Nudge effectiveness over different educational levels

Do students over different educational respond in the same manner to a nudge aimed to increase the proportion of vegetarian product sales?

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Contents

Chapter 1: Introduction

Your friend Anna owns a chain of cafeteria at hundreds of schools. One evening the two of you talk about the ordering of items in supermarkets and how they relate to sale numbers. A well-known example is how items on eye level tend to sell better than those under or above eye level. She thinks about the ordering of food in her own cafeteria and decides to experiment a bit. She gave specific directions to order food to the schools. In some schools were French fries, but in others the carrot sticks at eye level. As expected, the results were dramatic. Simply by rearranging the cafeteria Anna could influence what children would be eating. Now there are a few things Anna can do with this information.

1. Arrange the food so that the kids are best off, whatever way Anna deems fit (for example, best taste, cheapest, healthiest or most ecological).
2. Choose the food order at random.
3. Arrange the food in such a way that kids would pick the same things as if they were not influenced.
4. Maximize profits.

Option number one has obvious appeal, however it does feel a little intrusive and paternalistic. The other options however seem worse. Arranging food at random might seem the fairest way on first sight but be aware that this may cause kids at certain schools to eat way healthier than kids at others. Should you desire this kind of neutrality if it is so easy to make all kids eat healthier? The third option seems like an admirable attempt to avoid intrusion: make kids decide for themselves without these external influences. But the hard thing about this is, how do you ever find out what children would pick without these influences, because there is not really a way to organise a cafeteria that does not have a certain ordering of items. Then finally option four seems to make sense if Anna thinks the best cafeteria is the one that makes the most

profit. But is that desirable since we are talking about children at school? Should Anna really try to maximize profits if that means making children less healthy?

In this example Anna is a choice architect. Choice architecture is the design of different ways in which choices can be presented to consumers, and the impact of that presentation on consumer decision-making (Thaler & Sunstein, 2008). Many people are choice architects without even realising it. Doctors who describe different kinds of treatments to their patients are choice architects. Parents who try to help their children picking a university to go to - by laying out their options - are choice architects. Salespersons are choice architects, but they already know that. And as will be explored, every detail matters in choice architecture. A good rule of thumb is therefore "everything matters". Possibly the most famous example is to be found in the men's bathroom of Schiphol airport. Into each urinal there is an etched image of a housefly. Men tend to make a mess when they are not really paying attention, but the target helps to get their attention and focus to the task. Apparently, it helps, because staff conducted trials and found that the etching reduced spilling by 80% (Evans-Pritchard, 2013).

Figure 1: Schiphol airport urinal with fly etched on the inside

The insight that everything matters can be frightening as well as empowering. A choice architect like Anna must choose an arrangement of food options in her cafeteria, and by doing so she can influence what people eat. She can nudge.

"A nudge (…) is any aspect of the choice architecture that alters people's behaviour in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid" (Thaler & Sunstein, 2008). To get back to the cafeteria example, this means that the placement of carrot sticks at eye-level counts as a nudge. If you really want to eat French fries you still can, without having to put in significant more effort next to locating the fries instead, therefore, the intervention is cheap and easy to avoid.

1.1 Sustainability

While nudging techniques are often used in sales and marketing, there are also applications in the areas of health (Hanks, Just, Smith & Wansink, 2012), wellbeing (Haynes, 2017), and sustainability (Demarque, Charalambides, Hilton & Waroquier, 2015; Egebark & Ekström, 2016; McClelland and Cook, 1980). Sustainability has never been as prioritized as it has become in the 21st Century. It is an important theme now, since the first public knowledge of anthropogenic climate change only started in the 1980s (Moser, 2009), and we have expanded on that knowledge ever since. Sustainability can be defined as meeting current needs without compromising the ability of future generations to meet theirs (United Nations, 1987). It has three main pillars: environmental, social and economic. Sometimes these pillars are referred to by the three P's: planet, people and profit.

The environmental pillar is the one that most people tend to think about when they hear ‘sustainability’ (Kho, 2014). This pillar focuses on carbon footprints, water usage, packaging and other waste and their effects on the environment.

The social pillar comes down to fair treatment of employees, keeping wishes and health of employees and people living in the vicinity of a certain company in account, and being a good community member both locally and globally. Examples for employees are maternity and paternity benefits, safe work environment and fair payments- also further down the line of a production process. Also, other methods contribute to the social pillar, such as fundraising, sponsorships and investments in local public projects. Most well-known issues in the social pillar in big companies include child labouring and unsafe work environments of which the Bangladesh factory collapse of 2013 - where 1,134 people died (The Guardian, 2015) – is the greatest example.

The economic pillar is the easiest to account for by companies. To be sustainable a business must make profit. However, making profit should not overshadow the other two pillars, as was the case in the example of the Bangladesh factory collapse. Profit at any cost is not what this pillar is about, but it is rather about proper governance, compliance and risk management.

1.2 Nudging towards sustainable behaviour

So how can nudges help in achieving more sustainable behaviour? There have been some papers trying to find exactly this out. In one example researchers achieved a decline in energy usage by as much as 12% compared to a control group by displaying current energy usage in cents per hour (‘disclosure nudge’, see chapter 2.1) (McClelland and Cook, 1980). But why are nudges so important in this field? A large-scale study in the Netherlands (Staats, Wit and

Midden, 1996) examined the effects of mass media campaign on the greenhouse effect and revealed that even while knowledge increased, behaviour did not change. And there are more studies that concluded that just giving information on the problem and possible solutions is not enough to change consumers' behaviour (Van Houwelingen & Van Raaij, 1989; Owens, 2000). This effect was not only found in households, but also on a university where employees were asked to use less paper while printing (Egebark & Ekström, 2016). According to Egebark and Ekström, the announcement as such was not enough to significantly change the use of paper, however, a simple nudge by putting double-sided printing as the default on certain printers reduced paper usage by 15%.

1.3 Students and sustainable behaviour

On 22 September 2018 the number of citizens of the Netherlands counted 17.255.325 (CBS, 2018). Of this number 732.804 were reported to enjoy higher education (HBO and WO) which is 4,25% of the total population. If we were to include all who are enrolled in middle-level applied education (MBO) this amount would rise to 1.709.178, that accounts for 9,91% of the Dutch population. It can therefore be stated that students make up a significant portion of the Dutch population, while this portion is rarely targeted in sustainability campaigns.

Furthermore, students are often seen as the generation for the future and - given that they are still developing habits - they could prove a group that easily adapts their behaviour towards more sustainability and maintain this behaviour through their lives. This is interesting as research towards sustainable behaviour targeted at households and their electricity and gas usage seems to be exhausted, while it could be a more future-proof design to target the behaviour of students.

1.4 Possible moderators and mediators

Before we dive into a new field of research, it is important to realise that there are many factors that will influence the sustainable behaviour of students. A general research into the influence of self-identity towards sustainable behaviour mentioned "Gender, household composition, age, urban vs. rural location, and education were salient for different behavioural clusters" (Whitmarsh & O'Neill, 2010). With this information in mind it could very well be feasible to say that for students also gender, background and upbringing, education level and self-identity play a role in sustainable behaviour choices. Next to these factors, also level of education and field of study could influence behaviour, as it might be likely for philosophy students to think different about sustainability compared to for example business students (Demarque et al., 2010).

Because of all the factors that can influence a student's level of sustainability in their behaviour it is interesting to pick one and see what effect it has on their susceptibility to nudges. In this thesis, there will be a focus on a student's educational level (further elaborated in chapter 2) as there is no research found yet on the effectiveness of nudges. The research question is therefore: Can a nudge be used to increase sustainable behaviour and does a student's level of education affect this relationship?

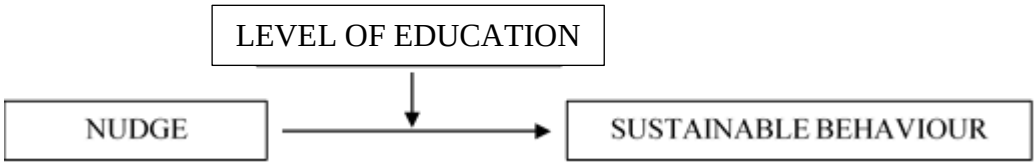


Figure 2: The model proposed above shows that the field of study is a moderator for the effect of the nudge on sustainable behaviour. The different segments of this model will be further elaborated on in chapter 2.

Chapter 2: Theoretical framework

To recap on the definition used in chapter one, "A nudge (…) is any aspect of the choice architecture that alters people's behaviour in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid" (Thaler & Sunstein, 2008). Nudges can be used to influence the decisions people make in many different fields; from what food they buy at the supermarket to which health insurance they take and how they use less energy in their homes. Because people are often not aware of how they are being nudged, it can be a very useful way to achieve behavioural change. Most nudges are being used in marketing, but there are many applications for nudges as the examples of chapter 2.1 will show.

2.1 Types of nudges

In the introduction there were already some examples of nudges mentioned. But what are different types of nudges exactly that can be used in choice architecture? In the following paragraphs there will be a list of several types of nudges and explanations.

1) *Default rules* (e.g. automatic settings in 'default installation' when installing software, or automatic enrolment)

   An example that shows the incredible effectiveness of default rules is the difference in organ donors in Germany and Austria. There are two types of organ donor registration, one by actively signing up to the program (opt-in), the other by presumed consent with the possibility to unenroll at any moment (opt-out). Germany has an opt-in system and an organ donation consent rate of 12% of its population, while in Austria – a country with similar culture and economic development, only with an op-out donor registration system – has a consent rate of 99,98% (Abadie & Gay, 2006; Johnson & Goldstein, 2003; Thaler & Sunstein, 2009).

2) *Simplification*

Complexity or volume of information can impair decision making by causing a cognitive overload (Ammerman, Hartman & DeMarco, 2017). This is especially prevalent in a supermarket - like the Dutch 'Albert Heijn' - where they can have over 30.000 different items in stock (Albert Heijn, n.d.). Cues can help, like bright green labels for ecological products, and red ones for the cheapest alternative in a product group (Ammerman et al., 2017). Complex decisions are also those who do not immediately give feedback (Thaler & Sunstein, 2008), like choosing what health care program, or pension savings fund to join, in these kinds of scenarios it could be helpful to find a way to make the effects of a certain decision less abstract (e.g. showing the achieved pension savings after certain time intervals).

3) *Use of social norm* (Emphasising what most people do, e.g. "Nine out of ten hotel guests reuse their towels")

People spend a lot of effort into conforming to social norms because they think that others are closely paying attention to what they are doing. Gilovich, Medvec & Savitsky (2000) called this the spotlight effect. In their experiment they had someone wear an embarrassing t-shirt and had the wearer estimate how many people would notice. The wearer always estimated significant higher numbers than the actual number of people that could report correctly what was printed on the shirt. Social pressure is therefore a very effective means to steer behaviour (Ash, 1955; Baron, Vandello & Brunsman, 1996). These kinds of results have been replicated in more than 130 experiments from 17 countries, including Germany, Japan, Lebanon and Kuwait (Sunstein, 2003, p. 19).

4) *Accessibility and visibility*

Cognitive effort can influence the decisions one makes, by placing fruit on eye level and candy on a less obvious place (e.g. close to the ground, or in a corner), you could state that the 'cost' of choosing candy is higher (Foster et al., 2014). People thus often make the easy choice, reducing the waste of precious energy to search for alternatives (Thaler & Sunstein, 2003).

5) *Disclosure* (e.g. energy labels for kitchen equipment or homes as an indication for energy usage and accompanying costs)

Disclosure can provide additional information to customers, making the results of their options less abstract (e.g. showing projected energy costs with a smart energy meter (Rozenkranz et al., 2013)). A very successful case of a successful disclosure implementation is the Toxics Release Inventory (TRI). The TRI requires plants (with ten or more employees) that produce or use quantities of toxic chemicals above a certain threshold, to file reports with the Environmental Protection Agency (EPA). In this manner a plant's releases and transfers of chemicals are categorized by where toxic end up (e.g. in the air, on land, underground injection, surface water, public sewage or off-site transfer (primarily to storage or disposal facilities)) (Hamilton, 2005, p. 1). The requirement to disclose the amount of toxins released by a certain plant incentivised those companies to reduce amounts

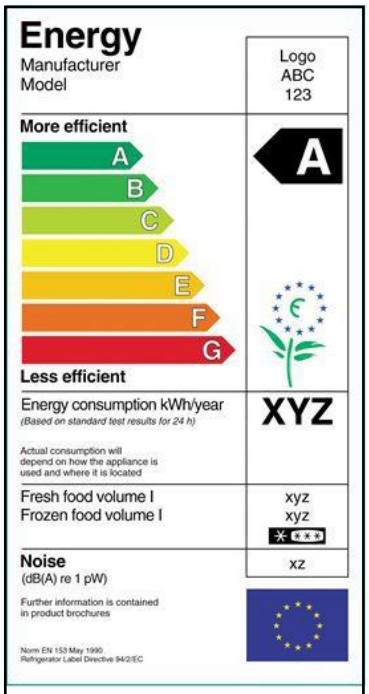


Figure 3: EU energy label as a disclosure nudge

released as to not end up on the bottom of the list for all consumers to see (Fung & O'Rourke, 2000).

6) *Warnings* (like the images and text warnings on cigarette cartons)

People have a tendency toward unrealistic optimism (Jefferson, Bortolotti & Kuzmanovic, 2017; Masiero, Riva, Oliveri, Fioretti & Pravettoni, 2018), therefore they could use some reminders of actual dangers of habits like drinking and smoking. There is a pitfall however, since exactly this unrealistic optimism can cause people to discount the warnings ("It might happen to others, but not to me"), in which case it makes sense to investigate positive messages (e.g. "quitting smoking reduces your chances of premature death and illness" rather than "smoking increases your chances of premature death and illness") (Schneider et al., 2001; Strahan et al., 2002).

Figure 4: Cigarette package with warning

7) *Precommitment strategies*

As New Year's resolutions show us every year, people often try to change their behaviour for the better (Rössner, Hansen, & Rössner, 2011). Therefore, it is not strange that according to Miller and Marlatt (1997) 37% of new year's resolutions are to start to exercise, 13% to eat better and 7% to reduce the consumption of tobacco, alcohol, caffeine, or other drugs. While a significant proportion of those resolutions fail (Miller & Marlatt, 1997), there are higher hopes for those who show self-control by precommitment strategies, such as smoking cessation programs (Sunstein, 2014).

8) *Reminders*

   Our minds are constantly busy processing. This, in combination with our tendency to procrastinate (Ariely & Wertenbroch, 2002), it is not strange that sometimes we can just simply forget to pay our bills or put some extra money in a savings account. In these cases, reminders can help (Karlan, McConell, Mullainathan & Zinman, 2016). An example of this is that many dentists nowadays send text messages on the day of, or before an appointment.

9) *Evoke implementation intentions* (Ask: "do you plan to lose weight?")

   Asking people to formulate intentions or predictions in an if-then format can significantly change their behaviour. This means that someone is asked to make some sort of plan, for example: "If I come home from my last lecture, I will go for a run". Whether it is about their intention to vote (Greenwald, Carnot, Beach & young, 1987), to buy a new car (Morwitz, Johnson & Schmittlein, 1993), to floss more often, to eat healthier and to read more (Levav & Fitzsimons, 2006), all mentioned sources in this paragraph questioned intent and have seen behavioural changes as a result.

2.2 Sustainable behaviour

Of the total amount of life cycle environmental impacts in industrialised countries, up to 75-80% can be assigned to three fields, namely housing (mostly heating systems), transportation (mainly use of cars and airplanes) and food and drinks (primarily meat and dairy products) (European Environment Agency, 2013). These are fields that mainly require behavioural changes to make an impact (Lehner, Mont & Heiskanen, 2016).

So, what is it exactly that determines people's behaviour? Azjen coined his - nowadays widely applied - Theory of Planned Behaviour (TPB) in 1991. TPB considers a person's attitude

toward the behaviour, their subjective norm (whether to engage in behaviour based on perception of significant others' preferences or not) and perceived behavioural control (the perception of difficulty to perform behaviour) to be important factors towards someone intentions, which in turn indicate the likelihood a certain behaviour will occur (see figure 5).

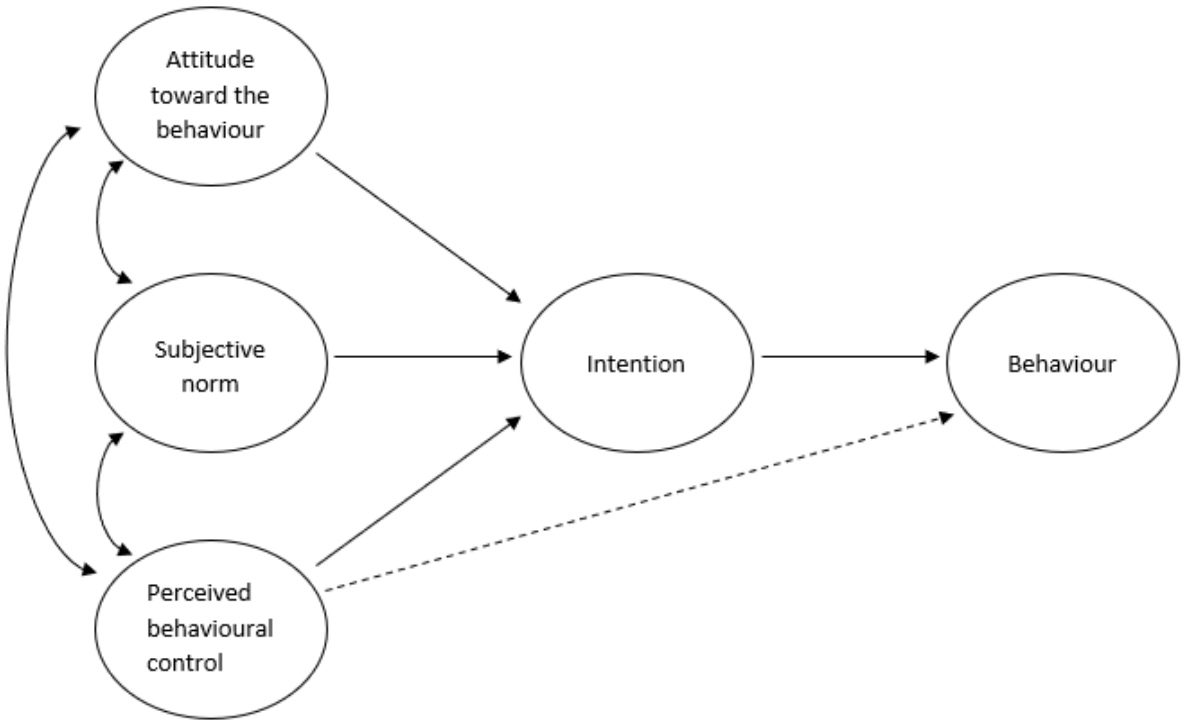


Figure 5: theory of planned behaviour (TPB)

Attitude toward the behaviour describes the subjective probability someone has that the behaviour will produce a certain outcome (Azjen, 1975. For example, if a sixteen-year-old teenager – let's call him Bart - believes that smoking is cool, he is more likely to start smoking, whereas another teenager, Tom, who believes that smoking is gross, is less likely to engage in the behaviour.

The subjective norm is the perception on whether certain behaviour is expected by friends, family members and society. To get back to the smoking example, the people that are close to

Bart and Tom influence their behaviour too. Say, Bart's family and friends expressed their disapproval of smoking, decreasing the probabilities he will try a cigarette. On the other hand, most of Tom's friends already smoke and his parents do too, increases the chances that Tom – even though he thinks it's gross – may try a cigarette once too.

Perceived behavioural control refers to the belief one has that he or she can successfully perform the behaviour required to produce the outcome (Azjen, 1991). Bart and Tom are both very young and are still in school, therefore they will not be able to buy cigarettes themselves. Because of this, they can believe it is impossible to try it unless someone else offers them a cigarette. This belief can also restrain them in their behaviour.

These three blocks mentioned above influence the intention, which in turn influences the actual behaviour. While intention might be more interesting to measure, this is very hard, for this reason it is more likely that actual behaviour is observed for these kinds of research. Note that perceived behavioural control also influences behaviour directly. Understanding this model is important if you want to change behaviour (as is the case in nudging), since this model shows that behaviour can be changed by anything that influences the attitude towards behaviour, subjective norm, and/or the level of perceived behavioural control.

There have been attempts improve the predictive power of the TPB, for example by including self-identity (Sparks & Shepherd, 1992), because the initial model seemed to leave out an important aspect that also influences behaviour. Examples of cases where self-identity seemed to be a good predictor will follow below, but before we investigate that, it is important to understand the definition of self-identity. Self-identity is how a person would generally label themselves (Cook, Kerr & Moore, 2002), and is influenced by personal motivations (self-esteem, self enhancement and self-understanding) as well as social interactions (Conner &

Armitage, 2006; Ellemers, Spears & Doosje, 2002) There are several sources (which also include relations to pro-environmental action) in which self-identity has been found a predictor of behaviour over TPB variables (Fekadu & Kraft, 2001; Sparks & Shepherd, 1992). For example, when people identify themselves with the stereotype of 'typical recyclers', they are more likely to recycle compared to those who do not identify with this stereotype (Mannetti, Pierro, & Livi, 2004). This is because individuals act upon their own, and others', expectations of them (Sherman, 1980). Pro-environmental behaviour can therefore be motivated by encouraging people to label themselves as 'pro-environmental consumers' (Schubert, 2017), for example by harnessing social identity.

In 1986, the very successful anti-littering campaign 'Don't mess with Texas' was launched (Thaler & Sunstein, 2008), as shown in figure 6. The campaign reduced litter with about 72% between 1986 and 1990 (Mols, Haslam, Jetten & Steffens, 2015). Through the campaign people were nudged, with the help of celebrities, to reduce littering on the highways. The slogan was so successful because it created the social norm that 'true' Texans find littering unacceptable, therefore using community pride to establish a behavioural change (Grasmick, Bursik & Kinsey, 1991).

Figure 6: Image from the 'Don't mess with Texas' campaign

Ultimately, such interventions work by exploiting people's desire to maintain an attractive self-image, a desire deemed universal already by Adam Smith (1759/2009). In the 'Don't mess with Texas'-campaign an artificial group identity was created which eventually reflected in people's self-identity.

2.3 Achieving behavioural change

Achieving behavioural change is not easy. Thaler and Sunstein (2008) described what they called the 'status quo bias'. A great example of this is how subscriptions work: many people are subscribed to products or services they no longer use, like magazines which they no longer read. This is often to blame to the fact that people have to put effort into cancelling these kinds of subscriptions, even if it saves them money. So, while a lot of people would like to change, not many of them do, or can sustain the change (Doyle, Claydon & Buchanan, 2000). This is interesting as the Gallup Health of the Planet (HOP) Survey - already in 1992 – showed that over 50% of the respondent of 13 out of 24 countries felt that climate change was a serious problem. If behaviour change was easy, with wide support for change, the Kyoto Protocol (1997) would never have to be signed. If behaviour was easy to change, there was no need to write this thesis.

2.4 Nudging towards sustainable behaviour

Successful behavioural changes have been made using nudges. Egebark and Ekström (2015) changed the default in their experiment to see whether more paper would be saved by setting the double-sided printing as a default. Rozenkranz et al. (2013), used a social norm of energy usage by displaying energy usage compared to others. Comber & Thieme (2012) also used social norms by displaying participant's waste on a dedicated social media page to enhance self-reflection and awareness. Wansink & Chandon (2014) used the concept of accessibility and visibility to reduce food intake. In this fashion there are countless examples that show how nudges can be used to facilitate more sustainable behaviour.

2.5 Education level

The Netherlands has a complex education system which caters different types of students by offering different levels of education (see figure 4) (Dutch Eurydice Unit, 2006). At the end of elementary school students take a test which - combined with their teacher's advice - determines their educational level. From this moment on there are three pathways: VMBO (4 years), HAVO (5 years) and VWO (6 years) prepare for separate options in tertiary education (MBO, HBO (university of applied sciences) and WO (university) respectively) (Need & de Jong, 2001). Students that are slower learners, but motivated to climb up to higher levels, can do so by finishing the level they are placed in (for example VMBO) and then enrol for the last two years of the next level (HAVO in this example) prolonging the student's time effectively by one year to reach the desired level (finishing HAVO after VMBO totals up to 6 years, instead of 5 years for the regular route (Kreft, 1993)). Tertiary education follows the same principle where students can climb up to higher levels with the only difference that students who want to continue for a higher-level degree must start at the beginning of the higher level after finishing the level they were originally in. While there are plenty of opportunities to switch between the three pathways, there are considerable differences between the three as VMBO/MBO are considerably more hands-on than VWO/WO, which are the most theoretical of the three, HAVO/HBO represents the middle ground. As these pathways cannot be a guaranteed indication for student's intelligence, instead they represent different modes of education: practical, theoretical and a mixture of both.

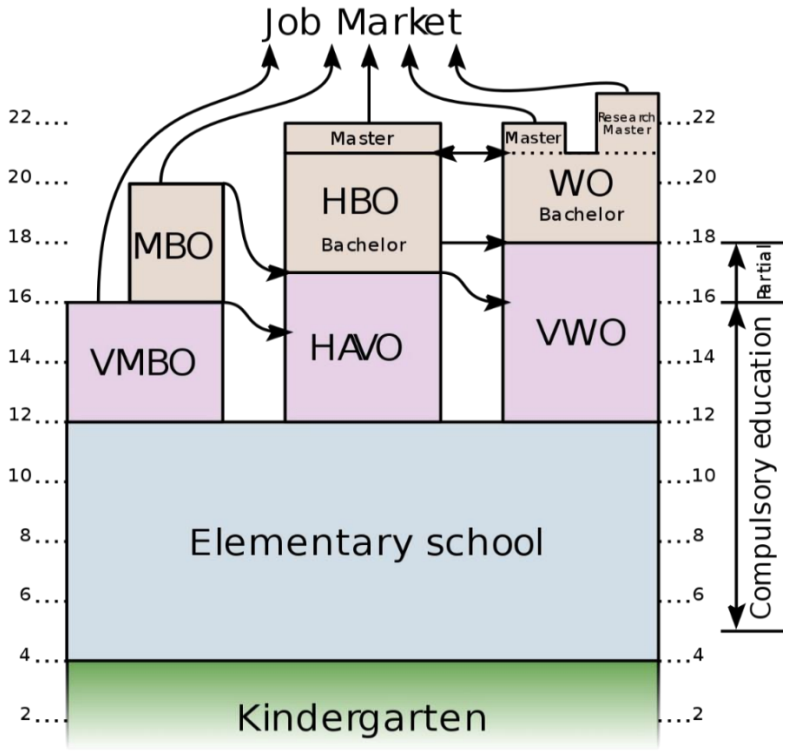


Figure 7: Schematic of Dutch education system

No papers have been found on the effectiveness of nudges compared to different educational levels. This is interesting as Demarque et al. (2015) described a difference between philosophy and business students' responsiveness to the same nudge, where philosophy students bought more ecological products and spent significantly more money on them. It is not hard to imagine that if this difference already occurs among students of different university studies, that there could also be a difference between students with entirely different kinds of education. The World Values Survey of 2005-2008, which covered 47 countries, showed a correlation between the level of education and concern for the environment. It turns out that a higher educated person is more likely to express concern for the environment (World Values Survey, 2014). This leads to the expectation that, because the students on different levels will have different attitudes toward climate change and sustainability, they will respond in different ways to a nudge that is meant to increase sustainable behaviour.

When we incorporate this information in the field of nudging, there are questions that can be asked about the effectiveness of a nudge over different educational levels. Thus, it leads up to the current research question: Can a nudge be used to increase sustainable behaviour and does a student's level of education affect this relationship?

Chapter 3: Method

The experiment is aimed to test the effectiveness of a certain nudge on different educational levels. In this chapter it will be specified how this is going to be tested.

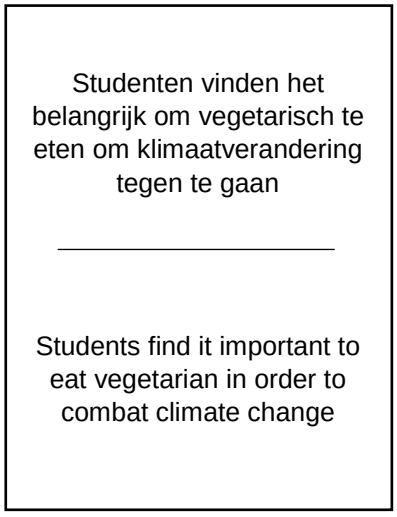
The setup of the experiment uses a 2 × 3 factorial design as this is the most common method for experiments that include two or more independent variables.

	No nudge	Nudge
WO	Pre-intervention measurement, location 1	Post-intervention measurement, location 1
HBO	Pre-intervention measurement, location 2	Post-intervention measurement, location 2
MBO	Pre-intervention measurement, location 3	Post-intervention measurement, location 3

Figure 8: 2x3 factorial design

3.1 Materials and procedure

In the experiment there will be an intervention in the form of posters which set a social norm. The social norm is created by stating that over half of the students eats vegetarian in order to combat climate change: “Students find it important to eat vegetarian in order to combat climate change”. These posters will be displayed at on-campus cafeteria of Dutch schools at different levels of education. Locations will include ROC Tilburg (MBO), Avans Hogeschool Den Bosch (HBO) and Tilburg University (WO), which represent the three levels in the Dutch higher education system. Because Tilburg University and Avans Hogeschool



both host Dutch and international students, all locations will get bilingual posters in Dutch and English.

The locations that are being used are ROC Tilburg Stappegoor (MBO), Avans 's-Hertogenbosch (HBO) and Tilburg University (WO). Below is an overview of the number of students enrolled at the different locations.

Location	**Number of students**
MBO – ROC Stappegoor Tilburg MBO – ROC Kasteeldreef Tilburg MBO – ROC Wandelboslaan Tilburg	6.711 (Onderwijsgroep Tilburg, 2016)
HBO – Avans onderwijsboulevard 's-Hertogenbosch	14.508 (Avans Hogeschool, 2018)
WO – Tilburg University	14.269 (Tilburg University, 2018)

Table 1: Number of students enrolled at each location. MBO numbers have been compiled by doing the experiment at three different locations to approximate a similar sample size.

At all locations, poster boards (A3 size) will be placed at the entrance of the cafeteria area. Using these posters, it is attempted to change behaviour by influencing one of the blocks of the TPB, namely the subjective norm. The quote on the poster is meant to influence the subjective norm (the perception on whether certain behaviour is expected by friends, family members and society) as it states what most people in their surroundings do, even while this is norm is fictional. Thus, influencing their intention and ultimately the student's behaviour, which will be visible in the sales of vegetarian alternatives.

3.2 Participants

Participants will be self-selected students from the different schools that visit the on-campus cafeteria. All participant's data will be kept separate based on the location of the gathered data, as locations represent the level of education. In this setup it is not possible to differentiate between students and staff member or other types of non-students visiting the cafeteria, but it is assumed that if any difference is to be found between the different locations that this caused by the difference among students that visited the cafeteria. Academic staff at university level is generally higher educated than academic staff at MBO level. Administrative staff however can have a similar educational level over the different locations. All three locations host students over a wide variety of fields as portrayed in Appendix A.

3.3 Hypothesis

The hypothesis for this experiment is that MBO students will show a greater response to the nudge compared to WO students, with the results for HBO somewhere in between. As it is assumed that university students are already more aware of the benefits of choosing vegetarian and what the impact of their decisions is (World Values Survey, 2014), thus making it harder to have the nudge influence subconscious decision-making.

3.4 Measuring results

Both the level of education and the presence of the nudge are independent variables which are controlled over the conditions by changing the location and presence of posters in the cafeteria. The dependent variable, sustainable behaviour, will be measured by comparing weekly sales of certain products that contain meat and their vegetarian alternatives. Sales numbers will be converted to percentages vegetarian sales compared to total sales to compare for the groups. These outcomes will be analysed in R using R studio.

Chapter 4: Results

The experiment was carried out on five different locations: one location on WO level (Tilburg University in Tilburg), one location on HBO level (Avans Hogeschool in ‘s-Hertogenbosch), and three locations on MBO level (ROC Stappegoor, ROC Kasteeldreef, and ROC Wandelboslaan in Tilburg).

Between the different educational levels, the participants of the experiment differ in several ways. Because of the way the Dutch educational system is structured students that attend an MBO school are on average younger than those on HBO and WO level.

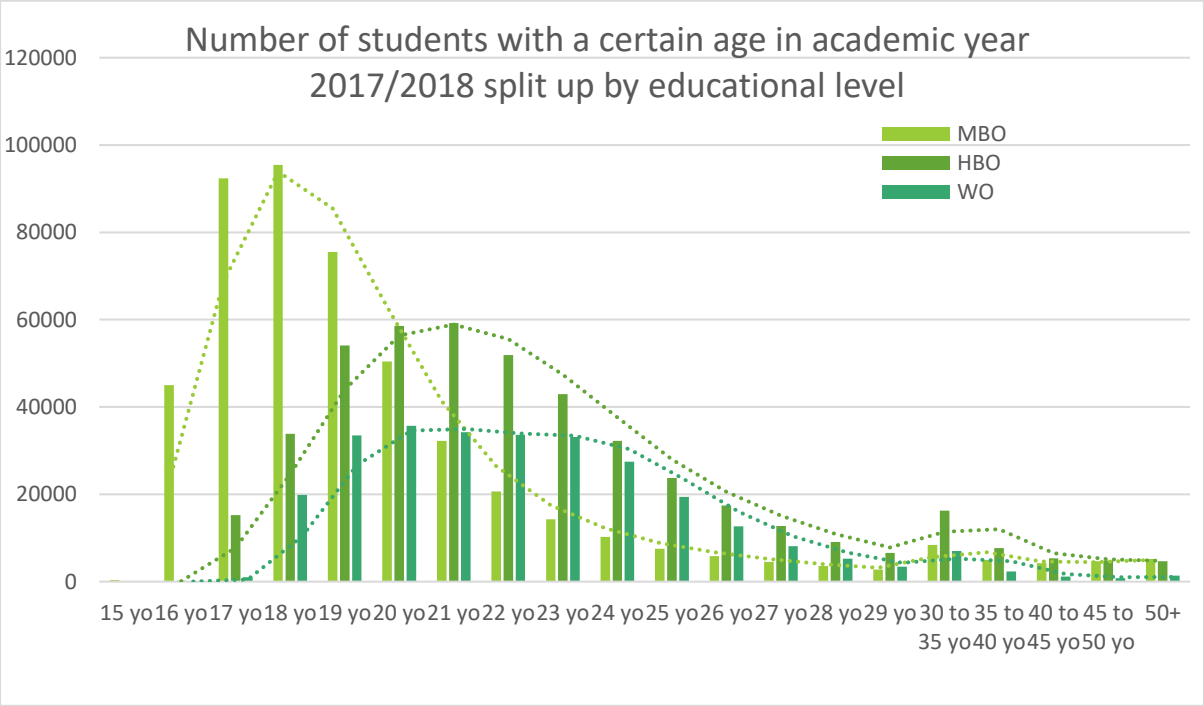


Figure 9: Number of students with a certain age in academic year 2017/2018 split up by educational level. This bar chart shows the differences in average age between the students of different educational levels. Data retrieved from Centraal Bureau Statistiek.

As can be seen from the chart in figure 9, MBO students start on the youngest age (16), followed by HBO (17) students and WO students (18). MBO students graduate on average on a younger age, while HBO and WO student graduate on comparable ages. This can be explained by looking back at the schematic of the Dutch education system presented in chapter

2.5. Here it becomes clear that all students start secondary education at approximately the same age, however, because of the different length of the separate pathways (VMBO 4 years, HAVO 5 years and VWO 6 years) average graduation ages begin to show differences for the three different levels. It then makes sense why MBO students, who require a VMBO diploma to begin this track, start their studies at a younger age, compared to for WO students who need a VWO diploma in order to enrol.

Percentage male/female over all educational levels in academic year 2017-2018

	% Male	% Female
MBO	52.04	47.96
HBO	49.36	50.64
WO	48.51	51.49

Table 2: the percentages of males and females grouped by educational level, calculated over all students in the Netherlands for academic year 2017-2018.

The male/female ratio on a national is very similar over the three educational levels, see table 2. As there is no such data available for the specific locations tested, the groups are assumed to be quite similar in this regard over the three educational levels.

On both WO and HBO level, the cafeteria was used by students and employees alike, only on MBO level locations there were separate parts of the cafeteria specifically designed for employees, so there were barely no non-students involved in those sales numbers.

4.1 Selecting datapoints

It was necessary to make product groups in order to be able to compare the sales over the different educational levels. All three instances that data were obtained for worked with different caterers who offered different products from each other and had changing menus. Therefore, at Tilburg University, groups have been made of all meals per week, ignoring their different composition every day. The same approach was used for the burgers.

On HBO and MBO locations no dinner options were presented, so the categories were changed to fit lunch options and snacks. Avans Hogeschool made a very clear distinction between regular sandwiches and vegetarian options which changed every day, so the data provided was used without any modification.

The caterer that was responsible on the ROC Tilburg locations has provided us with a wealth of datapoints for a lot of different products (see appendix B for the pdf document that was received). Next to the fact that numbers were split out over the different locations, which allowed for some further testing on differences between different schools, the numbers showed every single type of food item sold in the two test weeks.

Within these product types, three groups were made: those which were without a doubt containing meat, those which were certainly vegetarian products and the third group contains products which fell in the grey area or had no non-vegetarian counterpart. Examples of products that belonged to the third group were, all sandwich variants with the suffix ‘healthy’ (‘gezond’ in original data) as these products were made in variants of which some contained meat and others did not. There is no way for these products to track back what number was vegetarian because this was not separately documented and therefore omitted from the data.

Other products that were omitted were sweet snacks, like cookies, candy bars and waffles, because they had no non-vegetarian counterpart. Students who were going to get a sandwich and who would be influenced by the nudge would not change from a sandwich to sweets in order to comply to the social norm given but would always stick within the group of sandwiches. For this same reason fruit salads were also omitted, while regular salads did always offer a meat/fish option and a vegetarian version.

4.2 Test results

Below is a table that contains most of the data obtained and used in order to analyse the effectiveness of the nudge and the effect of the moderator (level of education) on the effectiveness of the nudge on vegetarian food choice.

Overview of the data gathered and used for analysis of all educational levels.

WO	Normal meal	Normal burger		Total normal	Vegetarian meal	Vegetarian burger		Total veg	Grand Total	Percentage Vegetarian
Before	2150	183		**2333**	175	23		**198**	2531	7.82
After	2534	218		**2752**	188	13		**201**	2953	6.81

HBO	Normal bread	Normal snack		Total normal	Vegetarian bread	Vegetarian snack		Total veg	Grand Total	Percentage Vegetarian
Before	1696	572		**2268**	151	99		**250**	2518	9.93
After	1286	539		**1825**	205	97		**302**	2127	14.20

MBO	Normal bread	Normal snack	Normal salad	Total normal	Vegetarian bread	Vegetarian snack	Vegetarian salad	Total veg	Grand Total	Percentage Vegetarian
Before	686	1435	7	**2128**	275	508	64	**847**	2975	28.47
After	632	1406	22	**2060**	233	444	33	**710**	2770	25.63

Table 3:Observed sales numbers compiled per food product category. In the last column, these numbers are translated into a percentage of vegetarian sales of the grand total, in order to show the difference over the two periods in a way that controls for the fluctuating numbers of sales per week. Whether the changes in percentages are significant will be explored further on in this chapter.

4.3 Between educational levels analysis

In order to test whether the nudge had an effect on the proportion of vegetarian product sales a Cochran-Mantel-Haenszel test for repeated tests of independence (see table 4) was conducted with vegetarian sales as dependent variable and the presence of the nudge and educational level as independent variables. The analysis suggests that the percentages of vegetarian sales before the nudge do not differ from the percentages of vegetarian sales after the nudge with a p value of 0.828. This does not necessarily mean that there is no proportional change, but that there is the possibility that the direction (positive/negative) of the percentage changes can be contrary

to each other over the different educational levels and thus one should look at the results of independence tests of the separate tables per education level before accepting the null hypothesis.

	WO		HBO		MBO	
	Vegetarian	Normal	Vegetarian	Normal	Vegetarian	Normal
Before	198	2333	250	2268	847	2128
After	201	2752	302	1825	710	2060

Table 4: Datapoints used in the Cochran-Mantel-Haenszel test for repeated tests of independence.

4.4 Independence tests within each education level

To test the effect of the nudge on the choice for vegetarian products over regular meat-containing products (normal) a two-proportions z-test is used to compare the proportions of vegetarian products before and after the intervention for every educational level.

For the analyses of Equal Proportions, the following hypotheses are being tested:

H_0: The number of vegetarian sales before the nudge = the number of vegetarian sales after the nudge.

H_a: The number of vegetarian sales before the nudge ≠ the number of vegetarian sales after the nudge

4.5 WO - Tilburg University

In order to test whether the nudge had an effect on the proportion of vegetarian product sales on WO level, a 2-sample test for equality of proportions was conducted with vegetarian sales as dependent variable and the presence of the nudge as independent variable, see table 5 for the numbers included in this test. The analysis suggests that the percentages of vegetarian sales

before the nudge do not differ from the percentages of vegetarian sales after the nudge with a p value of 0.1638. Therefore, the hypothesis that the number of vegetarian sales before the nudge ≠ the number of vegetarian sales after the nudge is rejected. This means that there is no effect of the nudge to be found on the percentage of vegetarian products being sold on WO level.

WO	Vegetarian meals and snacks	Normal meals and snacks	Proportion vegetarian
Before	198	2333	0.07822995
After	201	2752	0.06806637
		Change:	-1.02% (p = 0.1638)

Table 5: Observed sales values split up in vegetarian products and non-vegetarian numbers obtained from the caterer of Tilburg University

4.6 HBO - Avans Hogeschool ‘s-Hertogenbosch

In order to test whether the nudge had an effect on the proportion of vegetarian product sales on HBO level, a 2-sample test for equality of proportions was conducted with vegetarian sales as dependent variable and the presence of the nudge as independent variable, see table 6 for the numbers included in this test. The analysis suggests that the percentages of vegetarian sales before the nudge differs significantly from the percentages of vegetarian sales after the nudge with a p value smaller than 0.01. Therefore, the hypothesis that the number of vegetarian sales before the nudge ≠ the number of vegetarian sales after the nudge is accepted. This shows that there is a significant positive effect of the nudge to be found on the percentage of vegetarian products being sold on HBO level.

HBO	Vegetarian meals and snacks	Normal meals and snacks	Proportion vegetarian
Before	250	2268	0.09928515
After	302	1825	0.14198402
		Change:	+4.27% (p = 0.000009)

Table 6: Observed sales values split up in vegetarian products and non-vegetarian numbers obtained from the caterer of Avans Hogeschool.

4.7 MBO - ROC Tilburg

In order to test whether the nudge had an effect on the proportion of vegetarian product sales on MBO level, a 2-sample test for equality of proportions was conducted with vegetarian sales as dependent variable and the presence of the nudge as independent variable, see table 7 for the numbers included in this test. The analysis suggests that the percentages of vegetarian sales before the nudge differs significantly from the percentages of vegetarian sales after the nudge with a p value of 0.01557. Therefore, the hypothesis that the number of vegetarian sales before the nudge ≠ the number of vegetarian sales after the nudge is accepted. This shows that there is a significant negative effect of the nudge to be found on the percentage of vegetarian products being sold on MBO level. This negative change in proportions is contrary to the hypothesis, but on this will be further elaborated in chapter 5.

MBO	Vegetarian meals and snacks	Normal meals and snacks	Proportion vegetarian
Before	847	2975	0.2847059
After	710	2770	0.2563177
		Change:	-2.84% (p = 0.01557)

Table 7: Observed sales values split up in vegetarian products and non-vegetarian numbers obtained from the caterer of ROC Tilburg

4.8 Compiling the findings from 4.3 tm 4.7

So, what is to be seen in the results if we compile the results presented in paragraph 4.3 up to 4.7? Cochran-Mantel-Haenszel test for repeated tests of independence showed a non-significant effect with a p value of 0.828. However, further analysis revealed differences over the different educational levels. The Cochran-Mantel-Haenszel test for repeated tests of independence was not significant ($p = 0.828$) because it was revealed later that the differences over the levels were counter directional, meaning that while there was an increase in vegetarian sales on HBO level ($p < 0.01$), there was a decrease to be seen at the MBO level ($p < 0.02$). At WO level the values did not show a significant increase or decrease in the proportion of vegetarian sales and is therefore regarded as unchanged ($p = 0.1638$).

4.9 Analysis MBO per building

The data obtained for the MBO locations is much more elaborate than the data from HBO and WO level cafeteria. To get to a similar sample size for the educational level, three different locations were tested on MBO. The data received from the caterer were split out for these locations which allowed to do some further testing and see if there are any connections to be found between the effect of the nudge and field of study. This is interesting because, as introduced in chapter 2, there was also suspicion towards different effects of the same nudge over different disciplines. Demarque et al. (2015) described a difference between philosophy and business students' responsiveness to the same nudge, where philosophy students bought more ecological products and spent significantly more money on them.

Because of the detailed information obtained from the caterer at the MBO locations at which the test was executed, a similar table as the one presented in 4.1 could be made for only MBO, see table 9. This table allows to analyse the differences between different MBO school which all have their own discipline in this case, in or to find differences within the MBO group in

terms of responsiveness to the nudge. ROC Stappegoor houses engineering, logistics and has a part dedicated to arts, culture and media, and fashion. ROC Kasteeldreef is specialised in the directions of administrative and legal services, commercial services and IT & media technology. And ROC Wandelboslaan school is only having courses in the fields of healthcare and welfare.

Overview of the data gathered and used for analysis of differences between MBO locations.

Stappe-goor	Normal bread	Normal burger	Normal salad	Total normal	Vegetari an meal	Vegetari an burger	Vegetari an salad	Tota l veg	Grand Total	% Vege-tarian
Before	88	712	5	**805**	181	286	49	**516**	1321	39.06
After	82	627	13	**722**	148	265	26	**439**	1161	37.81

Kasteel-dreef	Normal bread	Normal snack	Normal salad	Total normal	Vegetari an bread	Vegetari an snack	Vegetari an salad	Tota l veg	Grand Total	% Vege-tarian
Before	165	383	2	**550**	67	84	0	**151**	701	21.54
After	125	409	8	**542**	46	103	0	**149**	691	21.56

Wandel-boslaan	Normal bread	Normal snack	Normal salad	Total normal	Vegetari an bread	Vegetari an snack	Vegetari an salad	Tota l veg	Grand Total	% Vege-tarian
Before	433	340	0	**773**	27	138	15	**180**	953	18.89
After	425	370	1	**796**	39	76	7	**122**	918	13.30

Table 9: Observed sales numbers compiled per food product category. In the final row, these numbers are translated into a percentage of vegetarian sales of the grand total, in order to show the difference over the two periods in a way that controls for the fluctuating numbers of sales per week. Whether the changes in percentages are significant will be explored further on in this chapter.

In order to test whether the nudge had an effect on the proportion of vegetarian product sales a Cochran-Mantel-Haenszel test for repeated tests of independence was conducted with vegetarian sales as dependent variable and the presence of the nudge and educational level as independent variables. The analysis suggests that the percentages of vegetarian sales before the nudge differs from the percentages of vegetarian sales after the nudge with a p value of 0.04204.

This means that there is a proportional change, but it does not specify where this change is in the dataset. Therefore, we will again take a look into the separate locations.

4.10 ROC Stappegoor

The following values have been found regarding the sale of vegetarian products and their non-vegetarian alternatives on ROC location Stappegoor. This school houses engineering, logistics and has a part dedicated to arts, culture and media, and fashion.

Stappegoor	Vegetarian meals and snacks	Normal meals and snacks	Proportion vegetarian
Before	516	805	39.06%
After	439	722	37.81%
		Change:	-1.25% (p = 0.5234)

Table 10: Observed sales values split up in vegetarian products and non-vegetarian numbers obtained from the caterer of ROC Tilburg, displaying specific sales numbers for location Stappegoor, including the percentage change after the nudge and its p-value. In this case showing no significant change in vegetarian product sales (p = 0.5)

In order to test whether the nudge had an effect on the proportion of vegetarian product sales on ROC Stappegoor, a 2-sample test for equality of proportions was conducted with vegetarian sales as dependent variable and the presence of the nudge as independent variable. The analysis suggests that the percentages of vegetarian sales before the nudge does not differ significantly from the percentages of vegetarian sales after the nudge with a p value of 0.5234. Therefore, the hypothesis that the number of vegetarian sales before the nudge ≠ the number of vegetarian sales after the nudge is rejected. This shows that there is no significant effect of the nudge to be found on the percentage of vegetarian products being sold on ROC Stappegoor.

4.11 ROC Kasteeldreef

The following values have been found regarding the sale of vegetarian products and their non-vegetarian alternatives on ROC location Kasteeldreef. This school is specialised in the directions of administrative and legal services, commercial services and IT & media technology.

Kasteeldreef	Vegetarian meals and snacks	Normal meals and snacks	Proportion vegetarian
Before	151	550	21.54%
After	149	542	21.56%
		Change:	+0.02% (p = 0.9919)

Table 11: Observed sales values split up in vegetarian products and non-vegetarian numbers obtained from the caterer of ROC Tilburg, displaying specific sales numbers for location Kasteeldreef, including the percentage change after the nudge and its p-value. In this case showing no significant change in vegetarian product sales (p ≈ 1).

In order to test whether the nudge had an effect on the proportion of vegetarian product sales on ROC Kasteeldreef, a 2-sample test for equality of proportions was conducted with vegetarian sales as dependent variable and the presence of the nudge as independent variable. The analysis suggests that the percentages of vegetarian sales before the nudge does not differ significantly from the percentages of vegetarian sales after the nudge with a p value of 0.9919. Therefore, the hypothesis that the number of vegetarian sales before the nudge ≠ the number of vegetarian sales after the nudge is rejected. This shows that there is no significant effect of the nudge to be found on the percentage of vegetarian products being sold on ROC Kasteeldreef.

4.12 ROC Wandelboslaan

The following values have been found regarding the sale of vegetarian products and their non-vegetarian alternatives on ROC location Kasteeldreef. This school is only having courses in the fields of healthcare and welfare.

Wandelboslaan	Vegetarian meals and snacks	Normal meals and snacks	Proportion vegetarian
Before	180	773	18.89%
After	122	796	13.29%
			Change: -5.60% (p = 0.001)

Table 12: Observed sales values split up in vegetarian products and non-vegetarian numbers obtained from the caterer of ROC Tilburg, displaying specific sales numbers for location Wandelboslaan, including the percentage change after the nudge and its p-value. In this case showing a significant decline of vegetarian product sales (p < 0.01).

In order to test whether the nudge had an effect on the proportion of vegetarian product sales on ROC Wandelboslaan, a 2-sample test for equality of proportions was conducted with vegetarian sales as dependent variable and the presence of the nudge as independent variable. The analysis suggests that the percentages of vegetarian sales before the nudge differs significantly from the percentages of vegetarian sales after the nudge with a p value of 0.001. Therefore, the hypothesis that the number of vegetarian sales before the nudge ≠ the number of vegetarian sales after the nudge is accepted. This shows that there is a significant effect of the nudge on the percentage of vegetarian products being sold on ROC Wandelboslaan.

4.13 Compiling the findings from 4.9 tm 4.12

So, what is to be seen in the results if we compile the results presented in paragraph 4.9 up to 4.12? Cochran-Mantel-Haenszel test for repeated tests of independence showed a significant

effect with a p value of 0.04204. Further analysis revealed that this significant result was only caused by one location, ROC Wandelboslaan, which specializes in the fields of healthcare and welfare showed a decline in vegetarian product sales of -5.60% ($p = 0.001$). At ROC Stappegoor the values did not show a significant increase or decrease in the proportion of vegetarian sales and the percentage change of -1.25% is therefore regarded as unchanged ($p = 0.5234$), same for ROC Kasteeldreef which only showed a +0.02% increase in vegetarian product sales ($p = 0.9919$). These results will be further discussed in chapter 5.

Chapter 5: Discussion

The data suggested that there was no effect of the nudge on the number of vegetarian product sales on WO, which is compatible with the hypothesis that WO student will be the least susceptible to the influence of the nudge. HBO students responded with a 4,27% increase in vegetarian products, which is again in line with the previously mentioned hypothesis. However, at MBO level the results were opposed to the initial hypothesis as the amount of vegetarian product sales actually went down by 2,84%. When similar analysis was done to find differences among the ROC locations, it was found that the decrease in vegetarian product sales was mostly caused by behavior at only one of the locations: ROC Wandelboslaan (housing the fields of healthcare and welfare) at which the percentage of vegetarian products sold went down by 5,60%. The other locations did not show a significant change.

5.1 Interpretation of the results

For our hypothesis it was assumed that university students are already more aware of the benefits of choosing vegetarian and what the impact of their decisions is, thus making it harder to have the nudge influence subconscious decision-making. This assumption has found support in the data, because there was no significant change in the student's behaviour at this level. It is interesting to note that in the Netherlands it is estimated that 3 to 4,5% of the population is vegetarian (Schyns, 2016), so from the collected data it seems that Tilburg University students are above average in terms of vegetarian consumers with 6.8% to 7.8% of evening meals sold being vegetarian. The increase in vegetarian product sales in response to the newly set social norm on HBO level was in line with the expectations following the hypothesis (MBO students will show the greatest response to the nudge compared to WO students, with the results for HBO somewhere in between).

Then at MBO levels schools the expected values of an even bigger percentage of all sales being vegetarian after implementation of the nudge, were completely absent. In fact, the percentage of vegetarian product sales actually went down compared to the week before the posters with the social norm were up.

5.2 Possible explanation for the effect found on MBO

No literature already discussed in chapter 2 could provide a satisfactory answer for this result. However, Zane, Irwin and Reczek (2015) described an interesting phenomenon where subjects refused more often to sign a Think Green Pledge after subjects had to imagine that someone else has asked more information about the circumstances a certain product was made in (in this case, whether a backpack was made from recycled materials). In their set-up, the subjects had to evaluate different products based on four attributes. Subjects were assigned to two groups: easy-to-justify wilful ignorance (participants could only view on attribute) and hard-to-justify wilful ignorance condition (participants could see two attributes). They were told that, because of time constraints they could only open one envelope with one attribute or two paired attributes inside based on the condition they were in. In the both conditions participants then had to rate consumers who would have chosen to research whether the backpack was made from recycled materials on 10 characteristics (5 positive, such as fashionable and attractive, and 5 negative characteristics, such as odd and boring). In the hard-to-justify wilful ignorance condition, participants were more negative about the imagined do-gooder than in the easy-to-justify wilful ignorance condition. Their explanation was that, through pointing out an ethical concern this imagined customer person introduced a threat of social comparison, in which all the subject, who did not bother to get information regarding an ethical concern, felt attacked for not trying to look into this attribute (Monin, Sawyer & Marquez, 2008). This in turn in denigrating the

do-gooder in this situation by the subjects in some sort of defensive reaction, ultimately leading to a reduction in willingness to commit to subsequent ethical act. This could be compared to the situation at MBO, where it is stated that other students eat vegetarian because of an ethical concern (a healthy planet), which could in turn have led to a reduction in willingness to commit to the same thing.

Why this effect would only be visible on MBO, and not on HBO or WO could have to do with the fact that all the posters had the exact same wording for all students. An interesting sidestep to this experiment would be the experiment whether a certain wording or tone that is adapted to the target group would give different results.

5.3 Higher vegetarian sales percentages at HBO and MBO

When looking at the data for HBO and MBO level, it is important to notice that schools at these levels only provided lunch and snacks, while the cafeteria at WO level provides evening meals. This could provide an explanation for the higher percentages of vegetarian products already before the nudge was introduced. An evening meal described according to typical Dutch standards would include vegetables, meat and potatoes (Brug, Glanz, Kok, van Assema, & van Breukelen, 1998), whereas a typical lunch could be described as a cheese sandwich (Rutters, Nieuwenhuizen, Lemmens, Born, & Westerterp-Plantenga, 2009). This shows that meat is regarded an integral part of the evening meal, while it is not as such for lunch, therefore explaining the lower percentages vegetarian meals observed on WO compared to HBO and MBO, which was already apparent before the nudge.

5.4 Limitations and recommendations for future research

It is recognized that there are limitations to this study. In the following paragraph limitations will be laid out including explanations on why certain decisions have been made in the research design process.

All three levels of Dutch tertiary education were included in this experiment, providing ground to compare the effectiveness of the nudge on all possible education levels for individuals in this age range. The only possible group that could have been added were individuals who did not continue in education after secondary school. In 2015, however, 92% of the Dutch youth continued their education after secondary school (Centraal Bureau Statistiek, 2016), so this remaining group is very small, and it is also hard to include in a similar experiment. This might nonetheless prove an insightful addition to the experiment. If this group would be included, it is be expected that their results are comparable to the results of MBO, because these people had the least years of education and recorded cases are - just like MBO students - a bit younger than HBO and WO students.

5.5 Information about the participants

At both the WO and HBO levels cafeteria were used by students and staff alike. On MBO levels separate cafeteria were present, making it possible to single out the effect on students only. There was actually no information at all about the participants, other than the location of the cafeteria and who were likely to be its customers. In theory everyone can go and eat at these locations. While that may not happen very often, it is still something to consider that participants outside the expected groups could have influenced the results. This was however the best approximation of the target group if you are looking into vegetarian food choices made by students in a natural environment.

5.6 Effectiveness of the posters

Another limitation is that there was no manipulation check performed, so there is no clarity on whether students really noticed and read the posters. Maybe at some locations, posters were generally overlooked explaining the unchanged numbers of vegetarian product sales on certain locations, while there were registered effects on others. Next to this it would have been interesting to keep posters up and collect data for a longer period of time. This did not happen in this research, because some locations had exam weeks shortly after the experiment, while others had not.

Also, there were no tests performed to check the effectiveness of the same text on the posters for the different educational levels. It can be easily imagined that a certain wording will have a different effect on WO than MBO and vice versa. In this case however, the decision was made to use the exact same posters on all educational levels in order to make the results comparable over the educational levels, rather than testing which wording works better on a certain location.

5.7 Difficulties in comparing the locations with each other

If it had been possible data collection in all cafeteria would have been focused on dinner, as this represents a vegetarian food choice better than the recording of lunch items, as motivated in 5.3. Since there was no access to individual customer's data there were no means to determine whether a customer really decided to eat vegetarian for the day, or whether someone got a cheese sandwich and chicken nuggets for lunch. Therefore, the focus was initially on meals, but shifted later to lunch items for HBO and MBO for the simple fact that these cafeterias contacted did not provide evening meals.

A strong suit of the set-up of the experiment conducted is that this allowed for recording and processing of actual behaviour, rather than subjective reports from students. In this study, it is unknown why students made decisions as they did, but at least there is a clear objective view on what they did in response to the presence of a poster with a social norm. Unfortunately, this set-up did not include a randomised experiment, which is needed in order to prove causality, something the proposed model did assume.

5.8 Conclusion

What does all the above mean? There is still too much unclear about the underlying mechanisms which are motivating the students to either buy more vegetarian products or not. To our knowledge, this was the first attempt to explore the nudge effectiveness over different educational levels. Additional research into the intention of students could yield useful information to add to these findings.

All three tertiary educational types of the Netherlands were included in this research, which certainly revealed some interesting results. A nudge that sets a social norm presented to all students across the educational levels did not yield the same result for every group. On WO the nudge had no effect, on HBO level the nudge was effective and on MBO level the nudge resulted in a counter-reaction. The exact reasons for this counter reaction are unclear, but some possible explanations have been explored.

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Appendix A – Overview of fields of study on the different schools

MBO – ROC Tilburg Stappegoor	**HBO – Avans s-Hertogenbosch**	**Uni – Tilburg**
Construction technology	Accountancy	Philosophy
Art, culture and media	Autonomous visual art	Online culture: Art, Media and Society
Logistics and mobility	Business administration	Theology
Aeronautical engineering	Public administration / government management	Business economics
Mechatronics, maintenance and engineering	Engineering	Public administration
Fashion and beauty care	Built Environment Associate degree	Cognitive science and artificial intelligence
Process and Environmental engineering	Business Innovation	Communication and information sciences
MBO – ROC Tilburg Kasteeldreef	Chemistry	Data science
Administrative and legal services	Civil engineering	Econometrics and operational research
Commercial services	Commercial economy	Economics
IT and media technology	Communication & multimedia design	Economics and Business economics
MBO – ROC Tilburg Wandelboslaan	Electrical engineering	Fiscal economics
Care and welfare	Finance & control	Global management of social issues
	HBO-Law	Human resource studies: people management
	HBO-Nursing	International business administration
	Human resource management	International sociology
	Informatics	New media design

	Integral safety science	Organisational sciences
	International business	Human recourse management
	Logistics	Psychology
	Marketing management	Public governance
	Small business & retail management	Sociology
	Social work	Fiscal law
	Technical business administration	Global law
	Technical informatics	Corporate law
	Design	Law
	Mechanical engineering	University college: Liberal arts and sciences

Appendix B – Sale numbers per product split up per week and location as received from the caterer (in Dutch)

ROC Stappegoor

Week 26 november t/m 30 november

Brood

220000009	Baguette kingsize 2,20	36,00
220000011	1/2 baguette onbelegd 0,50	30,00
220000012	Pistolet onbelegd 0,85	2,00
220000025	Luxe broodje 2,30	16,00
220000030	1/2 baguette 1,20	16,00
220000041	Lux brood/Special Geitenk 3,10	6,00
220000046	Luxe br. Special Mozzarel 3,10	13,00
220000047	Luxe br. Special Avocado 3,10	22,00
405030277	Pistolet 2,50	35,00
405030279	Sandwich 1,80	9,00
405030344	Zachte bol 1,25	16,00
405030608	1/2 Baguette ham/kip/sla 1,20	1,00
405030618	Baguette kingsize ham/kip 2,20	2,00
405030620	Baguette kingsize gezond 2,20	117,00
405030622	Baguette kingsize salade 2,20	100,00
405030624	Baguette kingsize Fil.Am. 2,20	8,00
405030645	Pistolet normal gezond 1,90	12,00
405030647	Pistolet normal salade 1,90	20,00
405030649	Pistolet normal Fil. Am. 1,90	11,00
405030660	Bagel carpaccio 2,50	1,00
405030687	Pistolet Mozzarella 1,90	18,00
405030688	Pistolet gekookt ei 1,50	2,00
405030690	Baguette hete kip 2,75	49,00

Snacks

270000001	Suikerwafe/appelflap 1,50	250,00
405030681	Foccacia 1,75	79,00
505040129	Worstenbroodje	423,00
505041771	Snack vd dag 1,50	494,00
505041772	Snack vd dag 2,00	289,00
505041836	1/2 baguette kruidenboter 1,00	18,00
505041838	Hele baguette kruidenboter 2,0	189,00

Salades

240000005	Salade 2,00	5,00
240000008	Salade couscous 2,00	49,00
250000001	Fruit stuks 0,50	5,00
250000003	Vitamin 2st 0,80	1,00
250000005	Fruitsalade 2,00	2,00

Week 3 december t/m 7 december

Brood

220000004	Luxe broodje (special) 2,80	2,00
220000009	Baguette kingsize 2,20	94,00
220000011	1/2 baguette onbelegd 0,50	17,00
220000012	Pistolet onbelegd 0,85	7,00
220000025	Luxe broodje 2,30	7,00
220000030	1/2 baguette 1,20	13,00
220000041	Lux brood/Special Geitenk 3,10	3,00
220000046	Luxe br. Special Mozzarel 3,10	10,00
220000047	Luxe br. Special Avocado 3,10	9,00
405030277	Pistolet 2,50	13,00
405030279	Sandwich 1,80	9,00
405030344	Zachte bol 1,25	14,00
405030488	Baguette onbelegd 1,00	3,00
405030612	Luxe Broodje carpaccio 2,80	3,00
405030613	Luxe broodje zalm/zuivel 2,80	2,00
405030620	Baguette kingsize gezond 2,20	78,00
405030622	Baguette kingsize salade 2,20	106,00
405030624	Baguette kingsize Fil.Am. 2,20	12,00
405030645	Pistolet normal gezond 1,90	5,00
405030647	Pistolet normal salade 1,90	17,00
405030649	Pistolet normal Fil. Am. 1,90	6,00
405030687	Pistolet Mozzarella 1,90	3,00
405030690	Baguette hete kip 2,75	47,00
405030701	Luxe broodje/Specal 3,10	50,00
505041124	Pistolet hete kip 2,50	5,00

Snacks

270000001	Suikerwafe/appelflap 1,50	209,00
405030681	Foccacia 1,75	109,00
405030684	Pita broodje 2,10	1,00
505040129	Worstenbroodje	367,00
505041771	Snack vd dag 1,50	446,00
505041772	Snack vd dag 2,00	260,00
505041836	1/2 baguette kruidenboter 1,00	16,00
505041838	Hele baguette kruidenboter 2,0	140,00

Salades

240000004	Rauwkost 1,50	1,00
240000005	Salade 2,00	13,00
240000008	Salade couscous 2,00	25,00
250000001	Fruit stuks 0,50	6,00
250000003	Vitamin 2st 0,80	1,00
250000005	Fruitsalade 2,00	1,00

ROC Kasteeldreef

Week 26 november t/m 30 november

Brood

220000009	Baguette kingsize 2,20	38
220000011	1/2 baguette onbelegd 0,50	7
220000025	Luxe broodje 2,30	38
220000030	1/2 baguette 1,20	0
220000046	Luxe br. Special Mozzarel 3,10	11
405030181	Pistolet 1,50	3
405030184	Pistolet 1,90	10
405030188	Zachte bol 0,75	2
405030190	Zachte bol 1,25	2
405030277	Pistolet 2,50	42
405030279	Sandwich 1,80	17
405030488	Baguette onbelegd 1,00	1
405030618	Baguette kingsize ham/kip 2,20	5
405030620	Baguette kingsize gezond 2,20	73
405030622	Baguette kingsize salade 2,20	42
405030624	Baguette kingsize Fil.Am. 2,20	24
405030645	Pistolet normal gezond 1,90	34
405030647	Pistolet normal salade 1,90	9
405030649	Pistolet normal Fil. Am. 1,90	1
405030688	Pistolet gekookt ei 1,50	3
405030689	Baguette gekookt ei 2,20	1
405030690	Baguette hete kip 2,75	68
405030691	Baguette Mozzarella 2,20	2
405030701	Luxe broodje/Specal 3,10	29
505041124	Pistolet hete kip 2,50	29

Snacks

270000001	Suikerwafe/appelflap 1,50	88
405030681	Foccacia 1,75	42
505040129	Worstenbroodje	100
505041771	Snack vd dag 1,50	339
505041772	Snack vd dag 2,00	283
505041836	1/2 baguette kruidenboter 1,00	39
505041838	Hele baguette kruidenboter 2,0	3

Salades

240000005	Salade 2,00	2
250000001	Fruit stuks 0,50	13
250000003	Vitamin 2st 0,80	1

Week 3 december t/m 7 december

Brood

220000009	Baguette kingsize 2,20	30
220000011	1/2 baguette onbelegd 0,50	4
220000025	Luxe broodje 2,30	32
220000030	1/2 baguette 1,20	0
220000038	Pistolet Zalm 2,50	3
220000041	Lux brood/Special Geitenk 3,10	2
220000046	Luxe br. Special Mozzarel 3,10	8
220000047	Luxe br. Special Avocado 3,10	2
405030277	Pistolet 2,50	42
405030279	Sandwich 1,80	11
405030488	Baguette onbelegd 1,00	1
405030618	Baguette kingsize ham/kip 2,20	14
405030620	Baguette kingsize gezond 2,20	51
405030622	Baguette kingsize salade 2,20	26
405030624	Baguette kingsize Fil.Am. 2,20	18
405030640	Luxe broodje onbelegd 1,00	1
405030643	Pistolet normal ham/kip 1,50	2
405030645	Pistolet normal gezond 1,90	43
405030647	Pistolet normal salade 1,90	8
405030649	Pistolet normal Fil. Am. 1,90	2
405030690	Baguette hete kip 2,75	57
405030701	Luxe broodje/Specal 3,10	20

Snacks

270000001	Suikerwafe/appelflap 1,50	53
405030681	Foccacia 1,75	43
505040129	Worstenbroodje	113
505041771	Snack vd dag 1,50	274
505041772	Snack vd dag 2,00	296
505041836	1/2 baguette kruidenboter 1,00	58
505041838	Hele baguette kruidenboter 2,0	2

Salades

240000005	Salade 2,00	8
250000001	Fruit stuks 0,50	6
250000002	Fruitsalade 2,20	0
250000005	Fruitsalade 2,00	7

ROC Wandelboslaan

Week 26 november t/m 30 november

Brood

220000012	Pistolet onbelegd 0,85	3,00
220000025	Luxe broodje 2,30	356,00
220000038	Pistolet Zalm 2,50	54,00
220000046	Luxe br. Special Mozzarel 3,10	4,00
220000047	Luxe br. Special Avocado 3,10	5,00
405030181	Pistolet 1,50	12,00
405030184	Pistolet 1,90	6,00
405030188	Zachte bol 0,75	1,00
405030208	Extra ingredient	39,00
405030277	Pistolet 2,50	0,00
405030279	Sandwich 1,80	2,00
405030344	Zachte bol 1,25	3,00
405030488	Baguette onbelegd 1,00	1,00
405030620	Baguette kingsize gezond 2,20	3,00
405030624	Baguette kingsize Fil.Am. 2,20	2,00
405030640	Luxe broodje onbelegd 1,00	3,00
405030645	Pistolet normal gezond 1,90	1,00
405030647	Pistolet normal salade 1,90	3,00
405030649	Pistolet normal Fil. Am. 1,90	3,00
405030687	Pistolet Mozzarella 1,90	11,00
405030688	Pistolet gekookt ei 1,50	4,00
505041124	Pistolet hete kip 2,50	18,00

Snacks

200519024	Hot pistolet 1,70	14,00
200519040	Panini 2,50	64,00
200519043	Volkoren tosti 1,50	9,00
270000001	Suikerwafe/appelflap 1,50	117,00
505040129	Worstenbroodje	168,00
405030681	Foccacia 1,75	24,00
505041771	Snack vd dag 1,50	492,00
505041772	Snack vd dag 2,00	172,00
505041836	1/2 baguette kruidenboter 1,00	114,00
505041838	Hele baguette kruidenboter 2,0	0,00

Salades

240000002	Gemengde sla los 0,50	4,00
240000008	Salade couscous 2,00	11,00
250000001	Fruit stuks 0,50	16,00
250000003	Vitamin 2st 0,80	3,00

Week 3 december t/m 7 december

Brood

220000012	Pistolet onbelegd 0,85	1,00
220000025	Luxe broodje 2,30	381,00
220000038	Pistolet Zalm 2,50	41,00
220000041	Lux brood/Special Geitenk 3,10	8,00
220000046	Luxe br. Special Mozzarel 3,10	4,00
220000047	Luxe br. Special Avocado 3,10	10,00
405030181	Pistolet 1,50	6,00
405030184	Pistolet 1,90	11,00
405030277	Pistolet 2,50	2,00
405030344	Zachte bol 1,25	4,00
405030485	Bagel 2,50	2,00
405030612	Luxe Broodje carpaccio 2,80	3,00
405030620	Baguette kingsize gezond 2,20	4,00
405030645	Pistolet normal gezond 1,90	2,00
405030687	Pistolet Mozzarella 1,90	16,00
405030688	Pistolet gekookt ei 1,50	1,00
405030701	Luxe broodje/Specal 3,10	2,00

Snacks

270000001	Suikerwafe/appelflap 1,50	210,00
405030681	Foccacia 1,75	28,00
505040129	Worstenbroodje	209,00
505041771	Snack vd dag 1,50	376,00
505041772	Snack vd dag 2,00	161,00
505041836	1/2 baguette kruidenboter 1,00	48,00

Salades

240000005	Salade 2,00	1,00
240000008	Salade couscous 2,00	7,00
250000001	Fruit stuks 0,50	19,00
250000003	Vitamin 2st 0,80	1,00
250000005	Fruitsalade 2,00	1,00