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Can social norms motivate Thermomix® users to eat sustainably?

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ABSTRACT: Modern food systems, but especially animal farming, are found to be the leading driver of global climate change, accounting for 30% of the world's greenhouse gas emissions. Simultaneously, diets high in animal proteins cause serious health issues worldwide, including premature death, and will force health insurance companies to face significantly increasing costs. Therefore, an urgent transformation towards sustainable dietary choices is required by increasing plant-based diets while decreasing animal proteins. This will create environmental, social, and economic value. By applying value orientation and nudging theory, this research proposes (1) a positive impact of social norms on sustainable behaviour, (2) which is increased by self-transcendence values. These hypotheses were analysed using ordered logit models based on survey data obtained from users of a recipe website. Findings suggest that although a self-transcendence value orientation enhances sustainable dietary choices, social norm nudges are ineffective.

KEYWORDS: celebrity recommendation nudge, nudging, online food platform, sustainable behaviour, sustainable food

Introduction

Being responsible for 30% of the world's greenhouse gas (GHG) emissions, contemporary food systems are one of the leading drivers of global climate change (Willett et al., 2019). Particularly under scrutiny is the contribution of animal farming to global GHG emissions and other environmental problems, such as water pollution and nitrogen emissions (Willett et al., 2019). Simultaneously, diets high in animal proteins cause serious health issues worldwide, including premature death, (Boeing et al., 2012; Willett et al., 2019). An increase in diet-related diseases not only leads to individuals' suffering, but also to significantly increasing costs of health care (Lang et al., 2011). Therefore, a transition towards dietary choices where plant-based food intake is increased and animal protein intake decreased is necessary to achieve a more sustainable food system (Tilman & Clark, 2014; Springmann et al., 2016; Poore & Nemecek, 2018; Willett et al., 2019). However, changing eating habits has been proven to be particularly challenging (Simon, 1997; Greger & Stone, 2018; Willett et al., 2019). Eating habits are connected with a person's identity, weakening the power of disincentives such as taxes (Byerly et al., 2018; Willett et al., 2019). Moreover, mechanisms such as bounded rationality and cognitive dissonance weaken the effect of information campaigns promoting eating habits that are healthy both for people and planet, but are not generally common. Thus, innovative, consumer-oriented but ethically sound interventions to encourage sustainable diets in the food and beverage (F&B) domain need further exploration.

In particular, more sustainable food choices can be enabled through behaviourally informed interventions such as "nudges" (Byerly et al., 2018; Willett et al., 2019). Nudges capitalise on bounded rationality by drawing attention to specific information. Moreover, nudges take into account the individual's value orientation and can therefore be aligned with a person's identity (Verplanken & Holland, 2002; De Groot et al., 2013). Nudges make a specific value orientation more salient to an individual in a given situation, and value orientations in turn influence the strength of an individual's goals (i.e. self-, other- or nature-benefiting). Goals, in their turn, influence behavioural choices. Alongside influencing the salience of individual values, nudges can affect the perceived importance and likelihood of different potential behavioural consequences, and thus impact the individual's choice (Verplanken & Holland, 2002; De Groot et al., 2013). Nudging is widely applied in brick-and-mortar settings where people make food choices, such as retailers and restaurants. Yet, very limited research has been done in the online environment, while online shopping has dramatically increased in recent years (Clement, 2019). This includes sites offering recipes, such as Cookidoo® or Rezeptwelt.de operated by Thermomix® that constitute the experimental environment for this research.

The purpose of this research is to foster our understanding of how to nudge people into changing their food consumption habits in the longer term and, thus, support the transition towards sustainable food production. The aim of the research is twofold. It explores the effectiveness of different nudges to incentivise consumers to choose more sustainable and healthy food in an online environment. Secondly, it evaluates the moderating effect of value orientations on food choices in the same online environment. The research question being explored

in this article is: "What is the impact of nudges on the choice for a more sustainable recipe by Thermomix® users who differ in prioritised values?" – where "sustainable" refers both to the planet's and people's health and is operationalised as a recipe without animal proteins. Therefore, this research contributes to innovations for web-based F&B offers, while considering ethics through the investigation of nudging towards a more sustainable and healthier diet.

The rest of this article is structured as follows: First, a literature review on sustainability in diet, nudging theory, and the influence of value orientations will be conducted. Then, the methodology used to derive an answer to this article's research question will be outlined, followed by a presentation of the analysed results. Lastly, the results will be discussed, and conclusions will be drawn, including the research's recommendations, limitations, and suggestions for future research.

Literature review

This section reviews the literature on a sustainable diet. The effect of different nudges on sustainable behavioural choices (and in particular towards a sustainable diet) and on value orientations as moderators of the impact of nudges on sustainable behaviour is outlined.

Sustainable diet definition

Sustainability requires value creation in an economic, social, and environmental dimension (Elkington, 2002; Cavagnaro & Curiel, 2012). Consequently, a sustainable diet should (1) benefit human health, (2) (at least) decrease environmental impact, while (3) providing a financial incentive. Although scholars disagree about the definition of a sustainable diet, there is a building consensus that it should reduce (or even eliminate) animal-based ingredients and increase plant-based ones (e.g. Reinders et al., 2017; Poore & Nemecek, 2018; Willett et al., 2019). In the following, "sustainable diet" is used to refer to a diet low in animal-based ingredients and high in plant-based ingredients.

Firstly, evidence shows that a sustainable diet enhances human health (e.g. by reducing obesity) while preventing or even reversing diet-related chronic diseases, such as diabetes, various kinds of cancer, and heart disease (Lang et al., 2011; Boeing et al., 2012; Greger & Stone, 2018).

Secondly, the environmental impact of meat and dairy is high. For example, meat and dairy consumption accounts for 24% of the European environmental impact (Tukker et al., 2009). On a global scale and considering 2010 as a reference year, replacing animal-based with plant-based proteins would reduce greenhouse gas emissions by more than ten billion metric tonnes per year, decrease used land by 55%, and scarcity-weighted freshwater withdrawals by 87% (Poore & Nemecek, 2018). Therefore, by reducing negative impacts on the planet, the transformation towards a sustainable diet creates environmental value (ibid.).

Last but not least, a sustainable diet also provides financial incentives to various stakeholders. More specifically, a diet high in meat consumption can be on average US$750 per year per person more expensive than a comparable plant-based diet (Flynn & Schiff, 2015). Besides, health insurances worldwide face significantly increasing costs due to obesity, one of the consequences of a growing animal-based food intake. These costs could be mitigated by a plant-based diet (Lang et al., 2011). In sum, a sustainable diet creates social (i.e. better health), environmental, as well as economic value, especially in the longer term.

Nudging sustainable diet choices

Vegetarians or flexitarians (i.e. people who seldom consume meat) represent around 5% to 20% of the global population, with 5% of Europeans holding the smallest share (Statista Research Department, 2018). These figures highlight the need to provoke a change in consumer dietary choices. Literature suggests that bounded rationality negatively influences sustainable dietary choices (Simon, 1997). Bounded rationality proposes that individuals do not possess the information (e.g. the environmental impact caused by a certain food product) or mental capacity needed to make rational decisions, nor the willingness to put much effort into weighing the total costs and benefits of each product they buy. Therefore, people often make decisions not out of calculated self-interest, but for other reasons, such as social norms (ibid.).

Moreover, eating habits are connected with a person's identity, weakening the power of disincentives such as taxes. Thus, innovative, consumer-oriented and ethically sound interventions to encourage sustainable diets in the food and beverage (F&B) domain need further exploration. In particular, nudges capitalise on bounded rationality by drawing attention to specific information (Byerly et al., 2018; Willett et al., 2019). As people not only respond to information, incentives, or persuasion, but also to how these are communicated and framed, nudging theory can be applied to motivate sustainable consumption behaviour (Kahneman et al., 1991; Kamenica, 2012; Lehner et al., 2016). A nudge is any aspect of the decision environment "that alters people's behaviour in a predictable way without forbidding any options or significantly changing their economic incentives" (Thaler & Sunstein, 2008, p. 8). Nudges avoid invoking an economistic decision frame, are human-centred (i.e. move people towards "better" decisions), and voluntary (i.e. transparent) (Tams, 2018).

Nudges can take different forms, such as defaults. Defaults present an option as the status quo so that individuals have to opt out to behave unsustainably (Tams, 2018). Default nudges are not applied in this research, because they would imply the exclusion from the recipe platform of less sustainable recipes, i.e. those including meat. In this study's context, excluding meat recipes equals forbidding a specific option and contradicts the definition of a nudge. Moreover, it would harm the user's freedom of choice, which has ethical implications (Thaler & Sunstein, 2008; Blumenthal-Barby & Burroughs, 2012). This study therefore opts for nudges that capitalise on saliency by making an option more visible than others (e.g. placing sustainable food at eye level), or by exploiting people's tendency to look at the behaviour of others by using social norms (Cialdini & Goldstein, 2004; Tams, 2018). Social norms are described as "rules and standards that are understood by members of a group and that guide and/or constrain social behaviour without the force of laws" (Cialdini & Trost, 1998, p. 152). Because humans are social beings, social norms influence behaviour by making a specific (e.g. sustainable) choice salient and visible to the individual, and, thus, increasing the moral benefit from engaging in sustainable behaviour (Cialdini & Goldstein, 2004). In conclusion, this research will focus primarily on social proof heuristics and indirectly on saliency by presenting a sustainable recipe for

which (1) the percentage of other users who chose this recipe or (2) a recommendation by a celebrity to choose this recipe is displayed.

Nudge 1: Descriptive normative information

The first nudge applied in this research provides information about descriptive norms to the user. Descriptive norms are a type of social norm that show how most users behave in the same situation (i.e. how many users cooked the same recipe). When individuals are confronted with different options, descriptive norms offer a decisional shortcut by informing the individual about the likely effective behaviour, i.e. the option chosen by the majority (Cialdini et al., 1991). Social norms, therefore, align with bounded rationality (Kallgren & Wood, 1986; Cialdini, 1988; Millar & Tesser, 1989). The effectiveness of a social norm nudge is decreased when descriptive normative information is not provided (Goldstein et al., 2008). Therefore, the nudge designed for this study shows the number of users who already chose to cook the sustainable recipe. Moreover, the individual's likelihood to be influenced by descriptive norms is higher when norms are presented in a setting comparable to the one that the individual is currently occupying and when they refer to individuals sharing that same setting (Goldstein et al., 2008). Hence, displaying the nudge in the same setting where participants choose a recipe (i.e. Thermomix® online platform) will further increase the likelihood of the nudge's impact on a sustainable choice. Thus, for the above reasons, the first hypothesis is:

- Hypothesis 1: Sustainable recipes for which a nudge in the form of descriptive normative information is introduced are more likely to be cooked than recipes for which no such nudge is introduced.

Nudge 2: Celebrity recommendation

The second nudge used in this research also capitalises on people's tendency to look at others' behaviour, and thus to act according to social norms (Cialdini, 1988). However, rather than displaying descriptive normative information and following a strategy that has been proven successful in traditional and digital marketing, this nudge shows a recommendation by a role-model or celebrity (Wansink et al., 2012; Wheeler, 2013; Wansink & Love, 2014; Qureshi & Malik, 2017). By having social ambassadors embody communicated norms, this type of nudge adopts a rather personal approach and uses emotions (Wheeler, 2013). Therefore, and particularly for promoting sustainable diets, the credibility of the "ambassador" is essential to ensure the success of the nudge (Sternthal et al., 1978). Interestingly, this type of nudge has been tested in restaurants in the form of a chef's recommendation or menu of the day (Van Trijp & Van Amstel, 2012; Wansink & Love, 2014). Although van Trijp and van Amstel (2012) found support for behavioural adoption of a recommended vegetarian dish, they called for further research in real-life settings.

People's tendency to imitate other people's behaviour and especially that of a well-known, credible person leads to this research's second hypothesis:

- Hypothesis 2: Sustainable recipes for which a nudge in the form of a celebrity recommendation is introduced are more likely to be cooked than recipes for which no such nudge is introduced.

Influence of nudging on users strong in self-transcendence values

Although nudges do not aim at changing the individual's value system, but instead focus on enabling specific behaviour by advantageously framing the problem, they are capable of activating certain values or motives of the targeted individual (Thaler & Sunstein, 2008; Lehner et al., 2016). Based on goal-framing theory, individuals may be motivated to participate in pro-environmental behaviour for three main reasons or goals: hedonic, gain, and normative. Hedonic goals improve people's feelings in a particular situation; gain goals focus on personal resources, such as saving money and time; and normative goals focus on the appropriateness of actions, such as helping others and protecting the environment. Normative goals enhance, while hedonic and gain goals weaken sustainable behaviour (Lindenberg & Steg, 2007; Steg et al., 2014).

Values, defined as "desirable goals, varying in importance, that serve as guiding principles in people's lives" (Schwartz, 1992, p. 21), impact the extent to which hedonic, gain, and normative goals are accessible or salient in a particular situation. Values, therefore, determine the probability that a particular goal will be the individual's focus in a given situation (Steg et al., 2014). In the context of sustainable behaviour, two main categories of values have been distinguished: self-enhancement (i.e. concerning one's interests) and self-transcendence (i.e. concerning collective interests) values (Dietz et al., 2005; Steg & De Groot, 2012). Self-enhancement values cluster in two different value orientations: hedonic and egoistic. Hedonic values lead to hedonic goals, while egoistic values lead to gain goals. Self-transcendence values also cluster into two different value orientations: altruistic and biospheric. Both the altruistic and the biospheric value orientations lead to normative goals and, thus, positively influence pro-sustainable choices. Specifically, altruistic values reflect a concern for others' welfare and are conductive of pro-social behaviour. Biospheric values reflect a concern for the environment for its own sake and lead to pro-environmental behaviour (Stern et al., 1993; De Groot & Steg, 2008; Steg et al., 2011).

However, even people strong in biospheric values do not always behave pro-environmentally. Nudges might activate self-transcendence values or make these more salient (Verplanken & Holland, 2002; Lindenberg & Steg, 2013; Van den Broek et al., 2017). However, Steg et al. (2014) and Delmas and Lessem (2014) argue that nudges capitalising on extrinsic motivation and focusing on enhancing hedonic or gain goals can disincentivise individuals strong in self-transcendence values to engage in sustainable behaviour. These individuals are intrinsically motivated by altruism or nature's intrinsic worth, so the extrinsic incentive is incongruent with their values (Van den Broek et al., 2017). Therefore, nudges which avoid invoking extrinsic, hedonic, or gain motives are likely to be more effective for respondents with high self-transcendence values (Tams, 2018).

Based on the above (Verplanken & Holland, 2002; De Groot et al., 2013), the following hypotheses are derived:

- Hypothesis 3a: Sustainable recipes for which a nudge in the form of descriptive normative information is introduced are more likely to be cooked by users strong in self-transcendence values than by users low in self-transcendence values.

- Hypothesis 3b: Sustainable recipes for which a nudge in the form of a celebrity recommendation is introduced are more likely to be cooked by users strong in self-transcendence values than by users low in self-transcendence values.

Methods

This section describes the data collection and analysis procedures and outlines how the study complies with research ethics.

Data collection

To test the hypotheses and answer the research question, a quantitative research approach combined with a single-case study was chosen. The case chosen for this research is the international company, Vorwerk International Strecker and Co., and in particular its division Thermomix®, which is a multi-functional cooking machine. Thermomix® has approximately ten million users in 16 countries, either via the subscription-based recipe platform Cookidoo® or the free recipe community platform. The device promotes fresh cooking instead of ready meals and aims to support a healthy consumption of vegetables by its users. However, more than half of the main dishes cooked by Cookidoo® subscribers in Germany are meat-based recipes. This makes this geographical area an interesting one to research. Recognising the possibility of improving its sustainable value creation, Cookidoo® expressed its willingness to participate in this research and granted access to the platform.

To collect data on how Thermomix® users assess or expect themselves to be influenced by different nudges as well as their value orientations, a questionnaire was designed. The questionnaire consisted of (1) the sustainable recipe with *Nudge 1* ("Cooked by more than 15 000 Thermomix® users in Germany"), or *Nudge 2* ("Recommended by Gourmet Chef Siegfried Kröpfl"), or neither nudge; (2) an answering scale of 16 value portraits to calculate the four value orientations (Schmidt et al., 2007; Bouman et al., 2018); (3) questions on demographics and other characteristics to control for confounding effects; and (4) space to leave comments.

Data analysis

Data from a total of 1 960 respondents, of which 1 436 were complete, was obtained. Responses from users that did not actively choose the recipes were excluded since they do not represent this research's target group. Data were analysed using descriptive statistics and ordered logit models, testing the relationships for all hypotheses (Figure 1). Qualitative findings (comments section) were thematically analysed.

Variables

See Table 1.

Robustness checks

The value scales' internal consistency, group differences in variables, as well as assumptions for the chosen analysis technique were tested to enhance the results' reliability (Gillham, 2008). Firstly, the internal consistency of the value scales' items is verified by using Cronbach's alpha for each value orientation (Table 2).

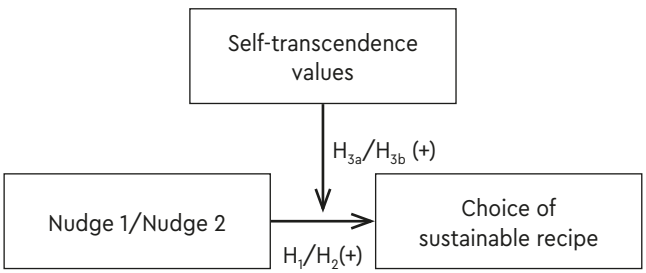

FIGURE 1: Conceptual framework of relationships

TABLE 2: Cronbach's alpha per value orientation

Value orientation	Cronbach's alpha
Biospheric values	α H 0.86
Altruistic values	α H 0.75
Hedonic values	α H 0.77
Egoistic values	α H 0.82

TABLE 1: Variables

Dependent variable	
Recipe choice	Ranges from 1 to 4, with 1 representing that the user will definitely not choose the recipe, and 4 representing that the user will definitely choose the recipe.
Independent variables	
Nudge 1	Dummy variable equalling 1 for the recipe including the descriptive normative information, and 0 for the recipe without either nudge, to test Hypotheses 1 and 3a.
Nudge 2	Dummy variable equalling 1 for the recipe including the celebrity recommendation, and 0 for the recipe without either nudge, to test Hypotheses 2 and 3b.
Self-transcendence	The mean of the respondent´s chosen scores of the altruistic and biospheric values (Bouman et al., 2018).
Self-transcendence Nudge 1	Interaction of the self-transcendence value orientation and Nudge 1 to test Hypothesis 3a.
Self-transcendence Nudge 2	Interaction of the self-transcendence value orientation and Nudge 2 to test Hypothesis 3b.
Control variables	
Gender	Dummy variable equalling 1 for female, and 0 otherwise.
Age	(1) ≤30 years; (2) 31 to 40 years; (3) 41 to 50 years; (4) 51 to 60 years; (5) Older than 60 years, (.) No answer.
Usage frequency	(0) Never; (1) Less than once per week; (2) 1–2 times per week; (3) 3–5 times per week; (4) More than 5 times per week; (5) Daily; (6) Several times per day; (.) I do not know. Highly frequent users might be more likely to engage in adoption than non-frequent users (Delmas & Lessem, 2014).
Vegan diet	Dummy variable equalling 1 for a vegan or vegetarian respondent, who will be more likely to choose the recipe even without either of the nudges (Delmas & Lessem, 2014), and 0 otherwise. Respondents indicating that they mainly eat vegetarian or are dairy intolerant were included as vegetarian or vegan.

To determine differences in value orientations between the three conditions, one-way ANOVAs were used. No statistically significant differences were found for both biospheric ($F(2, 1445) = 1.29$, $p = 0.28$) and altruistic ($F(2, 1445) = 2.64$, $p = 0.07$) value orientations. However, the ANOVAs showed statistically significant differences between the three conditions for the hedonic ($F(2, 1445) = 14.87$, $p < 0.001$) and egoistic ($F(2, 1445) = 21.06$, $p < 0.001$) value orientation. The Tukey post-hoc test revealed that the Nudge 1 condition has a weaker hedonic (−0.29 ± 0.06, $p < 0.001$) and egoistic (−0.36 ± 0.06, $p < 0.001$) value orientation than the No Nudge condition, whereas the Nudge 2 condition has a stronger hedonic (0.26 ± 0.06, $p < 0.001$) and egoistic (−0.33 ± 0.06, $p < 0.001$) value orientation than the Nudge 1 condition. In addition, no statistically significant differences were found between the Nudge 2 and No Nudge conditions for hedonic or egoistic values. Therefore, the population slightly differs in hedonic and egoistic values.

Moreover, a biospheric value orientation could be assumed to have a greater influence on pro-environmental behaviour, while a hedonic value orientation could influence the recipe choice more strongly because of the influence of taste. Therefore, the group differences between the recipe choice and the interaction of each value orientation with the Nudge 1 and Nudge 2 dummy variable have been determined. The conducted two-way ANOVAs revealed that none of the interaction terms showed statistically significant differences. However, significant differences were determined between the mean biospheric value orientation for each recipe choice considering the Nudge 1 and No Nudge conditions ($F(1, 874) = 15.92$, $p < 0.001$), as well as the Nudge 2 and No Nudge conditions ($F(1, 976) = 11.29$, $p < 0.001$). Because a statistically significant difference between the mean altruistic value orientation for each recipe choice ($F(1, 874) = 6.25$, $p = 0.01$) has been found considering the Nudge 1 and No Nudge conditions, although not for the Nudge 2 and No Nudge conditions, support is provided for using both biospheric and altruistic values as the independent variable to consistently test Hypotheses 3a and 3b.

Besides, group differences in the control variables between the Nudge 1, Nudge 2, and No Nudge conditions have been tested using the nonparametric Kruskal-Wallis test (Kruskal & Wallis, 1952; Leon, 1998). The test revealed no statistically significant differences in mean ranks between the conditions for gender (chi-square with ties = 5.01 with 2 df, $p = 0.08$) or vegan diet (chi-square with ties = 3.57 with 2 df, $p = 0.17$). On the other hand, significant differences in mean ranks between the three conditions have been found for age (chi-square with ties = 38.74 with 2 df, $p < 0.001$) and usage frequency (chi-square with ties = 8.63 with 2 df, $p = 0.01$). A follow-up Dunn's test (Dunn, 1964) revealed that the age is lower in mean rank for the Nudge 1 condition compared to the No Nudge condition, and higher for the Nudge 2 condition compared to the other two conditions. Lastly, the usage frequency is lower in mean rank for the Nudge 1 and Nudge 2 conditions compared to the No Nudge condition, whereas no statistically significant difference has been found between the Nudge 1 and Nudge 2 conditions. Consequently, the population slightly differs in age and usage frequency, but not in gender or type of diet. Nonetheless, it was controlled for all four characteristics in the applied models (see below) to increase the results' reliability.

Furthermore, in order to test the robustness of the chosen analysis models, the parallel lines assumption for each variable of the ordered logit models has been tested by a Brant test (Williams, 2006). Some variables violated the parallel lines assumption, which confirmed that this assumption is not easily met (Williams, 2016). Therefore, other robustness checks were conducted. On the one hand, both the likelihood ratio test – between the ordered and the generalised logit models – and the Akaike Information Criterion suggested that the generalised logit models fit the data better (see Appendix B, Table B1). On the other hand, the Bayesian Information Criterion provided decisive support for the ordered logit model (see Appendix B, Table B1). Therefore, the coefficients were compared between both types of models for each hypothesis model. Because no significant differences could be observed in the size and direction of the coefficients in their effect, nor their statistical significance, the more parsimonious ordered logit model was chosen to test the hypotheses. Lastly, it was controlled for heteroskedasticity by comparing differences between normal and robust standard errors.

Models applied

Based on the robustness checks conducted, the following ordered logit models were applied to test the hypotheses.

Model 1

$$P(RecipeChoice_i > j) = \frac{\exp(\alpha_j + Nudge1_i\beta_{1,j} + Gender_i\beta_{2,j} + Age_i\beta_{3,j} + UsageFrequency_i\beta_{4,j} + VeganDiet_i\beta_{5,j})}{1 + [\exp(\alpha_j + Nudge1_i\beta_{1,j} + Gender_i\beta_{2,j} + Age_i\beta_{3,j} + UsageFrequency_i\beta_{4,j} + VeganDiet_i\beta_{5,j}]}$$

$$j = 1, 2, 3, 4$$

Model 2

$$P(RecipeChoice_i > j) = \frac{\exp(\alpha_j + Nudge2_i\beta_{1,j} + Gender_i\beta_{2,j} + Age_i\beta_{3,j} + UsageFrequency_i\beta_{4,j} + VeganDiet_i\beta_{5,j})}{1 + [\exp(\alpha_j + Nudge2_i\beta_{1,j} + Gender_i\beta_{2,j} + Age_i\beta_{3,j} + UsageFrequency_i\beta_{4,j} + VeganDiet_i\beta_{5,j}]}$$

$$j = 1, 2, 3, 4$$

Model 3a

$$P(RecipeChoice_i > j) = \frac{\exp(\alpha_j + SelfTranscendence_i\beta_{1,j} + Nudge1_i\beta_{2,j} + SelfTranscendence_i * Nudge1_i\beta_{3,j} + Gender_i\beta_{4,j} + Age_i\beta_{5,j} + UsageFrequency_i\beta_{6,j} + VeganDiet_i\beta_{7,j})}{1 + [\exp(\alpha_j + SelfTranscendence_i\beta_{1,j} + Nudge1_i\beta_{2,j} + SelfTranscendence_i * Nudge1_i\beta_{3,j} + Gender_i\beta_{4,j} + Age_i\beta_{5,j} + UsageFrequency_i\beta_{6,j} + VeganDiet_i\beta_{7,j}]}$$

$$j = 1, 2, 3, 4$$

Model 3b

$$P(RecipeChoice_i > j) = \frac{\exp(\alpha_j + SelfTranscendence_i\beta_{1,j} + Nudge2_i\beta_{2,j} + SelfTranscendence_i * Nudge2_i\beta_{3,j} + Gender_i\beta_{4,j} + Age_i\beta_{5,j} + UsageFrequency_i\beta_{6,j} + VeganDiet_i\beta_{7,j})}{1 + [\exp(\alpha_j + Nudge2_i\beta_{1,j} + Gender_i\beta_{2,j} + Age_i\beta_{3,j} + UsageFrequency_i\beta_{4,j} + VeganDiet_i\beta_{5,j}]\ ,j}$$

$$j = 1, 2, 3, 4$$

Code of conduct

This research complies with the Netherlands Code of Conduct for Research Integrity (KNAW et al., 2018). In addition, an ethical review was conducted where necessary (KNAW et al., 2018). Consent to use Siegfried Kröpfl's name as the celebrity recommendation nudge was provided by Thermomix® (see Appendix C). In addition, respondents were given the choice to participate and drop out of the questionnaire process at any time, and the data was obtained and analysed anonymously.

Results

In the following, the results of this research's data analysis are presented. First, the variables' descriptive statistics are outlined, followed by the results of the ordered logit models which test the proposed hypotheses.

Descriptive statistics

Overall, 1 960 respondents answered how likely they would be to choose to cook the sustainable recipe presented to them. However, only 73% of these completed the survey (see Appendix C, Table C1 for all summary statistics). In total, 407 completed observations were obtained for the No Nudge condition, 462 for the Nudge 1 condition, and 567 for the Nudge 2 condition. Regarding the distribution of the likelihood of cooking the recipe, the majority chose to probably not cook the recipe, followed by the choice to probably cook the recipe, in all three variations – showing a relatively normal distribution (Figure 2). In addition, both nudges are slightly negatively correlated with the choice for the recipe (see Appendix D, Table D1 and Appendix E, Table E1). Consequently, nudged respondents are less likely to cook the recipe. On the other hand, as indicated by the respondents' comments, only three responded that they were missing meat or fish in the recipe, whereas the majority did not like one or more of the ingredients or perceived the recipe as too complicated (Appendix F; Table F1). Lastly, as expected, users with a higher self-transcendence value orientation, female users (in the case of Nudge 2), older users, higher-frequency users, and vegans or vegetarians are more likely to cook the recipe (see Appendix D, Table D1 and Appendix E, Table E1).

Regression results

In this section, the regression models testing Hypotheses 1, 2, 3a, and 3b as defined in the methodology section are presented. As seen in Figure 3, the predicted probabilities of not cooking the recipe are higher, and cooking the recipe lower, for the recipe including the descriptive normative information. Although the dummy's coefficient for Nudge 1 is negative, it is not statistically significant (Table 3, Model 1). Therefore, the hypothesis that sustainable recipes for which a nudge in the form of descriptive normative information is introduced are more likely to be cooked than sustainable recipes for which no such nudge is introduced is not supported by the analysed data. Besides, both age (Diamantopoulos et al., 2003) and vegan or vegetarian users (Delmas & Lessem, 2014) positively affect the likelihood of choosing the sustainable recipe, whereas female users (Diamantopoulos et al., 2003) and usage frequency do not support the expected effects (Delmas & Lessem, 2014).

A similar effect to the first hypothesis test was found for the celebrity recommendation nudge. On the one hand, the predicted probabilities of not cooking the recipe are higher and cooking the recipe lower for the recipe including the celebrity recommendation (Figure 4). On the other hand, the coefficient of the dummy variable for Nudge 2 shows a stronger effect compared to the one for Nudge 1, while being statistically significant (see Table 3, Model 2). Therefore, rejecting the second hypothesis, sustainable recipes for which a nudge in the form of a celebrity recommendation is introduced are less likely to be cooked than sustainable recipes for which no such nudge is introduced. In addition, as for Model 1, age (Diamantopoulos et al., 2003) and vegan or vegetarian users (Delmas & Lessem, 2014) positively affect the likelihood of choosing the sustainable recipe, whereas female users (Diamantopoulos et al., 2003) and usage frequency (Delmas & Lessem, 2014) have positive signs as expected, but are statistically insignificant.

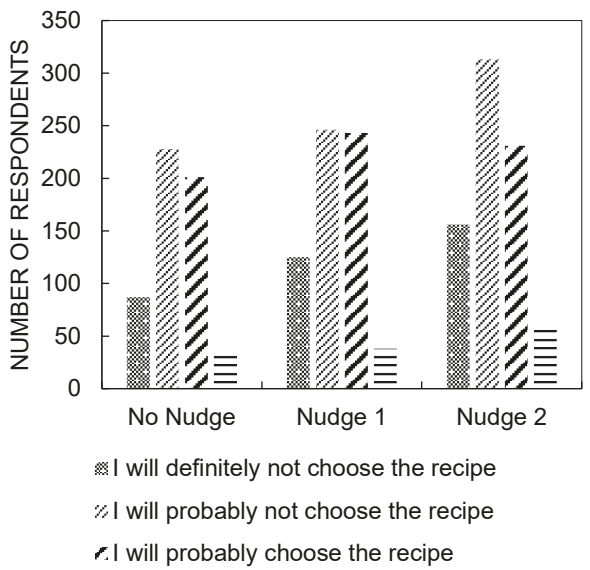

FIGURE 2: Frequencies of recipe choice by nudge type

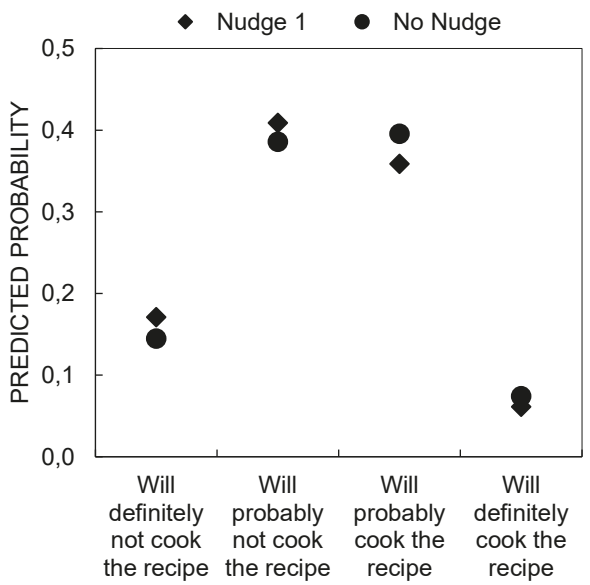

FIGURE 3: Predicted probabilities of recipe choice with and without descriptive normative information

TABLE 3: Regression output of Models 1, 2, 3a, and 3b

	Model 1 recipe choice	Model 2 recipe choice	Model 3 recipe choice	Model 4 recipe choice
Nudge 1	−0.20		0.56	
	(0.14)		(1.05)	
Gender	−0.40	0.09	−0.43	0.02
	(0.29)	(0.29)	(0.28)	(0.29)
Age	0.28**	0.37***	0.25**	0.33***
	(0.09)	(0.09)	(0.09)	(0.09)
Usage frequency	0.02	0.09	0.00	0.08
	(0.07)	(0.06)	(0.07)	(0.06)
Vegan diet	0.68*	0.47*	0.35	0.35
	(0.23)	(0.21)	(0.23)	(0.21)
Nudge 2		−0.30*		0.16
		(0.14)		(0.98)
Self-transcendence			0.40*	0.37*
			(0.16)	(0.16)
Self-transcendence x Nudge 1			−0.16	
			(0.22)	
Self-transcendence x Nudge 2				−0.09
				(0.21)
Cut 1	−1.20**	−0.23	0.50	1.28
	(0.46)	(0.45)	(0.88)	(0.87)
Cut 2	0.70	1.80***	2.42**	3.33***
	(0.46)	(0.45)	(0.89)	(0.88)
Cut 3	3.10***	4.07***	4.84***	5.62***
	(0.46)	(0.46)	(0.90)	(0.90)
Observations	694	769	694	769

Standard errors in parentheses
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

As predicted by Model 1, the coefficient of the dummy variable for the first nudge is statistically insignificant, but positive (see Table 3, Model 3a). Interestingly, users high in self-transcendence values are more likely to choose the recipe than users low in these values, therefore partly supporting Hypothesis 3a (see Table 3, Model 3a). Comparing this effect for the recipe with descriptive normative information versus without, Figure 5 shows a lower effect of self-transcendence values on the likelihood of cooking the former. On the other hand, the coefficient of the interaction between the dummy variable for Nudge 1 and self-transcendence value orientation is negative and statistically insignificant (see Table 3, Model 3a). This outcome, as seen in Figure 5, suggests that users higher in self-transcendence values are less likely to choose to cook the recipe including the descriptive normative information. Regarding the control variables, except for the gender coefficient, all coefficients have positive signs, but only age statistically affects the predicted probability (Diamantopoulos et al., 2003).

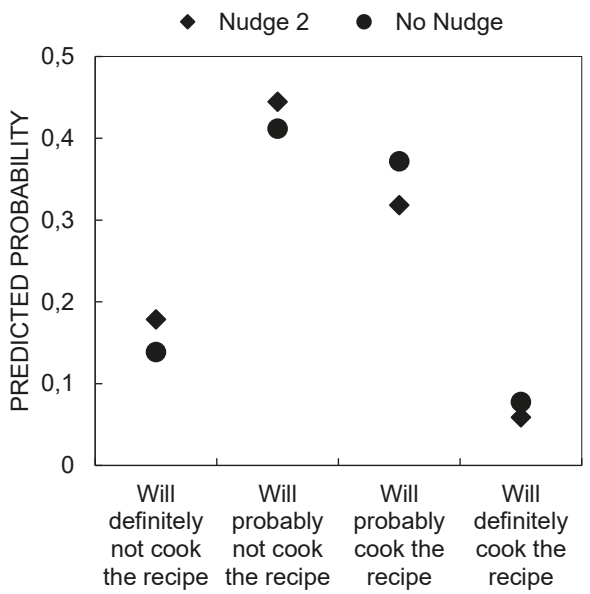

FIGURE 4: Predicted probabilities of recipe choice with and without celebrity recommendation

The predicted effects of this model are similar to the previous one. A self-transcendence value orientation positively and statistically significantly influences the likelihood that users choose to cook the recipe; however, the effect is slightly weaker (see Table 3, Model 3b). The effect of a celebrity recommendation nudge is positive but smaller than the effect of a descriptive normative information nudge, and also statistically insignificant (see Table 3, Model 3b). Moreover, the coefficient of the interaction term between the dummy variable for Nudge 2 and self-transcendence value orientation is negative; thus, the effect of self-transcendence values on the likelihood of cooking the recipe including the celebrity recommendation nudge is weakened (as seen in Figure 6). However, this effect is statistically insignificant (see Table 3, Model 3b). Consequently, hypothesis 3b is only partially supported. Finally, all the control variables show positive effects, but only age statistically affects the predicted probability, as in Model 3a (Diamantopoulos et al., 2003)

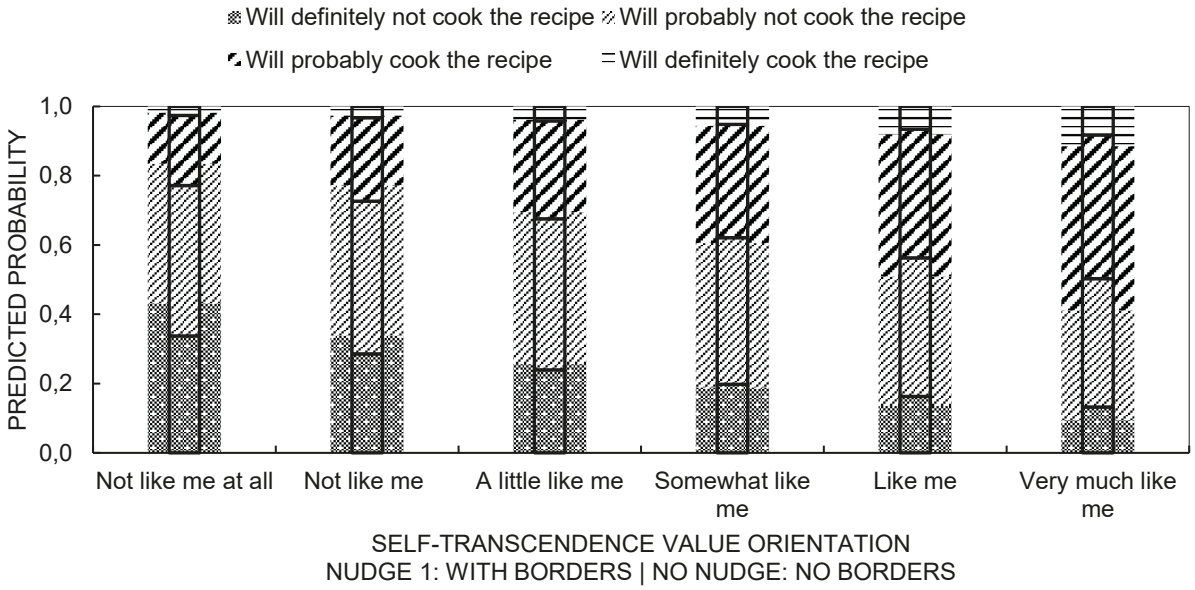

FIGURE 5: Predicted probabilities of recipe choice with and without descriptive normative information for different levels of self-transcendence value orientation

Discussion, recommendations, and limitations

The research question "What is the impact of recipe nudges on Thermomix® users differing in prioritised values in choosing for a more sustainable diet?" could be answered through the research that has been conducted.

Firstly, sustainable recipes for which a nudge in the form of descriptive normative information (Nudge 1) or a celebrity recommendation (Nudge 2) is introduced are not more but less likely to be cooked than sustainable recipes for which no such nudge is introduced. This finding contradicts existing literature on social norms that, as noted above, focuses on offline environments (e.g. Sternthal et al., 1978; Kallgren & Wood, 1986; Cialdini, 1988; Millar & Tesser, 1989; Cialdini et al., 1991; Van Trijp & Van Amstel, 2012; Wansink & Love, 2014). Therefore, a possible explanation for the ineffectiveness of the tested social norm nudges is the different context, i.e. the online environment. The point is that an online recipe platform presents a vast choice of different recipes and therefore users can easily choose another (sustainable or non-sustainable) recipe instead of the nudged one. On the contrary, guests in a brick-and-mortar setting such as a restaurant have a limited choice of dishes and may thus be more easily influenced by nudges.

The analysis of the comments shows that only three respondents were missing meat or fish in the nudged recipe, showing that the majority's choice to not cook the recipe was

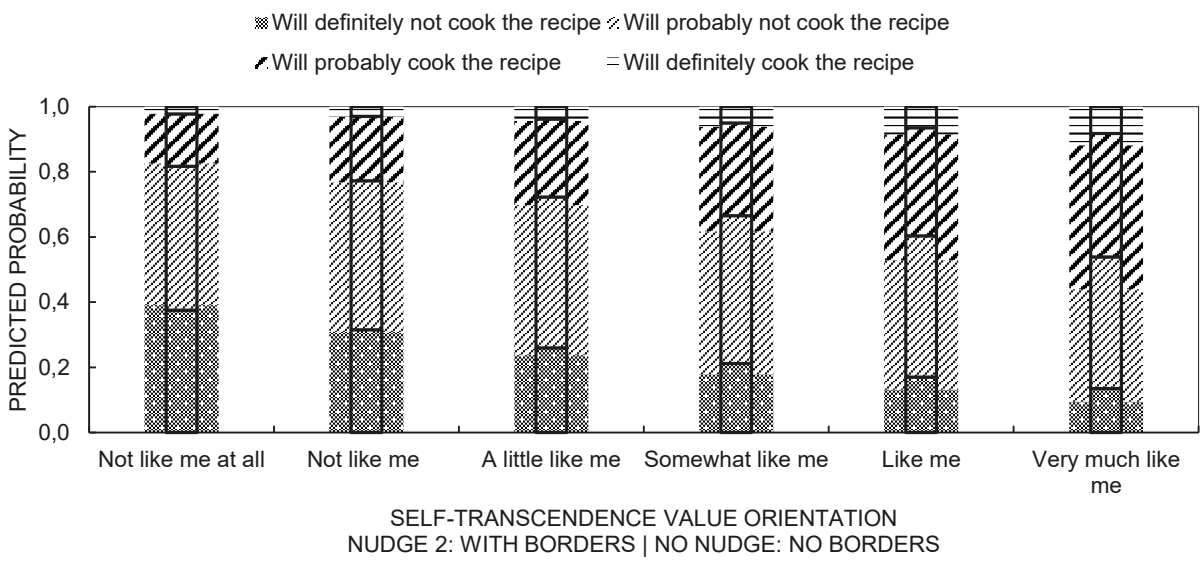

FIGURE 6: Predicted probabilities of recipe choice with and without celebrity recommendation for different levels of self-transcendence value orientation

primarily influenced by taste, convenience or other dietary restrictions. Consequently, these findings could reflect the importance of such hedonic values in choosing a particular recipe and engaging in pro-sustainable behaviour (Steg et al., 2014). Rather than being in conflict with it, strong hedonic values could also complement a self-transcendence value orientation (Steg et al., 2014). According to the research's thematic analysis, hedonic reasons of taste or other individual preferences could have prevailed and outperformed the social norm nudges (Lindenberg & Steg, 2007; Steg et al., 2014). This proposition could be undermined by the robustness checks conducted on differences in value orientations between the three conditions and recipe responses. On the one hand, the Nudge 1 condition was found to have a weaker hedonic value orientation compared to the No Nudge condition, which could explain the negative effect of the descriptive normative information on the sustainable recipe choice (see Table 3). On the other hand, no statistically significant difference has been found between the mean hedonic values of the Nudge 2 and No Nudge condition, nor for the interaction between the effects of Nudge 1 or Nudge 2 versus No Nudge and a hedonic value orientation on a sustainable recipe choice. Therefore, no evidence for an influence of a hedonic value orientation on the negative effect of both nudges on sustainable behaviour is provided. Overall, it can be concluded that users are willing to choose a sustainable recipe; however, taste and other factors must be individually controlled for, which is supported by research on user-customised nudges (Nelson & Garst, 2005; Updegraff et al., 2007; Dijkstra, 2008).

Secondly, it could be confirmed that users stronger in self-transcendence values are more likely to choose a sustainable recipe. However, this effect is not increased by displaying descriptive normative information nor a celebrity recommendation. Therefore, although users who have stronger biospheric and altruistic values are more likely to cook a sustainable recipe, they are not further influenced by social norms. Contrary to previous research, social norm nudges could not strengthen normative goals and thereby could also not weaken hedonic and gain goals (Steg et al., 2014). On the other hand, users with stronger normative goals choose the sustainable recipe, also without one of the nudges. Thus, social norms could ultimately cause a heterogeneous response by users with a strong self-transcendence value orientation, as their moral benefit from engaging becomes lower compared to users with a weak self-transcendence value orientation (Schultz et al., 2007). Consequently, the former may be less motivated to choose a sustainable recipe including a social norm nudge, compared to a recipe without this type of nudge (Schultz et al., 2007). Because it could be assumed that users high in self-transcendence values are more intrinsically motivated when choosing a sustainable recipe, they do not need (and therefore react negatively to) extrinsic motivations. A similar result has also been found by Giebelhausen and Chun (2017). Therefore, the behaviour of users high in self-transcendence values could potentially be influenced by other kinds of nudges than social norms, such as sustainability ratings (Delmas & Lessem, 2014). Since taste is a highly subjective and strongly influencing factor when it comes to food choice, further exploration into effective decision architectures must be conducted to enhance understandings of sustainable dietary choices.

This research's findings also constitute practical contributions. First, managers and policymakers must pay special attention to the context in which the nudge is presented. Comparing this research to previous findings, behaviour on nudges differs between the physical and digital environment. Consequently, new and more effective ways to nudge pro-sustainable behaviour on online platforms must be found and carefully analysed. Second, it is paramount to examine the hedonic values involved, such as taste, when aiming to nudge sustainable dietary choice. The digital environment holds a significant advantage for this recommendation, because user data can be tracked and analysed. Therefore, sustainable recipes can be customised to the tastes and preferences of previously cooked recipes by the user. Then, social norm nudges can be displayed on the customised sustainable recipe to promote engagement. Last but not least, practitioners should also consider users' differing value orientations, which influence their behaviour upon nudges. Again, the user's previous behaviour can be analysed by examining previously cooked recipes. Because self-transcendence values are positively correlated with vegetarian or vegan users (see Appendix D and Appendix E), it can be assumed that users cooking sustainable recipes are more likely to have distinct self-transcendence values. Thus, if the user regularly cooks sustainable recipes, they are more likely to be intrinsically motivated due to a possibly stronger self-transcendence value orientation. Hence, displaying a sustainable rating of the recipe may be more effective in further promoting their sustainable dietary behaviour.

This research has limitations in its statistical, survey, and ethical design. First, the interpretation of the quantitative results found is limited since qualitative responses indicate other explanations. Also, the respondent's characteristics cannot be entirely controlled for and no longitudinal data was obtained, which limits the insights into a habitual change in sustainable dietary choice. Besides, possible differences in value orientations might result from differences in origin (Schwartz, 1992; Goldstein et al., 2008). Second, respondents in Germany may have been unaware of the Austrian chef, Siegfried Kröpfl, who was chosen for the celebrity recommendation nudge. Furthermore, respondents may have dropped out because of the time-consuming questions on value orientations, although recognised as less complicated (Cavagnaro & Staffieri, 2014). Third, ethical limitations concern the use of social norm nudges. Since this research found that the sustainable recipe without a social norm nudge was chosen relatively more frequently, it must be ensured that the nudge is not doing people and planet more harm than good (Blumenthal-Barby & Burroughs, 2012). Moreover, the descriptive normative information nudge is hypothetical, and because sustainable behaviour is often less frequent, the type of nudge in itself could raise limitations.

Future research

Based on this research's limitations, future research could explore the importance of hedonic values on sustainable dietary behaviour. On the one hand, respondents could be asked to choose how likely they would be to cook the recipe given that they like the recipe's ingredients and procedure, which would eliminate hedonic differences and, thus, control for these in advance. Nonetheless, this could raise other limitations, such as the respondent's limited mental capacity to imagine that they hypothetically like the recipe. On the other hand, if the company under observation can enable a user-customised survey, the

sustainable recipe in the questionnaire could be customised to the user's previous behaviour. In addition, this could also open new areas of insight by not only customising the recipe, but also the type of nudge, depending on the user's value orientation and intrinsic or extrinsic motivation. However, such a context is not always realisable, so future research could capitalise on the limitations of quantitative research by conducting interviews with users and experts instead. As a consequence, further insights could be gained into what nudge, e.g. social norm or sustainability rating (Hoogland et al., 2007; Engels et al., 2010), would be most effective to promote pro-sustainable dietary behaviour, and how human values impact the effectiveness of different nudges.

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APPENDIX A: Questionnaire Design

Let's make the Thermomix and its recipes FUTURE-PROOF!
RISOTTO WITH ASPARAGUS AND CHARD
Please take a look at the recipe below and answer the following question.

Condition 1

RECIPE OF THE DAY
08.04.2019
★★★★★ (Cooked by more than 15.000 Thermomix Users in Germany)

Risotto with Asparagus and Chard

Condition 2

RECIPE OF THE DAY
08.04.2019
★★★★★ (Cooked by more than 15.000 Thermomix Users in Germany)

Risotto with Asparagus and Chard

Condition 3

RECIPE OF THE DAY
08.04.2019
★★★★★ (Cooked by more than 15.000 Thermomix Users in Germany)

Risotto with Asparagus and Chard

INGREDIENTS
Serving size: 4 portions
Difficulty: easy
Preparation time: 25m
Total time: 45m

Carrot and ginger juice
150 g of carrots, in pieces
40g onions
2 slices of ginger, fresh root (2 mm)
15 g of olive oil
45 g white wine
1 tsp paprika powder, sweet
1 tsp salt
½ vegetable broth cube (for 0.5 l)
250 g carrot juice (from the bottle)

Risotto
100 g onions, quartered
30 g of olive oil
250 g risotto rice (e.g. Arborio)
100 g white wine 650 g of water, hot
1 tsp salt, a little more to taste
3 pinches of black pepper, ground, a little more to taste
1 ½–2 vegetable broth cubes (each 0.5 l)
1 tbsp margarine
6 pieces of cherry tomatoes
250 g green asparagus, lower third peeled, woody ends removed, in pieces (1 cm)
75 g of chard leaves, stems removed, in strips (5 mm)
4 stalks fresh parsley, plucked and chopped leaves

How likely would you be to choose to cook the risotto with asparagus and chard?
O I will **definitely not** cook this recipe
O I will **probably not** cook this recipe
O I will **probably** cook this recipe
O I will **definitely** cook this recipe
If you will not cook this recipe, why not?

YOUR VALUES

To be able to customise the following answers to you, please indicate your gender.

O Female

O Male

How similar is this person to you? Please differentiate between *very much like me*, *like me*, *somewhat like me*, *a little like me*, *not like me*, and *not like me at all*.

Values (E-SVS; Steg et al., 2012)	Portraits (E-PVQ; Bouman et al., 2018)	Portraits in German (Translation by Schmidt et al., 2007; here, the male version is presented)
WEALTH: material possessions, money	It is important to [him/her] to have money and possessions.	Es ist ihm wichtig, reich zu sein. Er möchte viel Geld und teure Sachen besitzen.
EQUALITY: equal opportunities for all	It is important to [him/her] that every person has equal opportunities.	Er glaubt, dass es wichtig ist, dass alle Menschen in der Welt gleich behandelt werden. Er denkt, dass jeder Mensch im Leben gleiche Chancen haben soll.
GRATIFICATION FOR ONESELF: doing pleasant things	It is important to [him/her] to do things [he/she] enjoys.	Er sucht nach jeder Möglichkeit, Spaß zu haben. Es ist ihm wichtig, Dinge zu tun, die ihm Freude bereiten.
PREVENTING POLLUTION: protecting natural resources	It is important to [him/her] to prevent environmental pollution.	*Es ist ihm wichtig, Umweltverschmutzung zu verhindern. Er möchte die natürlichen Ressourcen schützen.* (Not translated by Schmidt et al., 2007; directly translated from Bouman et al., 2018, and includes the description of the value from the SVS to imitate the other translations)
AUTHORITY: the right to lead or command	It is important to [him/her] to have authority over others.	Es ist ihm wichtig, die Führung zu übernehmen und anderen zu sagen, was sie tun sollen. Er möchte, dass die anderen tun, was er sagt.
HELPFUL: working for the welfare of others	It is important to [him/her] to be helpful to others.	Es ist ihm sehr wichtig, den Menschen in seinem Umfeld zu helfen. Er möchte sich um ihr Wohlbefinden kümmern.
ENJOYING LIFE: food, sex, leisure time, etc.	It is important to [him/her] to enjoy the life's pleasures.	Es ist ihm wichtig, die Freuden des Lebens zu genießen. Er „verwöhnt" sich gerne selbst.
PROTECTING THE ENVIRONMENT: preserving nature	It is important to [him/her] to protect the environment.	Er ist fest davon überzeugt, dass die Menschen sich für die Natur einsetzen sollten. Es ist ihm wichtig, sich um die Umwelt zu kümmern.
AMBITIOUS: hardworking, striving to perform	It is important to [him/her] to work hard and be ambitious.	Es ist ihm wichtig, ehrgeizig zu sein. Er möchte zeigen, wie fähig er ist.
A WORLD AT PEACE: free of war and conflict	It is important to [him/her] that there is no war or conflict.	Er glaubt, dass die Völker der Welt in Harmonie zusammenleben sollten. Es ist ihm wichtig, den Frieden zwischen allen Gruppen der Welt zu fördern.
PLEASURE: enjoyment, fulfillment of desires	It is important to [him/her] to have fun.	Er möchte das Leben richtig genießen. Es ist ihm wichtig, Spaß zu haben.
RESPECT FOR THE EARTH: live in harmony with other species	It is important to [him/her] to respect nature.	*Es ist ihm wichtig, die Natur zu respektieren. Er glaubt, dass die Menschen in Harmonie mit anderen Arten zusammenleben sollten.* (Not translated by Schmidt et al., 2007; directly translated from Bouman et al., 2018, and includes the description of the value from the SVS to imitate the other translations)
INFLUENTIAL: having an impact on people and event	It is important to [him/her] to be influential.	Es ist ihm wichtig, im Leben vorwärts zu kommen. Er strebt danach, besser zu sein als andere.
SOCIAL JUSTICE: correcting injustice, care for the weak	It is important to [him/her] to take care of those who are worse off.	Er möchte, dass jeder gerecht behandelt wird, sogar Leute, die er nicht kennt. Es ist ihm wichtig, die Schwachen in der Gesellschaft zu beschützen.
UNITY WITH NATURE: fitting into nature	It is important to [him/her] to be in unity with nature.	Es ist ihm wichtig, sich der Natur anzupassen und zu ihr zu passen. Er glaubt, dass die Menschen die Natur nicht verändern sollten.
SOCIAL POWER: control over others, dominance	It is important to [him/her] to have control over others' actions.	Er möchte immer derjenige sein, der die Entscheidungen trifft. Er ist gerne in der Führungsposition.

ADDITIONAL INFORMATION

To be able to control for other influences, we need some additional information about yourself.

1. Your age
   - O Younger than 30 years
   - O 31 to 40 years
   - O 41 to 50 years
   - O 51 to 60 years
   - O Older than 60 years
   - O No answer
2. How often do you usually use the Thermomix®?
   - O Never
   - O Less than once per week
   - O 1–2 times per week
   - O 3–5 times per week
   - O More than 5 times per week
   - O Daily
3. Do you usually choose the recipes?
   - O Yes
   - O No
4. Do you follow a strict diet?
   - O I eat everything
   - O Vegetarian
   - O Vegan
   - O Other

   Other diet, allergies and/or intolerances (please indicate):

APPENDIX B: Model robustness checks

TABLE B1: Results of model robustness checks

Test	Model 1	Model 2	Model 3a	Model 3b
Δ likelihood ratio				
LR chi²(2)	9.60	0.00	9.56	7.60
Probability > chi²	0.01	–	0.01	0.02
Δ AIC	−5.60	0.00	−5.56	−3.60
Δ BIC	3.48	0.00	3.52	5.69

APPENDIX C: Summary statistics

TABLE C1: Summary statistics of model variable

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
Recipe choice	1 960	2.29	0.85	1	4
Nudge 1	1 204	0.54	0.50	0	1
Nudge 2	1 308	0.58	0.49	0	1
Self-transcendence	1 448	4.76	0.73	1	6
Gender	1 937	0.94	0.23	0	1
Age	1 164	2.92	0.80	2	4
Usage frequency	1 436	4.44	1.16	1	6
Vegan diet	1 436	0.11	0.31	0	1

APPENDIX D: Correlation matrix Nudge 1

TABLE D1: Correlation matrix for descriptive normative information nudge

Variable	Recipe choice	Nudge 1	Self-transcendence	Gender	Age	Usage frequency	Vegan diet
Recipe choice	1.00						
Nudge 1	−0.05	1.00					
Self-transcendence	0.13	−0.05	1.00				
Gender	−0.05	0.08	0.02	1.00			
Age	0.11	0.14	0.14	0.02	1.00		
Usage frequency	0.04	0.08	0.12	0.06	0.10	1.00	
Vegan diet	0.10	−0.08	0.14	0.01	0.01	0.05	1.00

APPENDIX E: Correlation matrix Nudge 2

TABLE E1: Correlation matrix for celebrity recommendation nudge

Variable	Recipe choice	Nudge 2	Self-transcendence	Gender	Age	Usage frequency	Vegan diet
Recipe choice	1.00						
Nudge 2	−0.08	1.00					
Self-transcendence	0.14	-0.05	1.00				
Gender	0.01	0.04	0.05	1.00			
Age	0.16	-0.07	0.17	0.02	1.00		
Usage frequency	0.09	0.04	0.10	0.03	0.11	1.00	
Vegan diet	0.10	-0.02	0.19	−0.05	0.04	0.04	1.00

APPENDIX F: Qualitative results of recipe choice

TABLE F1: Qualitative results of recipe choice

Variable	Recipe choice comment					Total
Recipe choice	1	2	3	4	5	
Definitely not cook the recipe	243	62	0	8	6	319
Probably not cook the recipe	350	153	3	8	5	519
Probably cook the recipe	11	5	0	0	0	16
Definitely cook the recipe	5	6	0	0	0	11
Total	609	226	3	16	11	865

Comment 1: Doesn't like ingredients, too exotic, not suitable for children, includes alcohol
Comment 2: Too tricky, challenging to get ingredient(s), too expensive ingredients, too few amounts of ingredients/rest has to be thrown away, doesn't know an ingredient
Comment 3: No meat, no fish
Comment 4: Visuals, description, no procedure shown
Comment 5: Diet, intolerance