility of energy-dense and energy-rich foods in our environment do not seem to influence our food choices in a healthy way. The energy-dense and energy-rich foods often appeal to our natural preference for sweet, fat and salty. As humans tend to eat more when food is more easily available (Wansink, 2004), the high availability and accessibility of energy-dense and energy-rich foods may lead to overeating, weight gain and increased intakes of saturated fat, refined sugars and salt (Brug, 2008; Lucan & Mitra, 2012). In combination with more opportunities to avoid physical activity, it has been argued that the described environment can be called an 'obesogenic environment'. This can be seen as an environment which prevents people from living up to their health intentions.

It is not only the ultimate outcomes of food choices that show the discrepancy between motivation and behaviour. Behaviours that could lead to healthy food choices are also not as high as expected.



Research for example shows that only a minority of people read and process nutrition labels when shopping (Steenhuis et al., 2004; Cowburn & Stockley, 2004; Möser et al., 2010; Drichoutis et al., 2006).

## 2.2 Nudging as a new approach to guide consumers

It has been argued that interventions to promote more healthy food choices should focus on reshaping the environment in which consumers make their decisions, rather than the present focus on health education. The reshaping of the environment means that the population is more or less being 'protected' against unhealthy behaviour (Brug, 2008; Rothschild, 1999). Especially the concept of nudging has become increasingly popular in this regard (Kroese et al, 2015). Nudges are described as aspects of the choice architecture that can alter people's behaviour in a predictable way, without reducing freedom of choice or significantly changing economic incentives. Choices intended to be nudged are presented in a more salient or interesting way, presented in a more accessible position, or presented as the default option.

A whole range of nudges have been developed throughout the last years, in which different elements of the environments were reshaped. There are several elements that have shown to be effective in the implementation of nudges. Sunstein (2014) describes the ten most important elements to be *default rules, simplification, uses of social norms, increases in ease and convenience, disclosure, warnings, precommitment strategies, reminders, eliciting implementation intentions and informing people of the nature and consequences of their own past choices.*

Out of these ten elements used as a base for nudges, some of them have been found to be effective when used for nudges regarding healthy food choice behaviour. In the following paragraph, examples will be given for nudges related to ease and convenience, uses of purchasing norms and simplification.

Changing the accessibility of alternatives is a base for nudges that has been shown to be effective in multiple studies (van Kleef et al., 2012). The less desirable alternatives are presented in a less accessible way, which makes them less likely to be chosen. Accessibility has been conceptualized in different ways, including the extent of assortment of certain foods, the degree to which food is prepared or ready for consumption, the free provision of food and the spatial distance to food (Maas et al., 2011). One good example is a study by Maas et al. (2011), in which the distance to a bowl of snacks was randomly varied in a lab setting. The study showed that the probability and amount of intake was lower for the more distant conditions compared to the proximal condition. Another study by Kroese et al. (2015) repositioned the healthy and unhealthy foods in train station snack shops. Healthy foods were placed near the cash register, while the unhealthy products were available elsewhere in the shop. More healthy products were sold in the shop, even when the nudge was implemented with an explanatory sign. Note however that the amount of unhealthy snacks was not reduced.

Changing the availability is also a base for nudges that has shown to be a potential base for effective nudging strategies. A good example is a study by van Kleef et al. (2012), in which the availability of healthy snacks was varied in both a lab setting and an hospital staff restaurant. The assortment included either 25% or 75% healthy snacks. Within both settings, the assortment structure with more healthy snacks led to higher sales of healthy snacks. The larger availability of healthy snacks induced a certain consumption norm, next to the increased likelihood that a consumer found a healthy

product that he or she liked. However, like in the study of Kroese et al. (2015), the sales of unhealthy snacks were not reduced.

Purchasing norms were also found to be effective when used as a cue to increase healthy food behaviour. In a study of Wansink et al. (2011) partitions were created in supermarket shopping carts, in order to increase sales for healthy foods like fruits and vegetables. The study showed that fruits and vegetables were purchased in quantities relative to their partition size in the shopping cart. The partitions were found to be effective because they suggest a certain purchasing norm.

The simplification of choices is also a way of nudging that has been studied before. Making healthy choices in the supermarket can be a complex and difficult task. Many consumers, who would like to make more healthy choices, find it difficult to understand the nutritious values of products. Another problem is that the present day supermarket confronts us with an overwhelming number of food products. The information available is simply too much to process rationally, which makes it more difficult to choose more healthy products (Kallehave et al., 2011). To make this task easier, Thapa et al. (2014) designed a supermarket project in which point of sale signs indicated which products were healthier within a category. Although sales for nudged items did not significantly increase across all categories, sales did increase for several nudged items' categories.

Other studies have started to explore the use of electronic devices to simplify choices. Kallehave et al. (2011) mounted an electronic device on shopping trolleys, which indicated the healthiness of products using three categories. Products were categorized as 'eat most', 'eat less' and 'eat least'. In addition, the device offered more healthy suggestions when a product from category 'eat less' or 'eat least' was chosen. Results from a small field trial showed little change of behaviour, as participants changed their original choice only a few times.

Another study by Kalkanitè et al. (2011) used an electronic device to nudge people to choose products with less food miles. They introduced a display that clips on a shopping trolley, including a set of LED lights on the handle. The amount of lit LED lights on the handle of shopping trolleys indicated the food miles of products, while a changing emoticon on the display compared the average miles of all the products in the trolley against a social norm. Results from a small field trial showed that the display nudged people to choose products with fewer food miles than the items they selected using the ordinary shopping trolley. See also table 1 for an overview of field studies regarding nudging food choices in an environment with shelves.

*Table 1 : Overview of field studies regarding nudging food choices in a retail environment.*

Author	Nudge	Items nudged	Goal of nudge	Result	Location
Kroese et al. (2015)	Healthy foods were placed near the cash register, unhealthy products were placed elsewhere in the shop.	Fruits, several types of muesli bars, cereal biscuits and crackers.	Make healthy food choices easier.	More healthy products were sold in the shop, but the amount of unhealthy snacks was not reduced.	Train station kiosk.
Kleef et al. (2012)	The assortment included either 25% or 75% healthy snacks.	Fresh fruit (banana, apple, orange), dried fruit chips, snack-sized vegetables, and granola bars.	Make healthy food choices easier.	The assortment structure with more healthy snacks led to higher sales of healthy snacks. Sales of unhealthy snacks were not reduced.	Hospital staff restaurant.

Wansink et al. (2011)	Partitions were created in supermarket shopping carts.	Fruit and vegetables.	Increase sales of fruit and vegetables.	Fruits and vegetables were purchased in quantities relative to their partition size in the shopping cart.	Supermarket
Thapa et al. (2014)	Point of sale signs indicated which products were more healthy within a category.	Bakery and Bread, Baking, Beverages, Sod, Breakfast, Can foods, Dairy and Cheese, Frozen, Grain Pasta and Sauce, Meat and Seafood, Pantry and Snacks.	Make healthy food choices easier.	Sales increased for several nudged items' categories, but no significant increase across all categories.	Supermarket
Kallehave et al. (2011)	An electronic device mounted on shopping trolleys indicated the healthiness of products using three categories. The device offered more healthy suggestions when a less healthy product was chosen.	All products	Make healthy food choices easier.	Only a few times a change of behaviour occurred, where the user changed the original choice.	Supermarket (field trial)
Kalnikaite et al. (2011)	The amount of lit LED lights on the handle of shopping trolleys indicate the food miles of products, while a changing emoticon compared the average miles of all the products in the trolley against a social norm.	A shopping list with 12 specific products.	Reduce food miles of products bought.	The lambent handle display nudged people to choose products with fewer food miles than the items they selected using their ordinary shopping strategies.	Supermarket (field trial)

## 2.3 Criticism on nudging

There are also critiques on using nudging as an instrument to improve the health of a population. One much heard argument against nudging is that it is not ethically acceptable, as nudging works by manipulating citizens' choices (e.g. Hansen & Jespersen, 2013; Hausman & Welch, 2010). Thaler and Sunstein's own position here is that citizens are always influenced by the decision making context anyway. They argue that liberty is preserved as long as the alternative options are not deleted from the context, leaving citizens free to choose otherwise. Opponents of nudging call this logic flawed, as the approach of nudging is based on the assumption that we tend to fall short on making optimal decisions (Hansen & Jespersen, 2013). A similar reasoning is used by Hausman & Welch (2010). They argue that the principle of not closing off alternatives nor changing economic incentives does not mean that a similar level of liberty has been preserved. Instead, they argue that exploiting non-rational factors in decision making still threatens personal liberty.

Hansen & Jespersen (2013) also pinpoint another argument. As nudges are intended to influence certain choices, they should promote certain end values. However, it cannot always be verified that these values are consistent with values of citizens, as there can be strong obstacles when determining what people judge to be in their own interests. For instance, when citizens are asked when they consider state intervention to influence behaviour to be acceptable, their answer largely depends on the level of abstractness of questions (Branson et al., 2013).

Another much heard argument against nudging is that it has not proven to be powerful enough to tackle society's major ills, as it does not change deeply ingrained behaviours. It has been argued that it instead reduces public engagement, thereby reducing opportunities for citizen empowerment to tackle society's problems (Goodwin, 2012). Others argue that the effectiveness of nudging will be marginal as long as the effects of unhealthy 'nudges' largely shaped by industry are not regulated yet (Marteau, 2011).

In order to use nudges in an ethically responsible way, Korthals (2012) described certain guidelines for ethical nudging. He argues that nudges should be transparent both in its design and its effects. They must respect choices instead of restricting them, and the designer of the nudge should be accountable for the effects of the nudge. Furthermore, nudges should only be used when it is clear that a majority of the people have values in line with the intended goal of the nudge. Therefore nudges should not intend to impact issues that only regard certain groups of people.

## 2.4 Summary and hypothesis

### 2.4.1 Summary

Research has shown that it is not only motivation that drives healthy eating behaviour. To promote healthy eating, people should be motivated to do so, should be exposed to environments that offer them opportunities to act on their intentions, and should be confident about their abilities. It has thereby been argued that the food decisions that we make are not always rational; instead suggesting that the environment we live in has a large influence on many of our unhealthy food choices (Brug, 2008).

It seems to be the case that many people are motivated to eat healthy, but that not everyone is actually able to act on these intentions. It has therefore been argued that interventions to promote more healthy food choices should try to adjust the environments in which decisions are made, rather than the present focus on health education (Brug, 2008, Rothschild, 1999). Especially the concept of nudging has become increasingly popular in this regard (Kroese et al, 2015). Nudges are described as aspects of the choice architecture that can alter people's behaviour in a predictable way, without reducing freedom of choice or significantly changing economic incentives (Thaler & Sunstein, 2008).

This study will explore the potential of nudging healthier choices in a supermarket setting, by exploring the factors that can explain the perceived personal relevance of nudging healthier choices in the supermarket.

### 2.4.2 Hypothesis regarding the framing of perceived benefit

Nudging in the supermarket could be presented as a benefit for the consumer, or it could be presented as a benefit for the supermarket, without having to change the actual facts. We know from literature that the framing of an issue could change a person's perception of that issue without having to alter the actual facts (Goffmann, 1974). It could even produce predictable shifts of preference (Tversky & Kahneman, 1981). In other words, the way that something is presented influences the choice people make about how to process that information. Nudges in the supermarket could also be seen from different perspectives. For example, a nudge that promotes the sales of vegetables and fruits could be seen as a way to make more profit for the supermarket. However, one could also see this as a way to help consumers to make healthy choices.

We therefore expect that the personal relevance will be higher when the nudge is presented as a benefit for the consumer, as opposed to a nudge that is presented as a benefit for the supermarket.

*H1 Compared with a description of nudges which emphasizes the commercial benefits of supermarkets, a description of nudges which emphasizes the potential benefits for consumers will lead to higher personal relevance of nudges in the supermarket.*

#### 2.4.3 Hypotheses regarding the influence of ability and motivation to make healthy choices on the personal relevance of nudging in the supermarket

Nudges in the supermarket that make healthy choices easier, could be seen as a way to decrease the effect of the external competitor. This external competitor could be identified as the direct temptation of unhealthy foods. That is, nudging healthier choices could be seen as an improvement of the ability to resist the temptation of unhealthy choices. This is in line with one's motivation to make healthy choices, as this encompasses the motivation to resist the temptation of unhealthy choices. Thus, nudging healthier choices could help consumers who are motivated to make healthy choices to reach their goals. We therefore expect that the motivation to shop healthily is positively related to the personal relevance of nudging healthier choices in the supermarket.

*H2 The motivation to shop healthily is positively related to the personal relevance of nudging healthier choices in the supermarket.*

Within the MOA framework, ability can be explained as the individual skill or proficiency to solve problems (Rothschild, 1999) or as beliefs about one's own ability to execute tasks (Luszczynska et al., 2005). For hypothesis H3a we use the second explanation, which leads us to the word *perceived* ability. For hypothesis H3b we use the first explanation, which leads us to the word *observed* ability.

For a person that already has high perceived abilities to shop healthily, there is no need for improvement by means of nudges. It is the persons without perceived and observed abilities to shop healthily, who could see nudging healthier choices in the supermarket as a benefit. We therefore expect that the perceived and observed ability to shop healthily is negatively related to the personal relevance of nudging healthier choices in the supermarket.

*H3a The perceived ability to shop healthily is negatively related to the personal relevance of nudging healthier choices in the supermarket.*

*H3b The observed ability to shop healthily is negatively related to the personal relevance of nudging healthier choices in the supermarket.*

We expect that the motivation to make healthy choices is positively correlated to the personal relevance of nudging healthier choices in the supermarket (H2), and we expect that the (perceived and observed) ability to shop healthily is negatively related to the personal relevance of nudging healthier choices in the supermarket (H3a & H3b). Hence, we expect that highly motivated consumers with a low (perceived or observed) ability to shop healthily will consider nudging healthier choices in the supermarket as most personally relevant. See also table 2 for a visual presentation of these hypothesis.

*H4a Highly motivated consumers with a low perceived ability to shop healthily will consider nudging healthier choices in the supermarket as most personally relevant.*

*H4b Highly motivated consumers with a low observed ability to shop healthily will consider nudging healthier choices in the supermarket as most personally relevant.*

*Table 2: Expected personal relevance of nudging healthier choices in the supermarket, for respondents with high and low motivation to shop healthily, and for respondents with high and low perceived or observed ability to shop healthily.*

Expected personal relevance of nudging healthier choices in supermarket	Motivation to shop healthily		
		Low	High
Perceived or observed ability to shop healthily	Low	-	++
	High	--	+

### 3. Online administrated experiment on effect of framed benefits of nudging

#### 3.1 Introduction

The objective of the first study was to investigate the effect of the framing of benefits of nudging healthier choices in the supermarket, and to investigate the relation between the motivation to make healthy choices, the perceived ability to make healthy choices and the personal relevance of nudging healthier choices in the supermarket. The study was conducted using an online questionnaire.

#### 3.2 Method

##### 3.2.1 Design

A between subjects experiment was conducted in which one factor was manipulated: the emphasis on the benefit of nudges (supermarket versus consumer). The framing of these nudges was manipulated using two conditions. Participants were randomly assigned to one of these two conditions. Nudges were either framed as a benefit for the consumer (“The supermarket considers this change because it wants to help its customers with making healthier choices”), or they were framed as a benefit for the supermarket (“The supermarket expects to make more profit in this way by selling more fruits and vegetables”).

The dependent variable was the personal relevance of nudging healthier choices in the supermarket.

Each participant was exposed to four nudges. Out of the four presented nudges, three nudges were about making healthy choices easier for consumers. One nudge was about making the choice for fair trade products easier. This variation in the intended goal of the nudges was created to analyse the relation between a participants’ motivation to make healthy choices, the intended goal of the nudge and the personal relevance of the nudge. The order of these four nudges was randomized, in order to control for the influence of one presented nudge on another. See table 3 for an overview of the presented nudges, including the articles on which they are based. Note that the first two presented nudges are very similar to the corresponding articles, while the latter two presented nudges are created based on findings in the corresponding articles. This is acceptable, as we will only measure the personal relevance of the nudges. In other words, it is the intention of the nudge that counts.

Table 3: overview of presented nudges and the framing of these nudges.

Nudge nr.	Description of nudge as used in the questionnaire	Benefit frame	Based on
1	"A supermarket considers to introduce new trolleys. The new trolleys have special partitions for vegetables and fruits. Research has shown that that makes customers buy more vegetables and fruits, because they will unconsciously think that the partitions should be filled."	"The supermarket considers this change because it wants to help its customers with making healthier choices" versus "The supermarket expects to make more profit in this way by selling more fruits and vegetables"	Wansink et al. (2011)
2	"A supermarket considers to change the shelves with snacks near the checkout counter. The new shelves would include more healthy snacks and less unhealthy snacks. Research shows that more healthy snacks are sold when they are placed clearly visible near the checkout counter."	Idem	Kroeze et al. (2015)
3	"A supermarket considers to change the shelves with hearty and salty snacks. The new shelves would be designed in such a way that healthy snacks are placed at eye-level, and less healthy snacks are placed at the bottom of the shelves. Research shows that more healthy snacks are sold when they are placed at eye level and when customers don't have to bend over to take the product."	Idem	Dreze et al. (1995)
4	"A supermarket considers to change the shelves with chocolate. The new shelves would have textual signings, indicating that an increasing number of people buy Fair Trade chocolate. Research shows that sales increase for products that have these signings, because customers like to do what others do"	Idem	van Trijp (2012)

### 3.2.2 Participants

Respondents were recruited using a mailing list. This is a list of persons who have indicated to be interested in participating in questionnaires before. In addition, the questionnaire was spread among acquaintances and family members of the researcher.

### 3.2.3 Procedure

Participants first gave informed consent. The questionnaire was divided in two parts. The first part of the survey focused on the motivation and perceived ability to shop healthily. This part was assessed using six questions. The second part of the survey focused on the personal relevance of nudging in the supermarket. Participants were presented with four nudges that could be implemented in a supermarket. The nudges were first explained shortly. The explanation of the nudges included the

intended change in the supermarket, the expected effects of the change and the reasons for the supermarket to introduce the change.

Subsequently the participants had to indicate how relevant these nudges would be for them personally. The term 'nudge' itself was not used, as explaining this concept would make the survey unnecessary complex for the respondents. Instead, the instructions described a situation in which a supermarket considers to implement certain changes in the supermarket.

At the end of the survey the participants were asked to give their demographic information. This included questions regarding gender, age and education level. In addition, participants were asked to indicate whether they are responsible for the daily groceries or not.

### 3.2.4 Measures

#### Dependent variable - personal relevance of nudges

Participants evaluated a total of four nudges on two items. These were seven-point Likert-scale items, with labels ranging from "completely disagree" to "completely agree". These questions consisted the assessment of the personal relevance of the presented nudges ("I would find it personally valuable if this change was implemented" and "I would be in favor of implementing this proposed change"). The internal consistencies of the two scales that measured the personal relevance was considered to be good ( $0.80 < \alpha < .90$ ) for all four presented nudges. Subsequently new variables were created that represented the personal relevance of each nudge. This variable was created by taking the average of the two items.

The internal consistency of the personal relevance of nudges 1-3 (nudges with health intention) was considered to be good ( $\alpha = .77$ ). Subsequently a new variable was created that represented the personal relevance of nudges with the intention to make healthy choices easier. This variable was created by taking the average of the three items. The internal consistency of the personal relevance of all nudges was considered to be good ( $\alpha = .79$ ). Subsequently a new variable was created that represented the personal relevance all nudges. This variable was created by taking the average of the four items.

#### Motivation and perceived ability

The MOA framework itself as proposed by Rothschild et al. (1999) does not tell how the determinants should be measured. However, these determinants are used in other behavioural theories as well. Therefore we used and adapted scales from other behaviour theories as much as possible.

To measure participants' motivation to make healthy choices, personal norms towards choosing healthy products were assessed, which were adapted from Conner et al. (2002) and Bos et al. (2015). These questions consisted of the personal willingness and importance of making healthy choices in the supermarket ("I would like to shop healthily" and "It is very important for me to shop healthily"). These items were measured by means of two 7-point Likert scales, with labels ranging from "completely disagree" to "completely agree". The internal consistency of the two scales that measured motivation to make healthy choices was considered to be good ( $\alpha = .86$ ). Subsequently a new variable was created that represented the motivation to make healthy choices. This variable was created by taking the average of the two items.



To measure participants' ability to make healthy choices, participants' self-efficacy regarding their knowledge and skills to make healthy choices were assessed. Both the knowledge and skills were measured by means of two 7-point Likert scales, with labels ranging from "completely disagree" to "completely agree". The internal consistency of the two scales that measured the perceived ability to make healthy choices was considered to be reasonable ( $\alpha = .62$ ). Subsequently a new variable was created that represented the perceived knowledge to make healthy choices. This variable was created by taking the average of the two items.

The perceived knowledge to make healthy choices was measured using questions adapted from Bos et al. (2015) ("Without reading the label I am able to make an estimate of the healthiness of a product" and "I am able to distinguish between healthy and unhealthy products within a product group") The perceived skills to make healthy choices was measured using questions adapted from Sheeska et al. (1993) and Bos et al. (2015) ("I would be capable of resisting the temptation of unhealthy foods, if I wanted to" and "I would be capable of making healthy choices, if I wanted to"). The internal consistency of the two scales that measured the perceived knowledge to make healthy choices was considered to be reasonable ( $\alpha = .66$ ). Subsequently a new variable was created that represented the perceived knowledge to make healthy choices. This variable was created by taking the average of the two items. At last, the variables 'perceived ability' and 'perceived knowledge' were transformed into a variable that combined these two variables. This variable was created by taking the average of the two items, and was called 'perceived ability score'.

### **3.2.5 Data analysis**

At first a randomization check was performed, to test whether the gender and education levels were evenly distributed between the two conditions. This randomization check was performed using a Pearson Chi-Square test.

The following hypothesis were then tested using the following analyses:

Hypothesis 1 was tested using an independent t-test. The means of the personal relevance of nudges which emphasize the commercial benefits of supermarkets was compared to the means of the personal relevance of nudges which emphasize the potential benefits for consumers.

Hypothesis 2, 3a and 3b were tested using a Pearson product-moment correlation. For hypothesis 2 there was tested whether there is a positive relation between the motivation to shop healthily and the personal relevance of nudging healthier in the supermarket. For hypothesis 3a there was tested whether the perceived ability to shop healthily is negatively related to the personal relevance of nudging healthier choices in the supermarket.

In order to test hypothesis 4a, variables 'motivation' and 'perceived ability score' were recoded into a categorical variable. The variables were divided in the categories 'low' and 'high'. Values higher than the median were considered to be 'high', while values lower than the median were considered to be 'low'.

Hypothesis 4a was tested using a Two-Way ANOVA. For this hypothesis there was tested whether there are interaction effects between the motivation and perceived ability to shop healthily on the personal relevance of nudges. Main effects were also analysed for the motivation and perceived ability to shop healthily on the personal relevance of nudges.

### 3.3 Results

#### 3.3.1 Descriptive information

##### Participants and randomization check

A total of 311 participants completed the experiment. Twelve participants indicated that they were not or almost not responsible for daily groceries. These participants were considered to have insufficient experience for answering questions about decision-making in the supermarket. These participants were therefore excluded from the analysis. A total of 299 participants were left over for analysis.

Out of these participants, 75% were female and 25% were male. Gender was equally balanced across conditions ( $P > 0.54$ ). The mean age of the participants was 37.5 years, with a standard deviation of 18.3 years. Age was equally balanced across conditions ( $P = 0.55$ ).

Participants' highest attained education was academic for 48% of participants and higher professional for 30% of participants. The remaining 22% of participants received various lower educations, ranging from lower vocational education to pre-university education. Education level was equally balanced across conditions ( $P = 0.70$ ).

##### Means of independent and dependent variables

In table 4 the means of the measured and computed independent variables can be seen. The table shows that both the motivation and the perceived ability to make healthy choices are quite high.

*Table 4: means and standard deviations of measured and computed independent variables.*

Variable	Mean (SD)
Motivation	5.5 (1.3)
Perceived knowledge	4.4 (1.4)
Perceived ability	5.1 (1.3)
Perceived ability score	4.7 (1.0)
Personal relevance of presented nudges	4.7 (1.5)

#### 3.3.2 Personal relevance of nudges in the supermarket

##### Personal relevance of nudging towards healthy choices

An independent samples t-test was conducted to test the effect of the framing of benefits of nudges with the intention to make healthy choices on the personal relevance of these nudges. Results indicated no significant difference between nudges which emphasized on the benefits of consumers ( $M = 4.79$ ,  $SD = 1.45$ ) and nudges which emphasized the commercial benefits of supermarkets ( $M = 4.57$ ,  $SD = 1.53$ );  $t(292) = 1.24$ ,  $p = 0.21$ . These results suggest that a description of nudges which emphasizes the potential benefits for consumers do not lead to higher personal relevance of nudges in the supermarket, compared to a description of nudges which emphasizes the commercial benefits of supermarkets.

A Pearson product-moment correlation coefficient was computed to assess the relationship between the motivation to shop healthily and the personal relevance of nudges in the supermarket. There was a significant correlation between the two variables,  $r = .23$ ,  $n = 294$ ,  $p < .001$ . These results suggest

that the motivation to shop healthily is positively related to the personal relevance of nudging healthier choices in the supermarket.

A Pearson product-moment correlation coefficient was computed to assess the relationship between the perceived ability to shop healthily and the personal relevance of nudges in the supermarket. There was a significant correlation between the two variables,  $r = .16$ ,  $n = 294$ ,  $p < .01$ . These results suggest that the perceived ability to shop healthily is positively related to the personal relevance of nudging healthier choices in the supermarket.

The same test also revealed that the motivation to shop healthily was positively related to the perceived ability to shop healthily  $r = .28$ ,  $n = 299$ ,  $p < .001$ .

A Two-Way ANOVA was conducted in order to examine the possible interaction effects of motivation and perceived ability on the personal relevance of nudging healthier choices. There was no significant interaction effect between the variables,  $F(1, 290) = .151$ ,  $p = .220$ . Main effects analysis showed that highly motivated respondents considered nudging healthier choices as more personally relevant than low motivated respondents  $F(1, 290) = 9.97$ ,  $p < .01$ . Consumers with a low perceived ability did not consider nudging healthier choices as more personally relevant than respondents with a low perceived ability  $F(1, 290) = 2.51$ ,  $p = .114$ . See table 5 for an overview of the main effects and interaction effects of motivation and perceived ability to shop healthily on the personal relevance of nudging healthier choices. In table 6 an overview of the average personal relevance is given for four categories of respondents. Figure 1 shows the same information, visually presented.

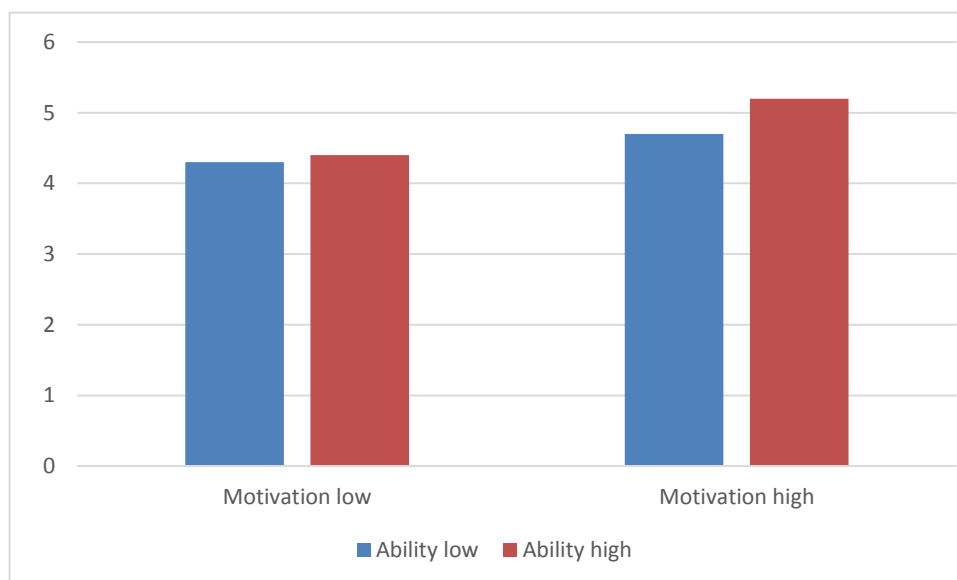
*Table 5: overview of main effects and interaction effects of motivation and perceived ability to shop healthily on the personal relevance of nudging healthier choices.*

	<b>F (1, 290)</b>	<b>p</b>
<b>Motivation</b>	9.97	.002
<b>Observed ability</b>	2.51	.114
<b>Motivation * observed ability</b>	1.51	.220

*Table 6: means and standard deviations of personal relevance of nudges in the supermarket, categorized by a low/high motivation in combination with a low/high perceived ability.*

		<b>Motivation</b>		
		<b>Low</b>	<b>High</b>	<b>Total</b>
<b>Observed ability</b>	<b>Low</b>	4.3 (1.5)	4.7 (1.7)	4.5 (1.6)
	<b>High</b>	4.4 (1.5)	5.2 (1.3)	4.9 (1.4)
	<b>Total</b>	4.4 (1.5)	5.0 (1.5)	

Figure 1: means of personal relevance of all nudges in the supermarket, categorized in respondents with a low or high motivation to shop healthy in combination with a low or high observed ability to shop healthy.



### 3.4 Discussion study 1

The framing of benefits of nudges was not found to influence the personal relevance of nudging healthier choices in the supermarket. However, the average personal relevance of nudging healthier choices was quite high. This suggests that the respondents made their evaluation of the nudges independent from the intentions of the supermarket. One possible explanation for this result could be situated in the credibility of the benefit frames. Although the nudges were either framed as a benefit for the consumer or as a benefit for the supermarket, all nudges were said to be introduced by a supermarket. It is therefore possible that the power of the frame was not strong enough to influence the trustworthiness of a supermarket as an initiator of nudges. That is, it could be that the framing of nudges is not powerful enough to change the image of a supermarket, being a private institution that wants to increase private gains. Another explanation could be that the intention of the nudge was irrelevant for consumers, as the outcomes are very clear. That is, the nudges were presented in a such a way that it was very clear for the readers what the outcomes would be. This might have been different if the descriptions of the nudges were more abstract, as this would ask more trust from consumers in the initiator of the nudge.

It seems that the framing of the benefits of nudging healthier choices is not a good way to improve the personal relevance of these nudges. Further research could investigate whether the framing would be effective if nudges were presented in a more abstract way.

The results further suggest that it is the consumers who are already motivated to make healthy choices who consider nudging healthier choices to be personally relevant. More surprisingly, it seems to be the consumers who already perceive themselves capable to make healthy choices, who consider nudging healthier choices to be personally relevant. An explanation for this result could be found in the positive relation between the motivation to shop healthily and the perceived ability to

shop healthily. This suggests that most consumers who are motivated to shop healthily, also consider themselves to be capable of shopping healthily.

Obviously, a perceived ability to shop healthily does not directly mean that a consumer actually shops healthily. This could be seen as a clear limitation of this online administrated survey. With this design we could only measure the perceived ability to make healthy choices, not an objective ability to make healthy choices. Therefore an observational study and survey in three Dutch supermarkets was conducted in order to make a more objective assessment of the ability to make healthy choices.

## **4. Observational and survey study in three Dutch supermarkets**

### **4.1 Introduction**

The objective of the second study was to assess the relation between consumers' self-reported motivation to shop healthy foods, an objective measure of the ability to make healthy choices and their reported personal relevance of nudging towards healthy choices in a supermarket setting. This study was conducted in three Dutch supermarkets, with customers who just went shopping grocery shopping as participants.

### **4.2 Method**

#### **4.2.1 Design**

The study was an observational and survey study. Motivation to shop healthy, estimations of the healthiness of a shopping basket and the personal relevance of nudging healthier choices were assessed using a survey, while an objective evaluation of the healthiness of a shopping basket was made using the receipts of customers.

#### **4.2.2 Participants**

Participants were recruited in the checkout zone at three Dutch supermarkets. This was done for three reasons. Firstly, recruiting at this location made it possible to ask receipts of customers. Second, we expected respondents' answers to be more in line with their actual behaviour, as they just went shopping. Third, we expected to recruit respondents with a good variety of age and gender. Participants were approached when they seemed to have bought 10 products or more.

#### **4.2.3 Procedure**

Participants were first asked to have their receipt photographed. When they agreed with this, the participants started with the questionnaire in Dutch (see questionnaire in appendix). The questionnaire was divided in three parts. The first part focused on the motivation to shop healthily. This part was assessed using two questions.

In the second part of the questionnaire the respondents were asked to make three estimations. They were asked to estimate the percentage of basic foods in their basket, the percentage of fruit and vegetable products, and the percentage of sweet and hearty snacks & drinks in their basket.

The third part of the questionnaire focused on the personal relevance of nudging healthier choices in the supermarket. Participants were presented with three nudges that could be implemented in a supermarket. These were the same nudges as used in study 1, without the benefit frame. See table 3 for an overview of these presented nudges. Like in study 1, the participants had to indicate how relevant these nudges would be for them personally. At the end of the survey the participants were asked to report their gender and age.

#### 4.2.4 Measures

##### Dependent variable - personal relevance of nudges

Participants evaluated a total of three nudges on two items. These were seven-point Likert-scale items, with labels ranging from “completely disagree” to “completely agree”. These questions consisted the assessment of the personal relevance of the presented nudges (“I would find it personally valuable if this change was implemented” and “I would be in favor of implementing this proposed change”).

The internal consistencies of the two scales that measured the personal relevance was considered to be good ( $\alpha > .90$ ) for all three presented nudges. Subsequently new variables were created that represented the personal relevance of each nudge. This variable was created by taking the average of the two items. The internal consistency of the personal relevance of all nudges was considered to be good ( $\alpha = .87$ ). Subsequently a new variable was created that represented the personal relevance of all nudges. This variable was created by taking the average of all three items.

##### Self-reported motivation to make healthy choices

To measure participants’ motivation to make healthy choices, personal norms towards choosing healthy products were assessed, which were adapted from Conner et al. (2002) and Bos et al. (2015). These questions consisted of the personal willingness and importance of making healthy choices in the supermarket (“I would like to shop healthily” and “It is very important for me to shop healthily”). These personal norms were measured by means of two 7-point Likert scales, with labels ranging from “completely disagree” to “completely agree”.

The internal consistency of the two scales that measured motivation to make healthy choices was considered to be good ( $\alpha = .95$ ). Subsequently a new variable was created that represented the motivation to make healthy choices. This variable was created by taking the average of the two items. The moderator motivation was then recoded into a categorical variable. The variable was divided in the categories ‘low’ and ‘high’. Values higher than the median were considered to be ‘high’, while values lower than average were considered to be ‘low’.

##### Self-reported estimations of percentages of specific types of products bought by participants during current shopping trips

To measure participants’ own estimation of the healthiness of their basket, participants were asked to give three estimations of percentages of specific types of products bought during their shopping trip. These questions asked for the same percentages as the three indicators described in Appendix C. The following questions were asked:

“What amount of the groceries *that you just bought* fits in the preferred foods of the ‘Schijf van Vijf’ of The Netherlands Nutrition Centre? Give an estimation in percentages”

“What amount of your groceries *that you just bought* consists of vegetables and fruits? Give an estimation in percentages.”

“What amount of your groceries *that you just bought* consists of hearty and sweet snacks and drinks which should be eaten only now and then according to The Netherlands Nutrition Centre? Give an estimation in percentages.”

#### Actual percentages of specific types of products bought by participants during current shopping trip as obtained from receipts

The estimation of the healthiness of a shopping basket was based on three indicators, which were all based on the guidelines of the Dutch Board of Health. There are two reasons for choosing the guidelines of the Dutch Board of Health as a basis for the indicators. The first reason is that it is an objective and detailed guideline, which is based on scientific knowledge. The second reason is that the guidelines are well-known in The Netherlands, which makes it easier to ask questions about it (The Netherlands Nutrition Centre, 2011).

The three indicators were measured using photographs of the receipts of the participants. First the total amount of food products on the receipt were counted. Subsequently the products that fell into the categories described in Appendix C. At last, the number of products that fell in a specific category were divided by the total amount of food products on the receipt.

#### 4.2.5 Data analysis

The following hypothesis will be tested using the following analyses:

Hypothesis 2 was tested using a Pearson product-moment correlation. For this hypothesis there was tested whether there is a positive relation between the motivation to shop healthily and the personal relevance of nudging healthier choices in the supermarket.

In order to test hypothesis 3b, variable ‘observed ability’ was created. This variable was defined as the ability of respondents to estimate the healthiness of the products in their basket. To create this variable, the three observed percentages as described in Appendix C were subtracted from the three self-reported estimations of percentages. Subsequently these three new variables were transformed into the variable ‘observed ability’, by taking the average of these three variables. At last, all entries of this new variable were transformed into absolute values.

Hypothesis 3b was tested using a Pearson product-moment correlation. For this hypothesis there was tested whether the observed ability to shop healthily is negatively related to the personal relevance of nudging healthier choices in the supermarket.

In order to test hypothesis 4b, variables ‘motivation’ and ‘observed ability’ were recoded into a categorical variable. The variables were divided in the categories ‘low’ and ‘high’. Values higher than the median were considered to be ‘high’, while values lower than the median were considered to be ‘low’.

Hypothesis 4b was tested using a Two-Way ANOVA. For this hypothesis there was tested whether there are interaction effects between the motivation and observed ability to shop healthily on the personal relevance of nudges. Main effects were also analysed for the motivation and observed ability to shop healthily on the personal relevance of nudges.

## 4.3 Results study 2

### 4.3.1 Descriptive information

#### Participants

A total of 139 participants participated in this study. From 12 participants the photo of the receipt got lost from the memory card of the photo camera. These participants were therefore excluded from corresponding analysis.

Customers were only approached when they seemed to have bought more than 10 products. However, this guess was sometimes wrong. 13 participants had less than 10 products on their receipt. As less than 10 products is not a good representation for daily groceries, these participants were excluded from corresponding analysis.

It became clear that some respondents did not understand the meaning of percentages, as some respondents estimated extremely low percentages for basic products and non-basic products. Respondents were classified as having problems with percentages when they indicated a total of 15% or less for basic products and non-basic products combined. Subsequently, 5 participants were excluded from corresponding analysis.

A total of 110 participants were left over for analysis. Out of these participants, 74% were female and 26% were male. The mean age of the participants was 53.4 years, with a standard deviation of 13.3 years.

#### Average estimations of percentages of specific types of products

In table 7 an overview is given of the average estimations of percentages that respondents reported, and the average actual percentages that were observed from the receipts. Subsequently the difference between these percentages was calculated, split by over- and under estimators of these percentages.

The table shows that a large majority of the respondents overestimated the 'percentage preferred foods', while estimations were more divided for the indicators 'percentage vegetables and fruits', and for 'percentage hearty and sweet snacks and drinks'. Remarkably is that all overestimations were larger than the underestimations. This especially holds for the 'percentage preferred foods'. These results suggest that respondents were better at estimating the share of unhealthy foods in their basket, compared to estimating the share of healthy foods in their basket.

The table further shows that respondents were quite accurate in their estimations when it comes to the percentage vegetables and fruits bought, as these over- and underestimations are relatively low. Next to that, the results show high standard deviations for all questions, especially for the overestimations.



Table 7: overview of the estimations of percentages reported by respondents, the average actual percentages observed, and the difference between these percentages, split by over- and under estimators.

Question	Average estimation of percentages by participants	Average actual percentages in basket (receipt analysis)	Average overestimation (Mean, SD, % of respondents)	Average underestimation (Mean, SD, % of respondents)
“What amount of the groceries <i>that you just bought</i> fits in the preferred foods of the ‘Schijf van Vijf’ of The Netherlands Nutrition Centre? Give an estimation in percentages”	51.9 (24.1)	30.7 (15.3)	28.0 (20.1)  82.2% of respondents	-9.3 (8.8)  17.8% of respondents
“What amount of you groceries <i>that you just bought</i> consists of vegetables and fruits? Give an estimation in percentages.”	22.1 (18.3)	16.1 (11.2)	14.3 (13.5)  57.4% of respondents	-5.6 (6.0)  42.6% of respondents
“What amount of your groceries <i>that you just bought</i> consists of hearty and sweet snacks and drinks which should be eaten only now and then according to The Netherlands Nutrition Centre? Give an estimation in percentages.”	23.6 (21.3)	22.9 (15.5)	19.5 (16.9)  42.2% of respondents	-13.1 (11.3)  57.8% of respondents
Average of all three questions (observed ability).	N/A	N/A	14.0 (9.9)  74.6% of respondents	-4.9 (3.8)  25.4% of respondents

#### 4.3.2 Personal relevance of nudging healthier choices in the supermarket

A Pearson product-moment correlation coefficient was computed to assess the relationship between the motivation to shop healthily and the personal relevance of nudges in the supermarket. There was a significant correlation between the two variables,  $r = .39$ ,  $n = 109$ ,  $p < .001$ . Like hypothesized, the motivation to shop healthily was positively related to the personal relevance of nudging healthier choices in the supermarket.

A Pearson product-moment correlation coefficient was computed to assess the relationship between the observed ability to shop healthily and the personal relevance of nudges in the supermarket. There was no correlation between the two variables  $r = .05$ ,  $n = 99$ ,  $p = .60$ . The results indicate that the observed ability to shop healthily was not related to the personal relevance of nudging healthier choices in the supermarket.

The same test also revealed that the motivation to shop healthily was not related to the observed ability to shop healthily  $r = -.03$ ,  $n = 100$ ,  $p = .79$ .

A 2x2 factorial ANOVA was conducted in order to examine the possible interaction effects of motivation and observed ability on the personal relevance of nudging healthier choices. There was no significant interaction effect between the variables,  $F(1, 95) = .05$ ,  $p = .832$ . Main effects analysis showed that highly motivated respondents considered nudging healthier choices as more personally relevant than low motivated respondents  $F(1, 95) = 5.27$ ,  $p = .024$ . Consumers with a low observed ability did not consider nudging healthier choices as more personally relevant than respondents with a low observed ability  $F(1, 95) = .75$ ,  $p = .387$ . See table 8 for an overview of the main effects and interaction effects of motivation and observed ability to shop healthily on the personal relevance of nudging healthier choices. In table 9 an overview of the average personal relevance is given for four categories of respondents. Figure 2 shows the same information, visually presented.

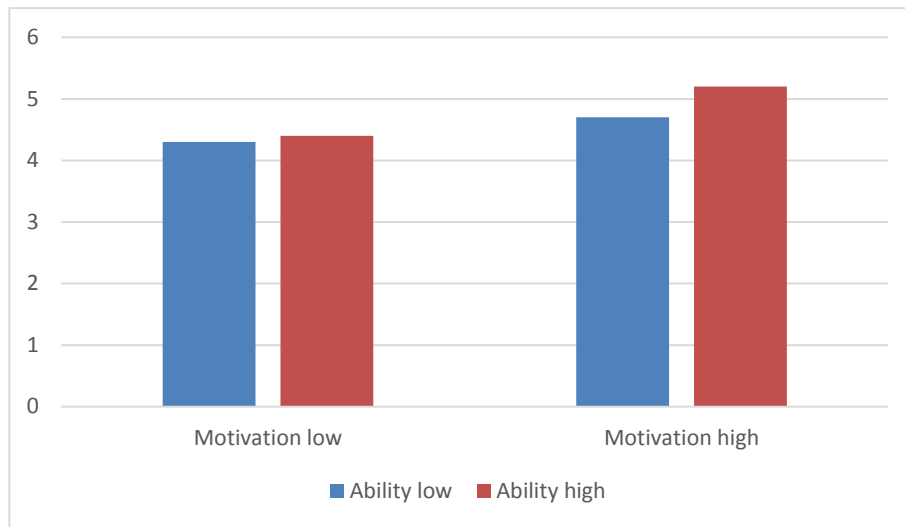
*Table 8: overview of main effects and interaction effects of motivation and observed ability to shop healthily on the personal relevance of nudging healthier choices.*

	<b>F (1, 95)</b>	<b>p</b>
<b>Motivation</b>	5.27	.024
<b>Observed ability</b>	.75	.387
<b>Motivation * observed ability</b>	.05	.832

*Table 9: means and standard deviations of personal relevance of nudges in the supermarket, categorized by a low/high motivation in combination with a low/high observed ability.*

		<b>Motivation</b>		
		<b>Low</b>	<b>High</b>	<b>Total</b>
<b>Observed ability</b>	<b>Low</b>	4.5 (1.5)	5.3 (1.5)	4.8 (1.5)
	<b>High</b>	4.3 (1.2)	4.9 (1.4)	4.7 (1.4)
	<b>Total</b>	4.5 (1.3)	5.1 (1.5)	

Figure 2: means of personal relevance of all nudges in the supermarket, categorized in respondents with a low or high motivation to shop healthy in combination with a low or high observed ability to shop healthy.



#### 4.4 Discussion study 2

Consistent with the first study, the motivation to shop healthily was found to be positively related to the personal relevance of nudging healthier choices in the supermarket. In contrast to the perceived ability to shop healthily, the observed ability to make healthy choices was not found to be related to the personal relevance of nudging healthier choices in the supermarket.

The difference between the results for the perceived ability and the observed ability could be caused by the discrepancy between the estimated healthiness of shopping baskets and the actual healthiness of shopping baskets. A majority of respondents overestimated the healthiness of their shopping basket, with overestimations being larger than underestimations. Next to that, the standard deviations of these estimations were quite high. These results indicate that respondents found it hard to give a correct estimate of the healthiness of a basket. Respondents may have evaluated the personal relevance of nudges based on their perceived ability to shop healthily, but this perceived ability did not seem to be correct for the majority of respondents. Therefore the perceived abilities did not correspond to the observed abilities, which explains the difference between these two when it comes to the correlation with the personal relevance of nudging healthier choices.

Another possible explanation for this result is that people did not actually evaluate the possible benefits of the nudges for themselves, but merely the possible benefits for all consumers involved. Consumers may think that others would benefit from nudges, but that they would not need to be helped with their choices themselves. This explanation is supported by the high perceived abilities to shop healthily found in study 1, and by the overestimation of healthiness of baskets as found in this study. The positive relation between the perceived ability to shop healthily and the personal relevance of nudging healthier choices could then be explained by the positive correlation between the motivation and the perceived ability to shop healthily.

No interaction effects were found between the motivation and observed ability on the personal relevance of nudging healthier choices. These results strengthen the idea that nudging healthier

choices is not considered more personally relevant by the consumers who would benefit the most from these nudges. It seems to be the consumers who are already motivated to make healthy choices who consider nudging healthier choices to be personally relevant, regardless their ability to make healthy choices.

Furthermore, consumers seem to overestimate the healthiness of the products in their shopping basket. Although they are reasonably good at estimating the share of unhealthy foods, the share of healthy foods overestimated by the majority of respondents. An exception was found for the 'percentage vegetables and fruits', which was estimated the most accurate. One explanation for these results is that consumers know better what products can be classified as 'unhealthy snacks and drinks' and 'vegetables and fruits', compared to products that can be classified as 'preferred foods'. However, this does not explain why the standard deviation of 'unhealthy snacks and drinks' is quite similar to the standard deviation of 'preferred foods'. This does also not explain why on average all overestimations were larger than the underestimations. We therefore think that consumers are unrealistically optimistic about their ability to shop healthily. There will be elaborated on this phenomenon in the overall discussion.

## 5. Overall conclusions and discussion

### *Short summary of studies conducted*

The main goals of this study were both to investigate the influence of the framing of benefits of nudging in supermarkets on the personal relevance of nudging in supermarkets, and to investigate the relation between the motivation and ability to shop healthily on the personal relevance of nudging healthier choices. Two studies were conducted in order to answer these questions. One online administrated survey and one observational study with survey in three Dutch supermarkets. Participants evaluated a series of possible nudges on their personal relevance, and an assessment was made of their motivation and ability to shop healthily. The first study used a self-reported measure for the ability to make healthy choices, while the second study measured the ability to make healthy choices in an objective way. The effect of framing of benefits on the personal relevance of nudging was investigated in the first study, by presenting nudges either as a benefit for the supermarket or as a benefit for the consumer.

### *Main findings*

The framing of benefits was not found to have an effect on the personal relevance of nudging healthier choices in the supermarket. This is not in line with our expectations. It was expected that the framing of the nudges as a benefit for the consumer would increase the personal relevance of nudging healthier choices. These results suggest that consumers do not care about the intentions of the initiator of the nudge. However, this regards the presentation of nudges in a specific and concrete manner. This may be different for a situation in which the nudges are presented are more abstract way. As the outcomes of the nudges would be more uncertain, the importance of trust in the initiator of the nudges would increase. This is an important aspect to research in the future, as it is uncertain whether all kinds of nudges still work when people know about the design of the nudge. Kroese et al. (2015) for example found that being transparent about the intention of a nudge that changes the accessibility of healthy foods does not decrease the effectiveness of the nudge. However, it cannot be directly said that this also works for nudges that work in a more unconscious way, like the nudge that promotes the sales of healthy foods using partitioned shopping trolleys

(Wansink et al., 2011). In short, it seems that the framing of the benefits of nudging healthier choices is not a good way to improve the personal relevance of nudges, at least not when they are presented in a specific manner.

The motivation to shop healthily was found to be positively related to the personal relevance of nudging healthier choices in the supermarket, which is in line with our expectations. This does not necessarily mean that our logic behind the hypothesis was right. We reasoned that nudging healthier choices could be seen as an improvement of the ability to resist the temptation of unhealthy choices, thereby increasing the ability to act on one's motivation to shop healthily. However, the following findings within this study suggest another explanation.

The perceived ability to shop healthily was found to be positively related to the personal relevance of nudging healthier choices in the supermarket, while the observed ability to shop healthily was not found to be related to the personal relevance of nudging healthier choices in the supermarket. This is not in line with the corresponding hypothesis, as it was expected that both the perceived and observed ability to shop healthily would be negatively related to the personal relevance of nudging healthier choices in the supermarket. These results suggest that people did not look at the benefits of nudges for themselves, but at the benefits of nudges for all consumers involved. This could also explain why the motivation to shop healthily was found to be positively related to the personal relevance of nudging healthier choices in the supermarket. Consumers that are more motivated to make healthy choices themselves, may consider the healthiness of others as more important too. The positive relation between the perceived ability to shop healthily and the personal relevance of nudging healthier choices could then be explained by the positive correlation between the motivation and the perceived ability to shop healthily.

Furthermore, it seems to be the case that consumers have a quite accurate idea of what products are considered to be unhealthy, but that they find it harder to indicate which products are healthy. Although the accuracy of the percentage of vegetables and fruits was also quite high, we think that this is due to the high concreteness of the question compared to the other two questions. These results indicate that consumers are unrealistically optimistic about their abilities to shop healthily. This idea is supported when looking at the self-reported motivations and perceived abilities to make healthy choices for all respondents, as these were quite high. At the same time, we found very low percentages of observed 'preferred foods' in baskets of consumers, foods that are considered to be most healthy option available (The Netherlands Nutrition Centre, 2011)

Although there are some studies that investigated the drivers for support of food intervention strategies before (e.g. Mazzocchi et al. (2014), Bos et al. (2013), Hilbert et al. (2007)), none of these studies investigated this in relation to one's individual motivation and ability to make healthy choices. Support for food interventions was found to be related to the attribution of obesity to external factors (Mazzocchi et al., 2014; Bos et al., 2013; Hilbert et al., 2007), perceived effectiveness and fairness of interventions (Bos et al., 2013), lack of physical activity, greater problem identification, societal responsibility beliefs and sociodemographic characteristics (Hilbert et al., 2007).

Most interesting is the finding that the attribution of obesity to external factors was the main determinant of support, regardless of the type of measure. Attribution to external factors increased support, while ascription to individual failure decreased it. Although this does not explain the positive relation between the perceived ability and the personal relevance of nudging healthier choices, it does explain why a negative relation was not found.

The finding of Mazzocchi et al. (2014) that more intrusive interventions receive less support, is in line with our findings. The most intrusive presented nudge was considered as least personally relevant in both studies. This was the nudge about a supermarket introducing partitioned shopping trolleys, which were said to suggest a purchasing norm for consumers unconsciously.

### *Practical implications*

Nudging healthier choices in the supermarket as a means to prevent the population from healthy choices can be an effective strategy. Although it may not specifically attract people who are less capable of making healthy choices, nudging healthier choices does not seem to repel these people. The same holds for the motivation to shop healthily. Although nudging healthier choices may not specifically attract people who are less motivated to make healthy choices, it does not seem to repel these people. Nudging healthier choices would then be effective if the supermarket sees a reason to implement it. This seems to be the case. Nudging healthier choices in the supermarket seems to be a means to improve customer loyalty among customers who are motivated to make healthy choices. However, further research is needed to confirm this finding, as it cannot be said that an increased personal relevance of nudging healthier choices directly translates into a higher probability of choosing the supermarket involved.

### *Limitations*

There are some limitations that apply to this study. In order to measure the observed ability, only specific part of the ability to make healthy choices was assessed. This was ability to estimate the healthiness of one's shopping basket. Although we think that this variable captures an important part of the ability to make healthy choices, it is evident that the ability to make healthy choices encompasses more variables. Future research on healthy food choices therefore requires further expansion and refinement of this measure.

There were also some problems with the validity of the first question that was used to measure the estimation of the healthiness of a shopping basket. Although the question specifically mentioned the wording 'preferred foods', it cannot be excluded that some respondents did not read this word carefully. This is important, as there is a clear distinction between 'basic foods' and 'preferred foods'. This misinterpretation can have resulted in higher estimations for this question, as the amount of products that can be classified as 'basic foods' is larger than the amount of foods that can be classified as 'preferred foods'.

### *Future research*

Further research is needed to know what kind of nudges are still effective when transparent in its design towards consumers, and which nudges decrease in effectiveness after being transparent. This is important, as a supermarket can only attract new customers with nudging healthier choices when it can use it in its promotion. It would be even better if this research included different grades of transparency. That is, a supermarket could communicate that a specific nudge is being used to help customers make healthier choices, but a supermarket could also communicate that nudges in general are used to help customers. Moreover, it would be interesting to know whether the personal relevance of nudges would decrease in this case, as it would require more trust in the supermarket.

As a supermarket is a commercial organisation, it would not directly benefit from implementing nudges to promote healthier choices. Thus, there should be focused on a clear link between the nudges and the profitability of the supermarket. It is therefore important that future research

focuses on the actual strength of nudges in the supermarket to attract new customers, as only the personal relevance of nudges in the supermarket was measured in this study.

At last, further research is needed to explain the finding that the personal relevance of nudging is not related to one's observed ability to make healthy choices. It could be investigated whether people do actually evaluate the possible benefits of the nudges for themselves, or merely the possible benefits for all consumers involved. And if so, it would be interesting to know whether this is indeed the result of an overestimation of the ability to make healthy choices.

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## Appendix A: Questionnaire 1

Fijn dat u mee wil doen aan dit onderzoek over keuzes in de supermarkt!

Het invullen van de vragenlijst zal minder dan 5 minuten duren. Er zijn geen goede of foute antwoorden, wilt u invullen wat als eerste bij u opkomt? Als deelnemer aan dit onderzoek blijft u geheel anoniem.

Er zijn geen risico's of voordelen verbonden aan het invullen van de vragenlijst. U kunt op ieder moment beslissen om te stoppen met invullen. Voor eventuele vragen kunt u contact opnemen met Gerben Vos ([gerben.vos@wur.nl](mailto:gerben.vos@wur.nl)).

Door op het pijltje naar rechts te klikken geef je aan dat je bovenstaande hebt gelezen en ermee instemt. De vragenlijst zal dan beginnen.

U krijgt eerst een aantal stellingen te zien. Geef bij deze stellingen aan in hoeverre u het eens bent met deze stelling, door de slider te verplaatsen. De eerste stellingen gaan over de motivatie om gezonde keuzes te maken in de supermarkt.

Ik wil heel graag gezonde keuzes maken in de supermarkt. (1)

Ik vind het heel belangrijk om gezonde keuzes te maken in de supermarkt. (2)

De volgende stellingen gaan over uw kennis om gezonde keuzes te maken in de supermarkt.

Zonder het etiket te lezen kan ik goed inschatten of een product gezond is of niet. (1)

Binnen een productgroep (zuivel, brood, etc.) kan ik gezonde producten goed onderscheiden van ongezonde producten. (2)

De volgende stellingen gaan over de mate waarin het u lukt om gezonde keuzes te maken in de supermarkt.

Ik ben goed in staat om de verleiding van ongezonde producten te weerstaan in de supermarkt, als ik dat zou willen. (1)

Ik ben goed in staat om gezonde keuzes te maken in de supermarkt, als ik dat zou willen. (2)

De volgende vier vragen gaan over mogelijke veranderingen in een supermarkt om betere keuzes mogelijk te maken.

1) Een supermarkt overweegt nieuwe winkelwagentjes te introduceren. De nieuwe winkelwagentjes hebben speciale vakken voor groente en fruit. Uit onderzoek is gebleken dat klanten dan meer groenten en fruit kopen, doordat ze dan onbewust denken dat de vakken gevuld moeten worden.

Benefit frame 1: De supermarkt overweegt deze verandering omdat ze haar klanten wil helpen om gezondere keuzes te maken.

Benefit frame 2: De supermarkt verwacht op deze manier meer winst te maken door meer groenten en fruit te verkopen.

Ik zou het persoonlijk waardevol vinden als deze verandering doorgevoerd werd. (1)  
Ik zou een voorstander zijn van deze verandering. (2)

2) Een supermarkt overweegt om het schap met snacks bij de kassa te veranderen. Het nieuwe schap zou meer gezonde snacks bevatten en minder ongezonde snacks. Uit onderzoek blijkt dat er meer gezondere snacks worden verkocht als deze goed zichtbaar bij de kassa liggen.

Benefit frame 1: De supermarkt overweegt deze verandering omdat ze haar klanten wil helpen om gezondere keuzes te maken.

Benefit frame 2: De supermarkt verwacht op deze manier meer winst te maken door meer klanten naar de supermarkt te trekken die gezonder willen leven.

Ik zou het persoonlijk waardevol vinden als deze verandering doorgevoerd werd. (1)  
Ik zou een voorstander zijn van deze verandering. (2)

3) Een supermarkt overweegt om het schap met hartige snacks zoals nootjes en zoutjes te veranderen. Het nieuwe schap zou op zo'n manier worden ingedeeld dat gezondere snacks op ooghoogte liggen, en minder gezonde snacks onderin het schap. Uit onderzoek blijkt dat er meer gezonde snacks worden gekocht als ze op ooghoogte liggen en klanten niet hoeven te bukken.

Benefit frame 1: De supermarkt overweegt deze verandering omdat ze haar klanten wil helpen om gezondere keuzes te maken.

Benefit frame 2: De supermarkt verwacht op deze manier meer winst te maken door meer klanten naar de supermarkt te trekken die gezonder willen leven.

Ik zou het persoonlijk waardevol vinden als deze verandering doorgevoerd werd. (1)  
Ik zou een voorstander zijn van deze verandering. (2)

4) Een supermarkt overweegt om het chocolade schap te veranderen. Bij het nieuwe schap zouden bordjes worden neergezet waarop staat dat steeds meer mensen Fair Trade chocolade kopen. Uit onderzoek blijkt dat de verkoop van producten waar deze bordjes bij staan omhoog gaat, doordat klanten graag doen wat veel andere klanten doen.

Benefit frame 1: De supermarkt overweegt deze verandering omdat ze haar klanten wil helpen om betere keuzes te maken.

Benefit frame 2: De supermarkt verwacht op deze manier meer winst te maken door meer Fair Trade chocolade te verkopen.

Ik zou het persoonlijk waardevol vinden als deze verandering doorgevoerd werd. (1)  
Ik zou een voorstander zijn van deze verandering. (2)

Als laatste vragen we u om enkele achtergrondgegevens in te vullen.

Wat is uw geslacht?

- ☐ Vrouw (1)
- ☐ Man (2)

Wat is uw leeftijd?

\_\_\_\_\_ (1)

Wat is uw hoogst behaalde opleiding? Of indien u nog studeert, welke opleiding volgt u op dit moment?

- ☐ basisonderwijs (1)
- ☐ lager / voorbereidend beroepsonderwijs (vmbo beroeps, lbo, lts, ito, leao, lhno, lave, huishoudschool, etc.) (2)
- ☐ middelbaar algemeen voortgezet onderwijs (vmbo theoretisch, mavo, ulo, mulo, ivo, vglo, etc.) (3)
- ☐ middelbaar beroepsonderwijs (mbo, mts, meao, mhno, inas, mis, etc.) (4)
- ☐ hoger algemeen voortgezet onderwijs (havo) (5)
- ☐ voorbereidend wetenschappelijk onderwijs (vwo, gymnasium, atheneum) (6)
- ☐ hoger beroepsonderwijs (hbo, hts, heao, kandidaatsopleiding, bachelor) (7)
- ☐ wetenschappelijk onderwijs (wo, doctoraal, master) (8)

In hoeverre bent u verantwoordelijk voor het doen van de dagelijkse boodschappen?

- ☐ (bijna) niet (1)
- ☐ gedeeltelijk (2)
- ☐ grotendeels of volledig (3)

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

Aan de Wageningen Universiteit worden vaker studies verricht waarvoor wij op zoek zijn naar deelnemers. Mogen wij u hiervoor af en toe (maximaal 1 keer per maand) benaderen per e-mail? Zo ja, schrijf hieronder uw e-mailadres:

Hartelijk dank voor uw deelname aan het onderzoek! Wij waarderen uw deelname zeer. Klik op het pijltje naar rechts om de vragenlijst in te sturen.

## Appendix B: Questionnaire 2

### Fijn dat u mee wil doen aan dit onderzoek over keuzes in de supermarkt!

Het invullen van de vragenlijst zal minder dan 5 minuten duren. Als deelnemer aan dit onderzoek blijft u geheel anoniem. U kunt op ieder moment beslissen om te stoppen met invullen. Als u het bovenstaande gelezen heeft en akkoord gaat, kunt u beginnen met de vragenlijst.

Geef aan in hoeverre u het eens bent met de volgende stellingen. Zet een kruisje in het juiste vakje.

	Volledig mee oneens						Volledig mee eens
Ik wil heel graag gezonde keuzes maken in de supermarkt							
Ik vind het heel belangrijk om gezonde keuzes te maken in de supermarkt							

Hoeveel van uw boodschappen *die u zojuist heeft gekocht* past in de voorkeursvoedingsmiddelen van 'De Schijf van Vijf' van het Voedingscentrum? Geef een inschatting in procenten.

.....% ☐ Ik ben niet bekend met de Schijf van Vijf van het Voedingscentrum

Hoeveel van uw boodschappen *die u zojuist heeft gekocht* bestaat uit groenten en fruit? Geef een inschatting in procenten.

.....%

Hoeveel van uw boodschappen *die u zojuist heeft gekocht* bestaat uit hartige en zoete snacks en dranken die u volgens het Voedingscentrum slechts af en toe zou moeten eten? Geef een inschatting in procenten.

.....%

**De volgende vragen gaan over mogelijke veranderingen in een supermarkt om betere keuzes mogelijk te maken.**

- 1) Een supermarkt overweegt nieuwe winkelwagentjes te introduceren. De nieuwe winkelwagentjes hebben speciale vakken voor groente en fruit. Uit onderzoek is gebleken dat klanten dan meer groenten en fruit kopen, doordat ze dan onbewust denken dat de vakken gevuld moeten worden.

Geef aan in hoeverre u het eens bent met de volgende stellingen. Zet een kruisje in het juiste vakje.

	Volledig mee oneens						Volledig mee eens
Ik zou het persoonlijk waardevol vinden als deze verandering doorgevoerd werd.							
Ik zou een voorstander zijn van deze verandering.							

- 2) Een supermarkt overweegt om het schap met snacks bij de kassa te veranderen. Het nieuwe schap zou meer gezonde snacks bevatten en minder ongezonde snacks. Uit onderzoek blijkt dat er meer gezonde snacks worden verkocht als deze goed zichtbaar bij de kassa liggen.

Geef aan in hoeverre u het eens bent met de volgende stellingen. Zet een kruisje in het juiste vakje.

	Volledig mee oneens						Volledig mee eens
Ik zou het persoonlijk waardevol vinden als deze verandering doorgevoerd werd.							
Ik zou een voorstander zijn van deze verandering.							



- 3) Een supermarkt overweegt om het schap met hartige snacks zoals nootjes en zoutjes te veranderen. Het nieuwe schap zou op zo'n manier worden ingedeeld dat gezondere snacks op ooghoogte liggen, en minder gezonde snacks onderin het schap. Uit onderzoek blijkt dat er meer gezonde snacks worden gekocht als ze op ooghoogte liggen en klanten niet hoeven te bukken.

Geef aan in hoeverre u het eens bent met de volgende stellingen. Zet een kruisje in het juiste vakje.

	Volledig mee oneens						Volledig mee eens
Ik zou het persoonlijk waardevol vinden als deze verandering doorgevoerd werd.							
Ik zou een voorstander zijn van deze verandering.							

Stelt u zich voor dat een supermarkt de drie beschreven veranderingen daadwerkelijk doorvoert. Zou dit voor u een reden kunnen zijn om uw boodschappen bij deze supermarkt te gaan doen?

zeker niet    1    2    3    4    5    6    7    zeker wel

Wat is uw geslacht?      Vrouw / Man      Wat is uw leeftijd?      ..... jaar

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

.....  
 .....

Aan Wageningen Universiteit wordt vaker onderzoek verricht onder consumenten. Als wij u vaker mogen benaderen per e-mail voor uitnodigingen aan deze studies, schrijf dan hieronder uw e-mailadres. Met uw gegevens wordt vertrouwelijk omgegaan:

.....

**Hartelijk dank voor uw deelname aan het onderzoek! Voor meer informatie:**

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## Appendix C: Indicators of healthiness of shopping basket

1. **‘Percentage preferred foods’:** the amount of ‘preferred food products’ as percentage of the total amount of food products.

This indicator was based on guidelines of The Netherlands Nutrition Centre, which makes a distinction between basic foods and non-basic foods. Foods that are designated as basic foods are part of the ‘Schijf van vijf’, which is a well-known food guideline concept in The Netherlands. It is a simple tool that can show people how to eat healthy. Basic foods have a high nutrient density in combination with a low energy density. Low energy drinks like water, coffee and tea are included, as they contribute to our water supply. Five categories of basic foods can be distinguished, with corresponding sources of nutrients. See table 6 for an overview of these categories. Within the ‘basic food products’ category, a further distinction is made between preferred foods and non-preferred foods. Roughly spoken, preferred foods contain more nutrients of which you need a lot, like fibre. At the same time, non-preferred foods contain more nutrients like sugar, (saturated) fat and salt, nutrients which your body needs in smaller amounts (The Netherlands Nutrition Centre, 2015).

*Table 6: food categories within the ‘Schijf van vijf, with the corresponding nutrients that can be derived from the products within these categories.*

Category	Source of
Fruit and vegetables	Vitamin C, folic acid, minerals (including potassium), fibers, bioactive compounds.
Bread and potatoes, pasta, rice and legume	Carbohydrates, protein, fiber, B vitamins, minerals (including iodine)
Milk(products), cheese and meats, fish, eggs and meat substitutes	Protein, minerals (including calcium and iron), vitamins B and fatty acids
Spread- and cooking fats	Essential fatty acids, vitamins A, D and E
Water	Water (moisture)

2. **‘Percentage vegetables and fruits’:** the amount of fruit and vegetable products as a percentage of the total amount of food products.

This includes canned, frozen and pureed fruits and vegetables. Eating lots of fruit and vegetables is healthy. Fiber from fruits and vegetables provide a good bowel function and digestion, and it reduces the risk of cardiovascular diseases and some cancers. Fruit and vegetables also help to maintain a healthy weight, as their fibers ensure a good stomach filling. Because that full feeling persists, you are less likely to eat high-calorie snacks (The Netherlands Nutrition Centre, 2015).

3. **‘Percentage non-basic snacks and drinks’:** the amount of non-basic snacks and drinks as a percentage of the total amount of food products.

Non-basic foods deliver less nutrients in the Dutch dietary pattern, and they often have a high energy-density. Products that fall into this category are for example soda, sweets, cake, pastry and

snacks. Nuts also fall in the category snacks, as they are mostly eaten in that context in The Netherlands. On balance, they provide a small contribution to the intake of nutrients (The Netherlands Nutrition Centre, 2011).