Promoting Food Choices in an Online Supermarket: The Use of a Default Nudge and

the Influence of Personality

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Abstract

Reducing the number of overweight people is of paramount importance given the links

between excess weight and numerous physical and mental diseases. Default nudges are pre-

selected options, which people will receive if they do not specify a different choice. The

current study examined whether this nudge would be a successful way to steer people

towards making healthier food choices. Moreover, the study addressed the influence of

personality, visceral state and healthy eating habits on the effectiveness of default nudges.

The study was conducted in an online supermarket environment. Participants (N = 60) were

asked to choose their preferred food or drink among four products, for a total of twelve

choices. One of the healthy products was pre-selected. After this, participants were asked to

fill in a questionnaire about their personality, visceral states and healthy eating habits. No

significant effects were found between three experimental conditions (control, default, default

+ salient) and the number of healthy nudged options chosen. Moreover, non-significant

effects or very weak correlations were found between personality type, visceral state and

healthy eating habits and the number of healthy nudged options chosen. This research did not

reveal that the implementation of a default nudge leads to healthier choices in an online

supermarket. Furthermore, the study did not indicate an influence of personal differences on

participants' susceptibility to the nudge. This study contributes to nudging literature by

indicating that default nudges might not always be the best intervention to promote health-

related behaviour. The study demonstrates that further research is needed to determine how

personal differences and nudges interact.

Keywords: healthy food choices*,* nudge, default, personal differences, susceptibility

Introduction

In recent decades, an increasingly sedentary lifestyle and a nutritional transition to processed foods and high-calorie diets have led to an increase in the prevalence of overweight and obese people (Hruby & Hu, 2015). To stimulate healthier lifestyles, the Dutch National Prevention Agreement was established in 2018 (Rijksoverheid, 2018), which contains agreements between several Dutch organisations. However, four years later, more than half of the Dutch adult population is still overweight (RIVM, 2021). Reducing this number is paramount as being overweight is associated with numerous diseases, including cardiovascular disease, hypertension, type 2 diabetes, certain cancers, osteoarthritis and gynaecological problems (Williams et al., 2015). Moreover, people suffer from an increased risk of psychological disorders and are more likely to have a negative self-concept (Williams et al., 2015). As eating behaviour is one of the main predictors of obesity and being overweight (Mendoza et al., 2007), it is important to research how society can contribute to promoting healthier diets.

Nudges to Promote Healthy Behaviour

To stimulate healthier eating, multiple interventions have been implemented by public health organisations and governments during the last decade (Vecchio & Cavallo, 2019). Interventions may focus on reducing the availability of unhealthy food and drinks in public places, reducing the number of unhealthy food commercials or increasing healthier menus in restaurants. Such interventions focus on transferring knowledge and creating awareness and therefore assume that consumers always make rational considerations and deliberate decisions. However, interventions focused on consumers' automatic thinking seem to have a greater impact on improving the effectiveness of health interventions (Benartzi et al., 2017). Due to a lack of time, motivation, or cognitive resources, people seldom make well-reasoned

decisions (Just & Gabrielyan, 2016). As a result, people generally do not choose their food decisions optimally (Thaler & Sunstein, 2008), but automatically decide based on attention, emotion, familiarity, or popularity (Marchiori et al., 2017). Hence, a good strategy for promoting a healthier diet is using interventions that require less rational thinking, by making use of people's automatic decision-making schemas or heuristics. Implementing nudges is one way of leveraging people's thought processes. A nudge is an adaptation of the (physical) environment which steers individuals' behaviour toward a certain option without limiting freedom of choice (Thaler & Sunstein, 2008). Studies often research ways to promote healthy behaviour with the use of nudges. For example, in an experiment by Kroese et al. (2016), healthy foods were placed next to the cash register to make them more accessible and prominent, leading to a significant increase in sales of those products. Similarly, a study in supermarkets in Denmark showed that increasing the availability of vegetables at the checkout counter in supermarkets led to increased sales (Winkler et al., 2016). These studies indicate that nudging can be an effective way to help people change their behaviour without much effort. Moreover, they exhibit that a supermarket setting can have a significant impact on people's food choices and have the potential to promote healthy food purchases (Story et al., 2008).

Default Nudges

Default nudges are choice options that have been pre-selected that people will receive if they do not explicitly specify a different choice (Brown & Krishna, 2004). Individuals tend to stick with standard options even when other options are available (van Kleef et al., 2018) because pre-selected choices reduce the amount of effort involved in deciding (Smith, Goldstein & Johnson, 2013), thereby facilitating decision-making. Moreover, people tend to avoid losses, so switching to another option implies losing the standard option that was theirs

before, which explains the preference for the existing option (Sunstein, 2017). Lastly, a

default communicates quality, as people assume that an expert suggested the default as the

optimal option for them. Defaults exert a considerable influence on people's decisions, as

demonstrated by a meta-analysis by Jachimowicz et al. (2016). Moreover, previous research

indicates that defaults are also effective for promoting healthy behaviour. For example, a

study by Loeb et al. (2018) demonstrated that when healthier lunch choices were presented as

the default option at a school in the United States, children's parents opted for the healthier

menu. Furthermore, van Kleef et al. (2018) demonstrated that 94% of participants from a

Dutch university chose the healthy default option (i.e., a healthy topping) over an unhealthy

topping (i.e., a deep-fried snack). Thus, findings suggest that default nudges are an effective

technique for stimulating healthier decisions. However, while the larger part of default

studies inhibits positive results, some studies do not find significant effects or even

demonstrate negative effects (Jachimowicz et al., 2016).

Besides the inconsistent findings in nudging interventions, there is a variation in the

effectiveness of nudges between individuals (Hummel & Maedche, 2019). This could be

because, currently, nudges are a one-size-fits-all intervention and are not designed based on a

specific target group (Schneider et al., 2018). In previous studies, insufficient attention has

been paid to the factors that determine when or whether people are likely to be influenced by

a nudge (Ridder, Kroese and van Gestel, 2021). However, past research has established a

relationship between the Big Five personality types (i.e., extraversion, agreeableness,

openness, conscientiousness and neuroticism) and decision-making (Riaz et al., 2012). The

research revealed differences in personality and decision-making style, showing that people

high on extraversion most often used spontaneous (i.e., rapid and fast) and intuitive (i.e.,

speed, impressions and emotions) decision-making styles. In contrast, conscientiousness was

linked to stronger use of a more rational thinking style (i.e., a thorough search for obtaining

information and consideration of all options). Lastly, individuals who scored high on agreeableness often used dependent decision-making characterised by reliance, consultations and dependence on others (Riaz et al., 2012); in other words, dependent decision-makers shift their decisional responsibility to others. It is reasonable to hypothesise that personality types that often engage in fast, automatic and dependable decisions will be more affected by nudges since nudges tap into these types of decisions.

In addition to personality characteristics, other factors can also impact how susceptible people are to nudges. For instance, when in a 'hot' visceral state (i.e., when the mental state is influenced by hunger, thirst, exhaustion or other strong emotions [Loewenstein, 2005]), people tend to rely more on automatic processes and heuristic thinking (Yang et al., 2012). Moreover, the effect of nudges is greater when someone has a greater personal value for the behaviour being promoted (Weingarten et al., 2016) and when it aligns with personal preferences (Ridder et al., 2021); this suggests that nudging healthy food options is more effective among people who already prefer healthy eating versus people who are not concerned about healthy eating.

Current Research

The current research implements a default nudge in an online supermarket environment. In this study, an online environment was chosen due to the more frequent decision-making in digital environments (Hummel & Maedche, 2019). Researching an online supermarket is particularly interesting because an online environment has the potential to allow more accurate targeting and to be customised to personality types, which could lead to nudges producing a stronger impact on consumers' behaviour (Ingendahl et al., 2021).

Research Questions and Hypotheses

This research aims to investigate if a default nudge in an online supermarket can be used to promote healthier diets. Therefore, the research question is as follows: can a default nudge be used to promote healthier food choices in an online supermarket? It is expected that healthier food choices are made when a healthier option is presented as the default choice. Furthermore, the role of personality in the effectiveness of default nudges will be researched. A follow-up question is as follows: does a consumer's personality affect their susceptibility to default nudge? It is expected that personality type will influence how susceptible a person is to the default nudge. Considering decision-making styles, it is expected that extraversion and agreeableness are positively associated with the healthy nudge option, while conscientiousness is negatively associated with the healthy nudge option. Additionally, visceral states and healthy eating behaviour are expected to influence how susceptible people are to the default nudge.

Method

Participants

Participants were recruited via an online panel agency (Prolific) and included Dutch-speaking members of the general Dutch population aged between 18 and 72 years. In total, 128 people (66 males, 61 females, 1 non-binary) participated in the study and had a mean age of 28 years (SD = 9.3). A total of 68 participants were excluded because they were assigned to conditions outside the scope of this research (see Design subchapter). Subjects provided informed consent to participate in the study as approved by the Faculty's Ethics Committee under Article 22-0477 and were compensated with €3.45 for 25 minutes.

Power Analysis

To estimate the required sample size for this study, an a priori power analysis was performed in G*Power 3.1 for an ANOVA with five groups ($\alpha = 0.05$, power = 80%). A moderate effect size of $f = 0.25$ was estimated. This power analysis revealed that a sample of 128 participants was sufficient (26 participants per group, rounded up from 25.6)**.**

Design

The study was partially a replication of unpublished research by Marchiori et al. (2016). This study used a between-subjects design with five conditions, and participants were randomly assigned to the control ($n = 9$), default ($n = 18$), salient ($n = 27$), default or salient ($n = 41$) or default + salient ($n = 33$) condition. Due to a mistake in the distribution of the participants, the conditions did not have an equal number of participants. This paper focuses only on the control, default and default + salient condition. The other two conditions were used for a different paper, which was outside the scope of this study. The dependent variable is the frequency that the healthier option was chosen over the less healthy option (healthy/not healthy). Independent variables were the default nudge (present/not present), personality type, healthy eating habits and visceral state.

Procedure

The study was conducted online, and food choices were presented in a simulated online shopping application environment. Participants were assigned to one of the five experimental conditions. The study started after participants provided informed consent. They were first instructed to imagine doing their weekly grocery shopping via a delivery service. Participants were asked to select the groceries they would normally buy in a supermarket. In total, every participant made 15 choices by choosing the products they liked most among the four options. The order of the 15 choices was randomised across participants. Depending on the condition they were in, there would either be a 'plus' sign or a 'check' sign above the

product. Participants selected the option they preferred by clicking on the product. By doing so, participants automatically proceeded to the next choice. After making the 15 choices, participants reported study conjecture by responding to two open questions.

After this, participants proceeded to the questionnaire. Firstly, they answered questions about their demographic characteristics. Secondly, they answered questions about how tired, hungry and thirsty they were at the moment. After this, participants answered questions concerning their personality type. Lastly, they were asked about their agreement on statements regarding their healthy eating habits. At the end of the questionnaire, participants were thanked and debriefed.

Online shopping application environment

The supermarket application was programmed using the online experiment builder Gorilla, which allows for Prolific panel integration. The layout of this experiment was based on an application of a grocery delivery service (Gorilla's), to make it a realistic online shopping environment. Images of products were obtained from the Albert Heijn Supermarket website (www.ah.nl). The online supermarket comprised 15 product categories. Twelve categories included various foods and drinks such as bread (e.g., whole wheat bread), beverages (e.g., Fanta Cassis), desserts (e.g., tiramisu), sauces (e.g., mayonnaise) and pre-packed meals (e.g., salad). Three categories included neutral supermarket products (e.g., candles) to support the instructions to do weekly groceries, however, these were not included in the analyses). Among each set of four options, two options were always healthier. Moreover, prices were not included to remove a confounding impact due to food prices. Each option was shown as a picture of the particular product with the name of the product underneath. In the control condition, each of the options started with a 'plus' sign. In the default condition, one of the healthier options was already pre-selected with a 'check' sign. In the default + salient condition, one of the healthier options was pre-selected and made salient

by having a standard blue 'check' sign. The order of the four options was randomised across

participants.

Figure 1.

The layout of the food choices.
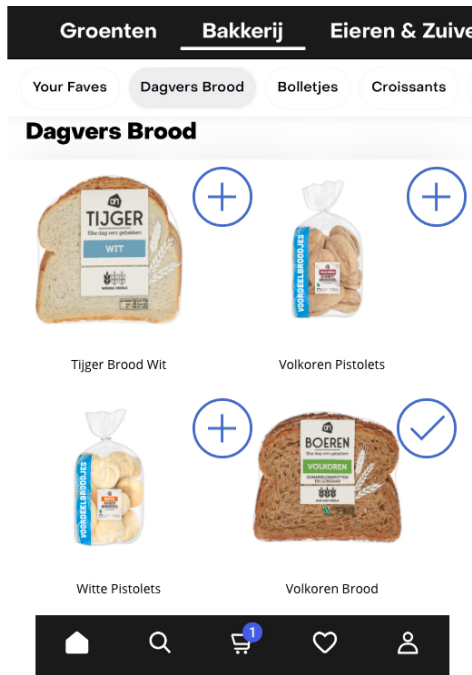
Note. This example is from the default condition. The other product categories can be found

in Appendix A.

Measures

Data was collected using an online survey containing 70 questions, covering socio-

demographic characteristics, visceral state, personality type, healthy eating habits and

questions about the awareness of the nudging intervention. The complete questionnaire can

be found in Appendix B.

Socio-demographic characteristics

To form a general impression of the sample, information about occupation, date of

birth, and gender were collected. Additionally, questions about food allergies and/or

intolerances were asked to examine whether participants needed to be excluded. No one had to be excluded based on specific allergies.

Visceral State

Participants' current visceral state (i.e., level of hunger, thirst and tiredness) was measured with six questions. These three measures were assessed on 5-point Likert scales ranging from 0 (completely disagree) to 5 (completely agree). In this research, level of hunger (α = .80), thirst (α = .78) and tiredness (α = .67) all indicated an acceptable to a good internal consistency.

Personality Type

Personality type was measured using the questions from the IPIP. This is a questionnaire to assess the Big Five personality traits. Participants answered 40 questions (two questions relating to each personality trait were removed beforehand to shorten the questionnaire) concerning their levels of extraversion (e.g., 'I am the life of the party'), agreeableness (e.g., 'I feel little concern for others'), conscientiousness ('I am always prepared'), emotional stability (e.g., 'I get stressed out easily') and intellect/imagination (e.g., 'I have a rich vocabulary'). These questions were assessed on 5-point Likert scales ranging from 0 (completely disagree) to 5 (completely agree). Extraversion (α = .90), agreeableness (α = .69), conscientiousness (α = .77), emotional stability (α = .88) and intellect/imagination (α = .75) presented a acceptable to excellent internal consistency. Emotional stability and intellect/imagination were not included in the analysis, because no relation with the susceptibility to the default was expected.

Healthy Eating habits

Participants answered questions concerning their healthy eating habits (e.g., 'It is important to me to eat healthily). Questions were based on the Eating Habits Questionnaire (Gleaves & Ambwani, 2013). The questions were assessed on 5-point Likert scales ranging

from 0 (completely disagree) to 5 (completely agree). A high score on this scale implies that

a participant generally tends to eat healthily. The Eating Habits Questionnaire indicated a

good internal consistency, with a Cronbach's α of .88.

Awareness of the Nudging Intervention

      To assess whether participants in the default and default and salient conditions noticed

the nudge, they were asked what they thought the research was about and whether they

noticed anything out of the ordinary while making choices.

Data Analysis

      The data retrieved from the survey and experiment was exported from Gorilla and

analysed in the statistical software SPSS 27. Firstly, the data from the different conditions

was scanned to check for missing data. Secondly, the negatively worded items of the IPIP

scores were reversed coded. Thirdly, the reliability of the scales was tested with Cronbach's

alpha (α). Next, the descriptive statistics were analysed. A one-way ANOVA was executed to

check whether the demographic characteristics were evenly distributed across the four

conditions (randomisation check). A T-test was then conducted to examine whether there

were differences in the effect of the default nudge across conditions. Next, three multiple

regression analyses were conducted to assess the effects of personality, visceral states and

eating habits on the effectiveness of the nudge. Lastly, participants' perceptions of the

nudging intervention were checked.

<div align="center">Results</div>

Randomisation Check

      To check whether the demographic characteristics were evenly distributed across the

three conditions, three one-way ANOVAs were used. No significant differences were found

in gender ($F(1, 58) = 1.437$, $p = .235$), occupation ($F(5, 54) = 1.662$, $p = .160$) and age ($F(23$,

36) = .714, *p* = .801) among the three conditions, namely control (n = 9), default (n = 18) and
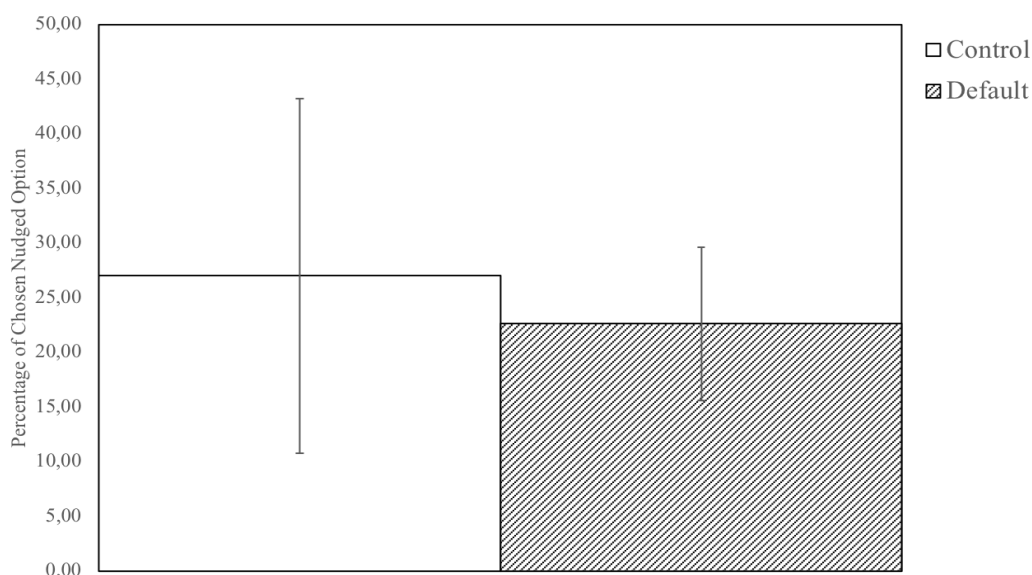
default + salient (n = 33).

Effects of the Default Nudge on Healthy Food Choices

It was expected that participants would make healthier food choices when a healthy

option was presented as the default choice. An independent sample T-test was conducted with

the condition as a predictor and as a dependent variable to determine the percentage of times

the healthy nudged option was chosen across the 12 choices. To perform a T-test,

assumptions must be checked. Accordingly, the Shapiro-Wilk test was used to test the

assumption of normality, and Levene's test was used to test for a violation of

homoscedasticity. All assumptions were met.

The results of the T-test indicated that participants in the default condition

(*M* = .23; SD = .14) chose the nudged option less often than participants in the control

condition (*M* = .27; SD = .18): in the default condition 23% of the participants chose the

healthy nudge option in contrast to 27% in the control condition (Figure 1). This difference

was not significant ($t(25) = 0.656, p = .256$).

Figure 2

Percentage of choosing the healthy nudged options for the control and default conditions.

To obtain a more elaborate understanding of the effect of the default nudge, the default + salient condition was also compared to the control and default condition using a one-way ANOVA. The results revealed that participants in the default + salient condition (M = .24; SD = .13) also chose the healthy nudged option less often than participants in the control condition (M = .27; SD = .18), with 24% of participants choosing the healthy nudged option in the default + salient condition versus 27% in the control condition (Figure 2). These differences were again not significant (F(2.57) = .269, p = .765).

Figure 3

Percentage of the healthy nudged options between the control, default and default + salient conditions.
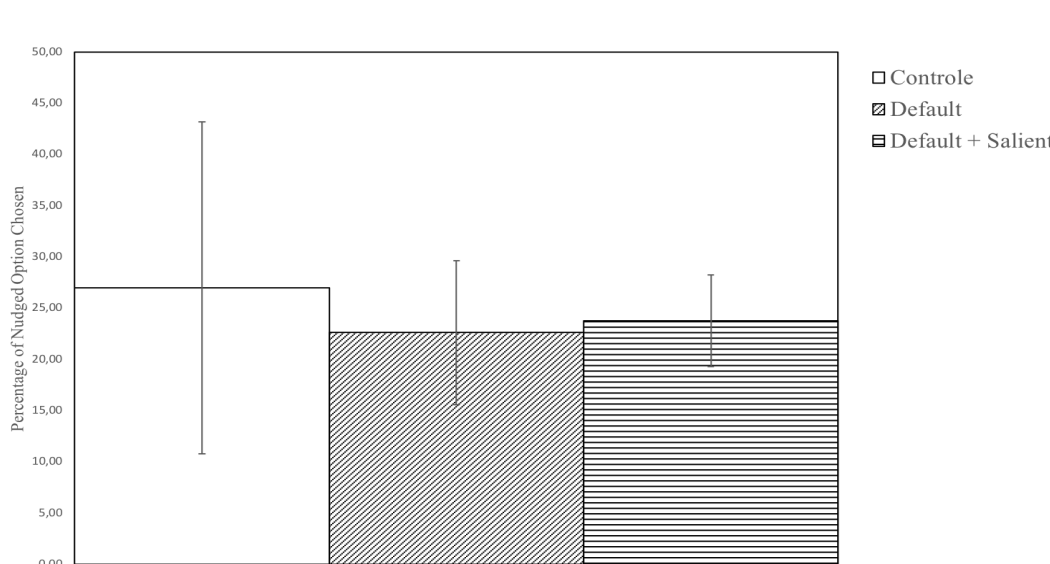
Susceptibility to the Default Nudge

Multiple regression analyses were used to analyse the relationship between personal differences and the percentage of nudged options chosen in the default and default + salient conditions. Before executing the analysis, the assumptions of no multicollinearity, homoscedasticity and multivariate normality were tested. All assumptions were met in this research.

Firstly, the relationship between personality type and how frequent the nudged option was chosen was analysed. Only 13.3% of the variance could be explained by personality

$(F(5.45) = 1.378, \ p = .250)$. Agreeableness $(r = -.29, p = .019)$ showed a significant negative correlation with the percentage of nudged healthy food choices, which indicates a weak relationship with the utility offered by the default nudge. The analysis showed a non-significant relationship between the default nudge and extraversion $(r = .36; p = .401)$ and conscientiousness $(r = .14; p = .165)$. The analysis showed that these personality types are not related to the effectiveness of the default nudge.

Another regression analysis was used to investigate the relationship between level of thirst $(r = -.098, p = .248)$, hunger $(r = -.191, p = .090)$ and tiredness $(r = .147, p = .151)$ and how often the healthy nudged option was chosen. Only 6.4% of the variance could be explained by the visceral state. None of these variables showed a significant correlation with the default nudge $(F(3.47) = 1.067, p = .372)$, thus no relationship between the variables and the effectiveness of the default nudge can be established.

Lastly, healthy eating behaviour was analysed to test whether this affects how often the healthy nudged option was chosen. A multiple regression analysis was conducted on eating behaviour and the percentage of nudged healthy food. The results revealed a weak negative relationship between healthy eating behaviour $(r = -.359, p = .005)$ and the effectiveness of the default nudge, which could indicate that the higher a person scores on healthy eating habits, the less of an effect the default has. Only 12.9% of the variance could be explained by healthy eating behaviour $(F(1.49) = 7.234, p = .010)$.

Perception of the Nudging Intervention

To check whether participants were aware of the nudge manipulations, they were asked open questions about what they suspected the research was about and whether they noticed anything out of the ordinary while making choices. Three participants in the default condition and six participants in the default + salient condition mentioned that one product was always pre-selected. Two participants mentioned that the pre-selected product was the

healthier option as well. Moreover, one participant mentioned that the pre-selected product influenced her decision. This result of the questions provided enough reason that the manipulation of the nudge was effective and there was limited study conjecture.

Discussion

This study researched a possible intervention to promote healthier diets by using a default nudge. The purpose of this study was to gain a better understanding of how implementing default nudges can promote healthier food choices and determine if personality plays a role in consumers' susceptibility to the default nudge. It was expected that using a default would increase the number of healthy food choices made. In addition, it was expected that personality type would affect how susceptible people are to the default nudge. No significant effects were found in the expected direction. Moreover, visceral states showed a non-significant effect, whereas healthy eating habits exhibited a weak relationship with the number of healthy food choices made.

Default Nudge

It was theorised that a default nudge would increase healthy decisions because individuals tend to follow default choices even when other options are available. Although previous research (e.g., Marchiori et al., 2016; Loeb et al., 2018; van Kleef et al., 2018) found effects in the expected direction, the results of the current study did not indicate that the default nudge promoted healthier choices between the three experimental conditions (control, default, default + salient). In contrast to expectations, the number of healthy food choices made was lower in the default and default + salient conditions, though there was no significant difference between the conditions.

A possible explanation for the refutation of the expectations is that, in some cases, default nudges do less than anticipated (Willis, 2012; Sunstein, 2017). Firstly, when there is a strong preference for a certain behaviour, this preference might be sufficient to ensure that

the default will not be effective (Sunstein, 2017). For example, a study (de Wijk et al., 2016) researched selling whole-grain bread, which is generally healthier than other types of bread. In the study, they placed the whole-grain bread either at the most visible location in the supermarket. Against expectations, this did not increase the sale. This suggests that people already prefer a type of bread and the change in the architecture of the supermarket will not change this preference (Sunstein, 2017). Thus, when people have little preference, they more readily accept the default nudge because attention is a limited resource that is only used when necessary (Sunstein, 2017). When people have a strong preference, for instance, for a specific product in the experiment, they are less likely to accept the default, hence the reduced effect of the default nudge. Additionally, some participants noticed that this experiment was about healthy eating and that one product was pre-selected. When people have a strong preference for a product and they realise they are being nudged towards a product they do not like, it could produce reactance (Ivankovic & Engelen, 2019) and thus reverse the effects of the default or render them ineffective.

Secondly, nudges might only have a short-term effect (Frey & Rogers, 2014). In the current study, participants were asked to make 15 choices. When participants see the first pre-selected products, they might be influenced by them. However, it is possible that after deciding between multiple products, people will not pay attention to the pre-selected product anymore or are not engaged by it on a substantial level any longer (Lin et al., 2017). This could eliminate the effect of the default (Sunstein, 2017).

A last possible explanation for the results is that the default nudge has less of an effect in the online environment compared to an offline environment. Two out of the three studies cited earlier were conducted in a physical environment. A study by Peng et al. (2018) demonstrated that people who perform online tasks are less able to process a range of different items at the same time and are more concentrated compared to people who do

offline tasks. This implies a rational way of thinking during an online experiment. Since nudges take advantage of the automatic interaction between a person and the environment (Marchiori et al., 2017), people may be less influenced by the default nudge. Moreover, research has indicated that online consumers are more cautious about accepting default options (Benartzi & Lehrer, 2015); this suggests that the default nudge was less helpful in promoting healthy behaviour in an online experiment and that an online nudge does not necessarily operate in the same manner as a nudge in a physical environment.

Susceptibility to Nudges

Furthermore, this research aimed to investigate if personality influences how susceptible people are to default nudges. Contrary to expectations, the conscientiousness and extraversion dimensions showed a non-significant relationship with the percentage of healthy nudged options made in the default and default + salient conditions. Moreover, agreeableness showed a very weak connection with the nudge, which makes the result negligible. Based on previous studies, a possible explanation for this result is that personality factors already influence people's food and drink choices (Mõttus et al., 2013). For example, agreeableness, extraversion and conscientiousness are all positively associated with a preference for a healthy diet (Mõttus et al., 2013; Pfeiler & Egloff, 2020). Moreover, past research indicates that extraversion and conscientiousness are robust concomitants of healthy behaviour (Raynor & Levine, 2010). On the one hand, this could imply that participants high on these personality dimensions opted for the other healthy product in the experiment instead of the nudged product. On the other hand, it could imply that participants low on these personality dimensions preferred the less healthy products. Since high preference for types of food and drinks are sufficient to ensure that the default will not be effective (Sunstein, 2017), this could be the reason that no effect was found. Hence, personality may have a strong direct relationship with food choices that outweighs the nudge, and the extent to which participants

follow a certain lifestyle may therefore depend on personality traits and eating styles (Keller & Siegrist, 2015); this suggests that personality is already a determining factor in food and drink choices, and the use of the default nudge was not strong enough to overrule this.

An additional explanation is that it is difficult for personality to have an effect because the default nudge did not exhibit significant or strong results. If the default nudge yields non-significant results regarding promoting healthier choices, it is highly unlikely that personality could have played a significant part in susceptibility to the nudge.

Limitations

Several limitations must be noted. The most evident limitation of this study is that an important underlying mechanism of the default did not apply. The mechanism states that the nudge reduces the amount of effort involved in decision-making such that a person only needs to agree with the default instead of first choosing an option (McKenzie, Liersch, & Finkelstein, 2006; Smith, Goldstein, & Johnson, 2013). Consequently, they will receive the pre-selected option if they do not explicitly specify otherwise (Brown & Krishna, 2004). However, due to technical limitations with the experiment builder, participants still had to click on the nudged product before continuing to the next product. As such, there was still some effort required when going along with the default, and they would not have received the option if they had not done anything, which makes our designed nudge insufficient. Additionally, people must make an active choice to alter a default (Sunstein, 2017). Since attention is scarce and effortful, people sometimes choose not to decide and opt for the default option instead since this requires the least effort. However, in this experiment, sticking with the default option or choosing another option both required a click on the preferred product. Therefore, a similar amount of effort for either the default product or another product was required. This suggests that effort might be one of the most important

mechanisms behind the default and future research could focus on which mechanisms are the most important driver in the effectiveness of the default.

A second limitation of the study was the differences in sizes in the conditions and the small control group. Due to a mistake in the randomisation of participants into the conditions, the participants were not evenly distributed, and the control group (n = 9) was much smaller than the other groups. Consequently, the power in this study was too low, and the study only has a small chance of detecting a true effect, which could also explain the lack of significant results. If the control group is small, people with exceptional or unusual responses could skew the results. With a more even distribution across groups and a bigger control group, more extensive conclusions could have been drawn. Future research with a larger sample size and control group should examine the link between personality and default nudges more closely.

Lastly, the generalisability of the results to other countries and real-life situations is not certain. Although the online supermarket was made as realistic as possible, participants were not required to actually buy the products. Other factors, such as prices, could explain the effects of default nudges in real supermarkets. Moreover, data collection only took place in the Netherlands, and it is possible that susceptibility to nudges varies by culture and that biases may interact with culturally specific features (Bovens, 2010). Further research could focus on the influence of prices on consumers' decision-making while being nudged and nudging in different cultures.

Recommendations

This paper examined the effects of a default nudge to promote healthy food choices in an online shopping setting. The results did not indicate that pre-selecting an option would increase the probability of that product being chosen. Nevertheless, this research contributes to nudging literature. Studies with insignificant results do not always get published (Hummel

& Maedche, 2019), which makes it seem like nudges are generally effective. This shows that, even though defaults have proven to be very effective in guiding behaviour (Wilson et al., 2016), they might not always be the most optimal choice, and sometimes other interventions can be more efficient; this is important for policymakers to keep in mind while developing interventions.

Moreover, the results did not reveal a relationship between personality and susceptibility to nudges. However, even if a strong significant relationship were to exist, there would be the remaining practical question of how to use personality while implementing nudges. Measuring and collecting data on consumers' personality traits raises ethical questions, and it would be challenging to determine how to use personality traits in an offline environment, such as a real supermarket. The study offers a new perspective to ongoing research about nudges and highlights that further research is needed to discover how personality and nudges interact.

This research was one of the first to implement a nudge in an online supermarket setting. Since online shopping will probably remain popular, further research should be carried out to establish if people respond differently to online nudges than they do to offline nudges. It would also be interesting to research the relationship between personality and other types of nudges, which could produce different results. Considering the low power and difficulties with the designed nudge in this study, significant effects are still possible. Additional research is important as it could contribute to helping people achieve healthier diets and, in turn, healthier lives.

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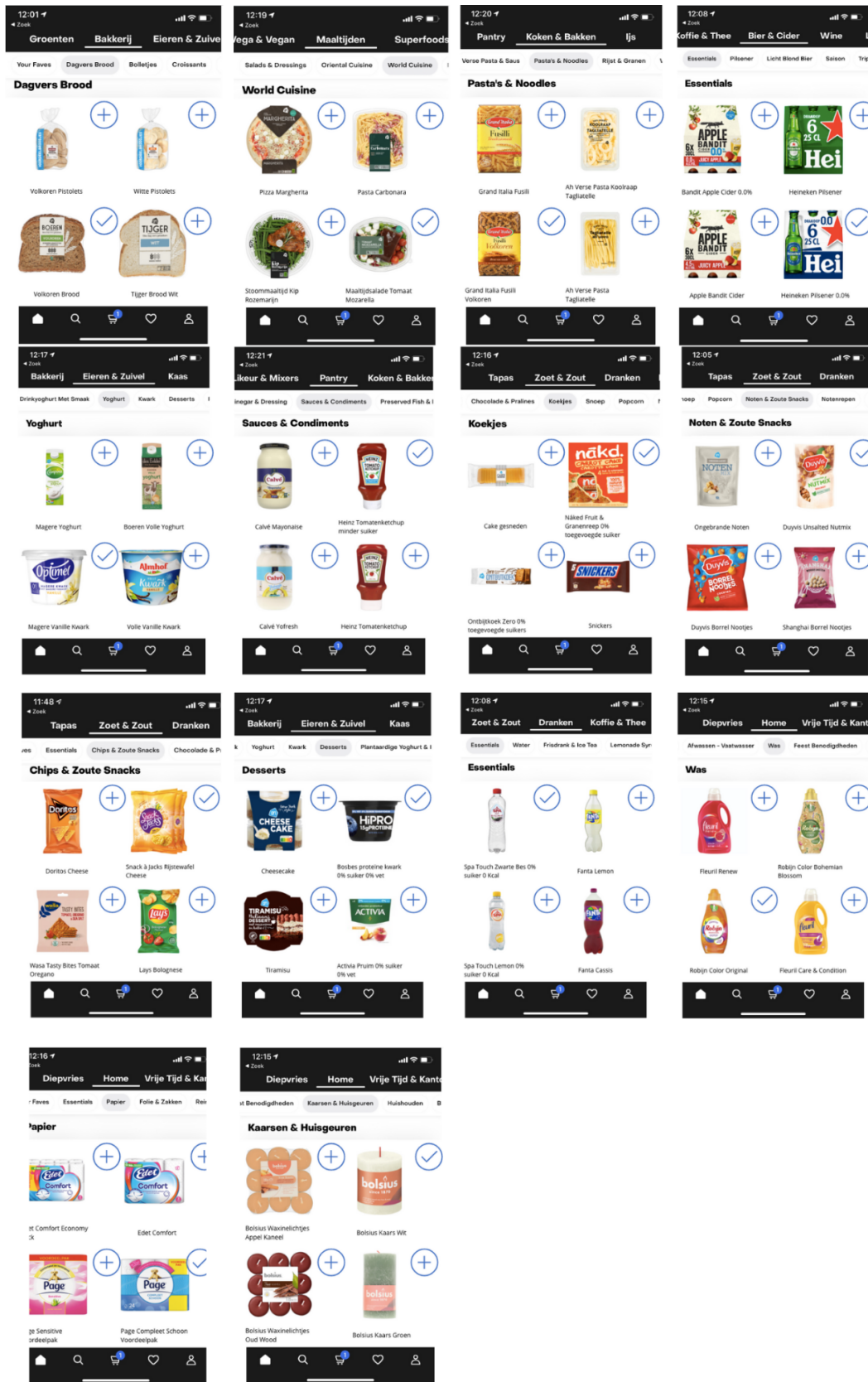
Appendix A

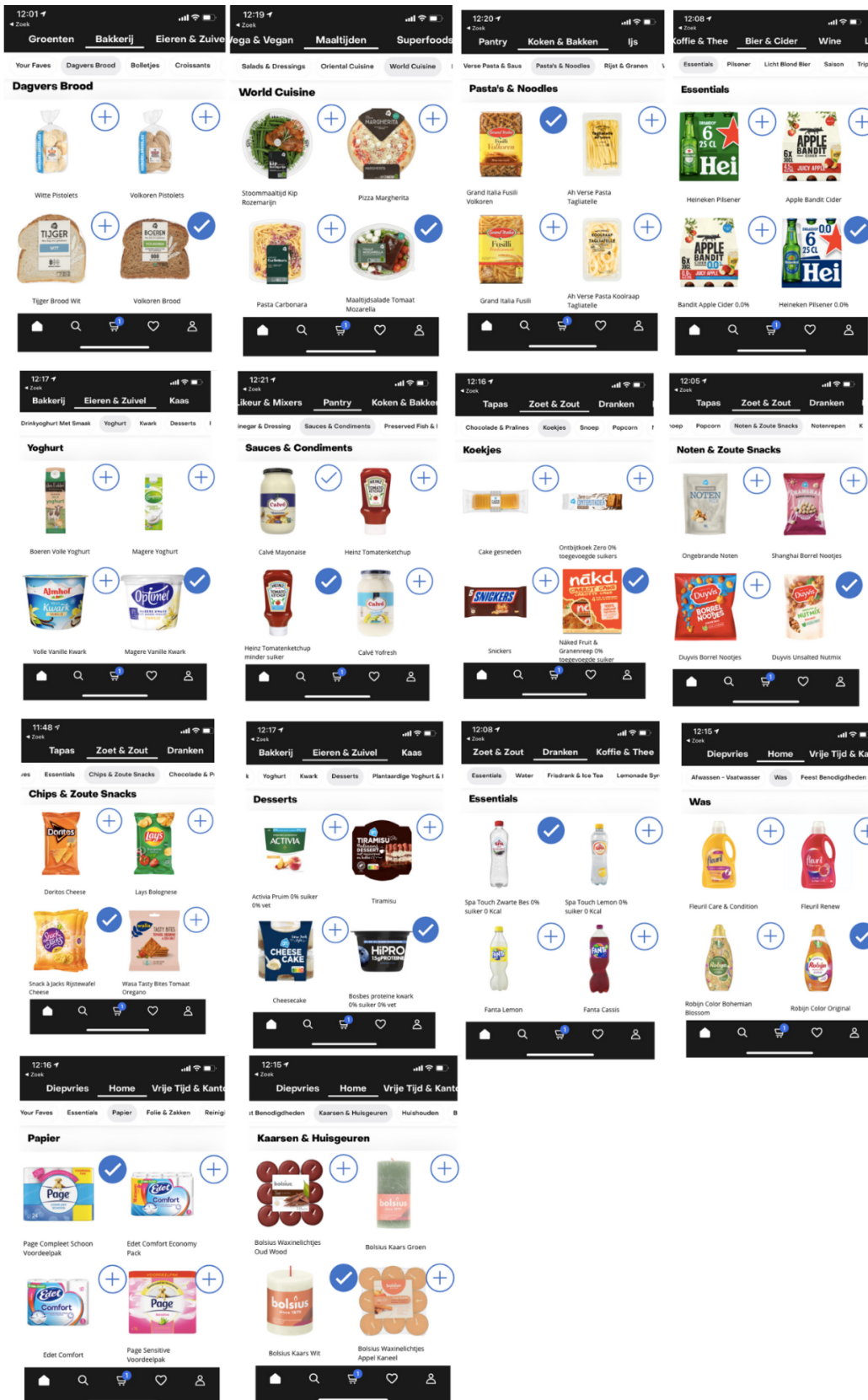## Online Supermarket Environment

Control condition
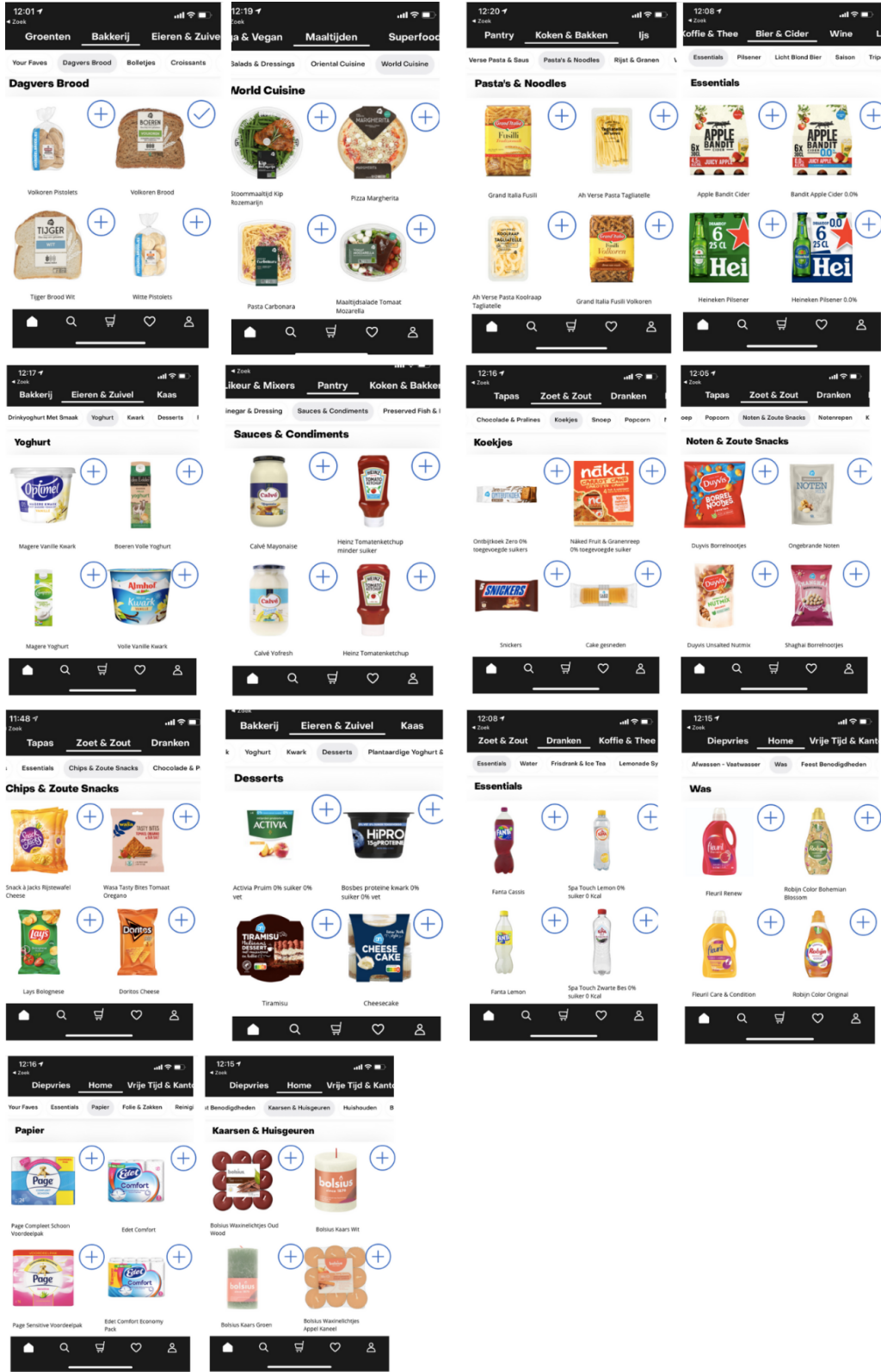
Default condition

Default + Salient Condition

Appendix B

Questionnaire

Note: all questions were asked in Dutch

Socio-demographic factors (sociaal-demografische factoren)

Geef antwoord op de volgende vragen:

1. Welke van de volgende categorieën omschrijft het beste jouw situatie?

 Student/ Werkende/ Geen baan: werkzoekend/ Geen baan: niet werkzoekend/

Gepensioneerd/ Anders, namelijk:

2. Wat is jouw geboortedatum?

3. Wat is jouw geslacht?

 Man/ Vrouw/ Anders, namelijk:

5. Heb je voedselallergieën (bv: noten) en/of een voedselintolerantie (bv: lactose)?

 Nee/ Ja, namelijk:

Visceral State

Geef aan hoeverre je het eens bent met de volgende stellingen:

Antwoordschaal: Helemaal mee oneens - Helemaal mee eens

1. Hoeveel honger heb jij op dit moment?

2. Op dit moment, heb jij meer of minder honger dan normaal?

3. Hoeveel dorst heb jij op dit moment?

4. Op dit moment, heb jij meer of minder dorst dan normaal?

5. Hoe moe voel jij je op dit moment?

6. Op dit moment, voel jij je meer of minder moe dan normaal?

Big Five Persoonlijkheid (Big Five Personality)

Antwoordschaal: Helemaal mee oneens - Helemaal mee eens

1. Ik ben het middelpunt van een feestje.

2. Ik geef weinig om anderen.

3. Ik ben altijd voorbereid.

4. Ik ben snel gestresst

5. Ik heb een rijke woordenschat.

6. Ik praat niet veel.

7. Ik ben geïnteresseerd in mensen.

8. Ik laat mijn spullen vaak slingeren.

9. Ik ben meestal ontspannen.

10. Ik vind het lastig om abstracte ideeën te begrijpen.

11. Ik voel mij op mijn gemak bij mensen.

12. Ik beledig wel eens mensen.

13. Ik besteed aandacht aan details.

14. Ik maak mij snel zorgen over dingen.

15. Ik heb een levendige fantasie.

16. Ik blijf vaak op de achtergrond.

17. Ik voel met anderen mee.

18. Ik maak vaak een puinhoop van dingen.

19. Ik voel mij zelden verdrietig.

20. Ik zit vol met ideeën.

21. Ik begin gesprekken.

22. Ik ben niet geïnteresseerd in andermans problemen.

23. Ik zorg ervoor dat klusjes meteen doe.

24. Ik ben snel afgeleid.

25. Ik heb geweldige ideeën.

26. Ik heb weinig te zeggen.

27. Ik heb een klein hart.

28. Ik vergeet vaak om dingen op de goede plek terug te zetten.

29. Ik raak snel overstuur.

30. Ik heb weinig fantasie.

31. Ik praat met veel verschillende mensen op feestjes.

32. Ik ben niet echt geïnteresseerd in mensen.

33. Ik hou van orde.

34. Ik verander mijn humeur vaak.

35. Ik begrijp dingen snel.

36. Ik vind het niet fijn om de aandacht te trekken

37. Ik maak tijd vrij voor anderen.

38. Ik ontwijk mijn plichten.

39. Ik heb vaak stemmingswisselingen.

40. Ik gebruik moeilijke woorden.

Gezonde eetgewoontes (Healthy Eating Habits)

Antwoordschaal: Helemaal mee oneens - Helemaal mee eens

1. Mijn dieet is gezonder dan andere diëten.

2. Ik weet meer over gezond eten dan anderen.

3. Ik hou van gezond eten.

4. Ik eet alleen maar gezond eten.

5. Ik weet veel over gezond eten.

6. Ik maak eten op de meest gezonde manier klaar.

7. Ik vind het belangrijk om gezond te eten.

8. Ik leg veel restricties op het eten dat ik mag eten.

9. Ik volg een strikt dieet.

10. Ik besteed meer dan drie uur per dag aan denken aan gezond eten.

11. Ik vind maar weinig eten gezond genoeg om te eten.

12. Ik volg een dieet met veel regels.

13. Ik eet alleen wat mijn dieet toelaat.

14. Ik denk van na over gezond eten.

15. De regels van mijn dieet zijn toegenomen.

16. Het grootste deel van mijn vrije tijd draait om gezond eten.

17. In het afgelopen jaar hebben vrienden en familie mij verteld dat ze zich zorgen maken over mijn eetgewoontes.

18. Ik word afgeleid door gedachten over gezond eten.

19. Ik ga minder uit sinds ik gezonder ben gaan eten.

20. Ik volg het perfecte dieet.

Appendix C

Information and Informed Consent

Om deel te nemen aan de Online Supermarkt Studie, willen we je eerst informeren over ons onderzoek. De Online Supermarkt Studie is een onderzoek van de Universiteit Utrecht. In ons onderzoek gaan wij het koopgedrag met behulp van boodschappen bezorg-apps onderzoeken. Wij onderzoeken hiervoor Nederlandse mannen en vrouwen van boven de 18 jaar oud. Tijdens dit onderzoek laten we jou verschillende producten zien die te vinden zijn in een (online) supermarkt. We willen graag dat je steeds een keuze maakt tussen een van de vier producten die je te zien krijgt. Beeld hierbij in dat je thuiskomt na een werkdag en nog boodschappen moet doen met hulp van een boodschappen-bezorg-app. We vragen jou om 15 keer een keuze te maken. Na de keuzes volgt een vragenlijst. Deze zal rond de 15 minuten duren. Alle onderzoeksgegevens die we verzamelen worden gecodeerd opgeslagen. Dat betekent dat jouw persoonsgegevens zoals je naam, e-mailadres en geboortedatum gescheiden van de onderzoeksgegevens worden opgeslagen en alleen bij Prolific bekend zijn. De onderzoeksgegevens die gebruikt worden voor data-analyse binnen het onderzoek bevatten geen herleidbare gegevens.

Welke gegevens worden gebruikt voor het onderzoek?

De volgende categorieën persoonsgegevens zullen van jou worden verzameld en gebruikt gedurende het onderzoek: geslacht, leeftijd, lengte, gewicht en opleiding. Voor vragen hierover kan je terecht bij de Functionaris Gegevensbescherming van de Universiteit Utrecht via: privacy@uu.nl.

Worden mijn gegevens gedeeld met anderen?

We zullen jouw gegevens op een veilige en vertrouwelijke manier behandelen. Jouw gegevens zullen alleen worden gedeeld met personen die direct met het onderzoek te maken

hebben. Aan het einde van het onderzoek zullen we een document publiceren over ons onderzoek, maar daarin zijn jouw gegevens volledig geanonimiseerd opgenomen, tenzij jij expliciet aan ons hebt aangegeven identificeerbaar terug te willen komen in de publicatie. Voor de (online) tools die we gebruiken zijn we met desbetreffende partijen strenge privacy-afspraken aangegaan, zodat jouw gegevens zowel door ons als door hen veilig en vertrouwelijk worden behandeld.

Hoe lang worden mijn gegevens bewaard?

Op grond van de Nederlandse Gedragscode Wetenschappelijke Integriteit van het VSNU bewaren wij alle onderzoeksgegevens maximaal 10 jaar op een veilige opslaglocatie op Universiteit Utrecht, die beveiligd is door middel van encryptie en login.

Hoe kan ik welke privacy rechten uitoefenen?

Je hebt het recht een kopie op te vragen van alle persoonsgegevens die we van jou hebben gebruikt voor dit onderzoek en het recht om te verzoeken deze te corrigeren bij onjuistheid. Verder heb je het recht om bezwaar te maken tegen de verwerking van jouw persoonsgegevens en heb je het recht op gegevensoverdraagbaarheid. We zullen je verzoek altijd serieus nemen, maar niet al deze privacy rechten gelden voor iedere situatie en voor alle gegevens. We zullen natuurlijk duidelijk communiceren waarom we een verzoek wel of niet kunnen uitvoeren voor jou. Wanneer je privacy vragen -of klachten hebt over dit onderzoek, neem dan ook vooral contact met ons op. Mochten we er samen niet uitkomen, dan heb je altijd de mogelijkheid een klacht in te dienen bij de toezichthoudende autoriteit.

Toestemming

We hopen je met bovenstaande informatie voldoende geïnformeerd te hebben over ons onderzoek. Mocht je meer informatie willen hebben over dit onderzoek, stuur dan een bericht naar verantwoordelijk hoofdonderzoeker: j.s.benjamins@uu.nl Door op akkoord te klikken,

geef je aan dat je vrijwillig toestemming aan ons geeft om jouw gegevens te gebruiken voor ons onderzoek en dat je begrijpt dat je ieder moment kan stoppen met het onderzoek. Indien je vragen hebt met betrekking tot het onderzoek kun je contact opnemen met de onderzoekers via l.veldhof@students.uu.nl of c.a.w.vanwoerkom@students.uu.nl. Bij klachten over het onderzoek kun je terecht bij een onafhankelijke contactpersoon via klachtenfunctionaris-fetcsocwet@uu.nl. Als je deelneemt aan het onderzoek is het dus van belang dat je kennisneemt van de volgende punten en daarmee instemt:

- Ik ben goed geïnformeerd over het doel en de werkwijze van het onderzoek.

- Mijn deelname aan het onderzoek is volledig vrijwillig. Ik kan op ieder moment stoppen met het onderzoek zonder dat dit nadelige gevolgen voor mij heeft.

- Ik heb het recht om mijn persoonsgegevens te allen tijde te laten verwijderen zonder hier een reden voor te hoeven geven.

- De onderzoeksgegevens worden anoniem geanalyseerd. Bij publicatie van de data wordt er zorgvuldig op gelet dat de gegevens niet tot individuele personen te herleiden zijn.

- Ik zal de vragenlijsten nauwkeurig en serieus invullen.

Als ik niet akkoord ga met bovenstaande informatie, worden mijn persoonlijke contactgegevens verwijderd uiterlijk een week na ontvangst van deze mail

Met vriendelijke groet,

Lise-lotte Veldhof, Charlotte van Woerkom Hoofdonderzoeker J.S. Benjamins

Ga je akkoord met bovenstaande?

- Ja
- Nee

Appendix D

Debriefing

Dit was het einde van de vragenlijst en het onderzoek. Je hebt zojuist deelgenomen aan een onderzoek naar online winkelgedrag met behulp van een boodschappen-bezorg-app. Er zal specifiek gekeken worden naar wat het effect is van de manier waarop de producten gepresenteerd zijn op het kiezen van gezondere producten. Het is je misschien namelijk opgevallen dat sommige keuzes opvallender waren dan anderen. Sommige gezondere keuzes waren beter zichtbaar gemaakt. Ook waren sommige gezondere keuzes al voorgeselecteerd. Ook hier zal gekeken worden naar het effect hiervan op het kiezen van gezondere producten. Het kan ook zijn dat je in de groep behoorde waar alle producten op dezelfde manier waren gepresenteerd. Hier is ook gekeken naar het effect ervan op het maken van gezonde keuzes. Na afloop heb je een vragenlijst ingevuld. Deze vragenlijst zal gebruikt worden om te onderzoeken of individuele verschillen van invloed zijn op het kiezen van gezondere producten.