

---

## Healthier Food Choices Made Easy: a Nudging Experiment in a Restaurant Targeting Millennials

Riccardo Vecchio, Carla Cavallo, Teresa Del Giudice, Gerarda Caso, Gianni Cicia

*Università degli Studi di Napoli Federico II, Via Università 100, 80055 Portici, Italy  
riccardo.vecchio@unina.it; carla.cavallo@unina.it; teresa.delgiudice@unina.it; gerarda.caso@unina.it; cicia@unina.it*

*Received January 2023, accepted June 2023, available online July 2023*

---

### ABSTRACT

The current food environment exposes individuals to continuous unhealthy signals. The present study investigates the effectiveness of a default option nudge - framed as a Dish of the Day - in guiding healthier food choices of Millennials (aged between 19 and 30 years old), a demographic particularly vulnerable to unhealthy eating. A between-subjects field experiment with two opposite treatments (i.e.: healthy and unhealthy default option) and a control group (no default) was performed on a random, convenience sample (N=341). Results show a limited impact of the healthy default option (3.9%) and suggest that this nudging intervention has a stronger influence on individuals who already prioritize health in their everyday lifestyle. Similarly, the default option is more effective on subjects who do not believe that health and taste are conflicting.

**Keywords:** *Dish of the Day; casual restaurant; choice architecture; default option; between-subjects design; field experiment.*

---

## 1 Introduction

The current food environment exposes individuals to continuous unhealthy signals (Novak and Brownell, 2012). Appetizing foods, rich in fat and served in large portions, or/and presented with attractive labels, are widely available on the market in inexpensive and easy-to-eat versions. These food options, which are poorly balanced in nutritional terms, strongly lead to unhealthy choices, which lead to several diseases and health complications (Browne et al., 2019).

The current study tests a nudging technique to improve healthy food choices by evaluating whether an already selected option at the restaurant, indicated as “Dish of the Day”, may increase the choice of a healthy meal over an unhealthy one (Milosavljevic et al., 2012).

Specifically, a between-subjects design experiment has been performed. Participants were randomly assigned into three groups: 1) the positive treatment group, where the healthy choice was preselected and framed as “Dish of the Day”; 2) the negative treatment, where the unhealthy choice was preselected and framed as “Dish of the Day”; 3) the control group which faced the two options with no default.

The study was targeted to Millennials, *i.e.*: individuals born between the 1990s and 2000s according to Moore (2012), since most of previous nudging interventions have been focused on children (Van Kleef et al., 2014; DeCosta et al., 2017; Anzman-Frasca et al., 2018; Yang and Benjamin-Neelon, 2019) and elderly individuals (Zhou et al., 2018, 2019). Whilst it is widely recognized that young consumers are also particularly vulnerable to unhealthy eating and thus changing their behavior leads to a substantial public health improvement (Volkert, 2002; Janssen et al., 2005; Baker et al., 2007; Saka et al., 2010; Castellari, 2016).

The paper is organized into seven sections. Firstly, a literature review paragraph presents the basis upon which the research is founded, followed by the explanation of the study hypotheses. Subsequently, the materials and methods section outline how the research was carried out. The results and discussion sections provide an analysis of the key findings. Finally, the conclusion section summarizes the entire work.

## 2 Literature Review

Although everyday decisions about what, how much and where to eat are influenced by a complex set of factors for all individuals, the transition to adulthood includes significant economic, biological, environmental and social changes that affect food choices (Robinson et al., 2016; Fisher et al., 2016; Powell et al., 2019). Indeed, the stage of young adulthood is characterized by family independence, exposure to new social groups, lack of time or cooking skills, and external peer influences that can dominate and even negatively influence food choices (Riddell et al., 2011; Fisher et al., 2016). Foods which taste good, are convenient and are low cost are thus especially prioritized by young consumers, which opt for practical, appetizing and abundant "out-of-home-food" options, instead of planning and preparing healthy meals (MacFarlane et al., 2010; Howse et al., 2018). Among the topics identified in the literature review by Powell et al. (2019) on the food choices of young consumers, there is an inadequate consumption of fruits and vegetables, a frequent use of convenience foods and snacks, and the selection of healthy foods based on misperceptions. This positions Millennials as a highly desirable target population for energy-dense, nutrient poor food and beverages and thus, particularly vulnerable to unhealthy choices. Therefore, it is important to reach Millennials in the places where these behaviors can occur in daily dynamics, to reduce the risk of negative outcomes and encourage the consumption of healthy foods (Fisher et al., 2016; Allman-Farinelli et al., 2019).

Previous researches revealed that most attempts made by policy makers to increase healthy food choices (such as information and education campaigns, tax interventions, control or limitation of unhealthy foods advertising) have not been particularly successful (Traill et al., 2013; Bhattarai et al., 2013; McGill et al., 2015).

An alternative approach that appears potentially promising, refers to behavioral economics techniques that gently push consumers for the best by altering the choice architecture, *i.e.*: nudging. In contrast to taxation or prohibitions, nudges do not impose choices and does not make options less convenient from an economic point of view: everyone can decide what he/she prefers most, without hindrance (Thaler and Sunstein, 2008).

Every day individuals perform a great number of food choices; many of these are guided by heuristics (van Kleef and van Trijp, 2018; Torma et al., 2018) and status quo bias (Just and Gabrielyan, 2018; Kahneman et al., 1991; Samuelson and Zeckhauser, 1988). The choice architecture acts precisely on the automatic nature of the decision-making process, re-structuring the physical and social environment, with the aim of promoting the best option, without openly interfering with choice freedom (Thaler and Sunstein, 2008) and thus ensuring greater effectiveness compared with the explicit messages of healthy eating (Wagner et al., 2015). As a result, incorporating nudging techniques in

restaurants can result in a valuable opportunity to improve individuals' food choices (Friis et al., 2017; Lachat et al., 2011; Sogari et al., 2019).

Indeed, nowadays, out-of-home food is considered part of modern lifestyle, the focus on pleasure of the experience of eating in restaurants can rely food healthiness as a non-priority, and thus threat healthy diets (Lin and Mattila, 2010; Novak and Brownell, 2012).

Among the different nudging techniques applied to gently push individuals in a certain direction, there is the possibility to present the healthier alternative as the default option, making less healthful options more difficult to achieve or requiring active effort from individuals (Choi et al., 2003; Choi et al., 2005; Thaler and Sunstein, 2008). Providing an already selected choice can appeal consumers in avoiding time waste and mental energies. Indeed, in every choice the consumer is faced, a prominence is possessed by the status-quo, being the choice with lowest transaction costs (Kahneman et al., 1991).

Several studies testing the default option have been carried out in mock restaurants and laboratories (Friis et al., 2017; Bergeron et al., 2019; Keegan et al., 2019; Tonkin et al., 2019). The novelty of the current research relies in the non-hypothetical nature of the selection made by respondents, which implemented the chosen meal consuming it in a real, casual restaurant.

### 3 Research Background and Hypotheses Development

Several attempts have already been made to implement nudging techniques with the aim of fostering healthy choices (Vecchio and Cavallo 2019). Among the available interventions, the default option appears to be particularly promising, due to the low investment needed to implement it and for its ability of leveraging consumers' inertia (Just and Price, 2013). Since consumers always try to save their efforts, the status quo is always the preferred option (Roberto, 2020), being free of transaction costs, unless they feel highly involved with the selection or product involved (Torma et al., 2018).

Recently, intervention policies in restaurants tested by some scholars (Yang and Benjamin-Neelon, 2019; Karpyn et al., 2020) have shown a high acceptability rate of predefined healthy drinks in children's meals, demonstrating relevant drivers to combat childhood obesity. Similarly, the healthy predefined options have been preferred to the less healthy alternative both for the choice of dessert (Bergeron et al., 2019) and for whole wheat bread (van Kleef et al., 2018), emphasizing the strength of the default option.

The "Dish of the Day" strategy has already been used in past research, with contradictory results. A project that took place in different European countries (Denmark, France, Italy and the United Kingdom) tested the effect of the "Dish of the Day" strategy to promote a plant-based meal among both elderly consumers and adolescents, however, it failed to increase the vegetables healthy choice in male adolescents and in older adults in these countries (Hartwell et al., 2020). Within this project, success was found in only one study in a Living Lab in France, but its effect have been particularly strong where consumers were faced with several alternatives of choice (Saulais et al., 2019). A successful intervention has been obtained with the "Dish of the Day" strategy in Anzman-Frasca et al. (2018) where the healthy dishes for US kids were displayed on a placemat beside games and puzzles.

Millennials are constantly under the influence of unhealthy food stimuli and often report severely poor eating habits (Stroud et al., 2015; Dietz, 2017). They also are among the primary consumers of takeaway food (Adams et al., 2016; Grunseit et al., 2019) and out-of-home food (Pereira et al., 2005; Mohr et al., 2007; Howse et al., 2018; Allman-Farinelli et al., 2019). Additionally, Millennials have a key role in the obesogenic environment preferring foods poor in nutrients and rich in energy (Kirk et al., 2010). This can be related to life stage changes, low levels of cooking capabilities, poor time management skills, and limited food budgets, which minimize young consumers' efforts towards healthy food (Larson et al., 2006; Pelletier and Laska, 2012; Alexander et al., 2018).

Therefore it is paramount to promote healthier food choices among this target population, also due to the strong influence that they will exercise on the food choices of future generations and the consequent associated risks (Ventura and Birch, 2008; Scaglioni et al., 2011; Gibson et al., 2012).

Based on previous research we explore the possible drivers of healthy food selection among Millennials. Evidence reveal that nutrition interventions success may be linked to individuals' concern for health (Bower et al., 2003). This interest may be measured applying the General Health Interest (GHI) scale developed by Roininen et al. (1999). Several studies found this measure able to explain consumers' food choices as in Zandstra et al. (2001) where respondents with a higher score of GHI, had a lower intake of fat, a lower consumption of salted snacks and a higher consumption of fruit and vegetables. Similarly, people with a high GHI have been found to be more likely to buy food according to health benefits over hedonic benefits and pay more attention to both health labels and portion dimensions (Lähteenmäki, 2013; Fenko et al., 2018; Bergeron et al., 2019).

Generally, young individuals link the healthiness of food to the possibility of improving the personal appearance and controlling weight (Oakes and Slotterback, 2001). Consequently, health and pleasure may be seen as opposite and may lead to a good/bad dichotomous classification of all foods (Rozin et al., 1996; Johansen et al., 2011, Cavallo et al., 2020). Specifically, this tendency depends on a personal belief, that can be measured to understand how the single individual infers taste information from cues that are accessible while choosing. This measure can be captured with the construct called Unhealthy=Tasty Intuition (UTI) as defined by Raghunathan et al. (2006). People with a high UTI tend to consume less healthy food because they do not expect it to be tasty. To support this literature, several studies have shown a positive association between UTI belief and body mass index (Mai and Hoffmann, 2015; Cooremans et al., 2017; Briers et al., 2020). These studies suggest that although people generally want to eat healthy, their belief in taste may lead them to consume fewer healthy foods, thus increasing the risk of being overweight.

Other auxiliary aspects can influence dietary choices, for example, the personal time discount rate. In particular, this trait has been found to be correlated with obesity (Dogbe and Gil, 2019). The reason can be related to how individuals deal with rewards, actually, subjects can either be patient and hold a high degree of self-control or be keener to immediate gains (Marques et al., 2020). Time preferences have been precisely measured as an individual trait by Courtemanche et al. (2015). Individual risk preference may also be correlated with food behaviour, being either high or low risks linked with everyday food consumption, (Lusk and Coble, 2005; Alfnes et al., 2008). Moreover, it has been found that risk aversion is negatively associated with being overweight or obese (Anderson and Mellor, 2008). Therefore preference toward risks in everyday was measured in the current study applying Holt and Laury (2002) mechanism.

Finally based on previous literature, we supposed that the nudging treatment would increase the choice of the default option framed as “Dish of the Day”. However, the effect cannot be the same for everyone, as there may be different patterns of choice among diverse groups of respondents. Consequently, we formulated the following six research hypotheses.

Since consumers have a tendency of saving efforts and are more prone to confirm a status quo more than opting-out (Thaler and Sunstein, 2008), the first hypothesis is:

*H1: Respondents nudged toward the healthy option will increase their choice of the default compared to respondents for which no treatment is provided.*

Previous evidences revealed that the effectiveness of healthy nudge treatments is higher for individuals that are already concerned of their personal health (Ghazanfar and Camire, 2002; Bower et al., 2003), thus:

*H2: Respondents with a higher concern for health are more likely to choose the healthy option.*

Since there is a popular belief that healthy foods are low on tastiness, and this belief is an individual trait that influences the appeal of different food choices (Raghunathan et al., 2006), we can suppose that:

*H3: Respondents who believe that only unhealthy food is tasty are less likely to choose the healthy dish.*

Furthermore, we know that individuals that are risk takers in their everyday life generally tend to make unhealthier food choices (Anderson and Mellor, 2008) and thus:

*H4: Respondents with lower risk preferences are more likely to choose the healthy option.*

Several researches showed that individuals' food behaviour can be influenced by time discounting (Anderson and Mellor, 2008; Marques et al., 2020). Consequently:

*H5: Respondents who place less emphasis on future gains over the present ones, are more likely to choose the healthy option.*

Although our research focuses on Millennials, since past literature has proven that the tendency of dietary control is higher for older individuals (Lai et al., 2020), we foresee that:

*H6: Older respondents will be more prone to choose the healthy option across the different treatment conditions.*

## 4 Materials and Methods

Data were collected during a period of fifteen days (excluding weekends) in the province of Naples, Southern Italy. On each weekday, approximately 20±5 respondents participated in the study between 12.00am and 1:00pm, and they consumed their chosen lunch between 1:00 pm and 3:00 pm. The study was structured in two, consecutive phases (Fig. 1) taking place in two different sites: the first, inside a university facility and then in a casual restaurant close to the University of Naples Federico II.

To select the sample, individuals were recruited through physical and online ads, and subsequently screened based on age (between 19 and 30 years old), not on a special diet (religious/ethical and vegetarian/vegan) and with no food intolerances or allergies. In the second step, recruited individuals were invited to the consumer sciences laboratory and were informed they would participate in an online survey investigating general eating behaviours. For their participation in the study (approximately 25 minutes), individuals received a 20€ lunch coupon (two courses lunch and bottled water) to be used in a local, informal restaurant.

Upon their arrival at the lab, subjects were randomly assigned to control or treatment groups, provided via a generated identification number; then signed an informed consent form. A randomization check revealed that the three groups did not significantly differ in basic demographics ( $p$ -value  $< .01$ ).

The experimental flow of each session (including  $10 \pm 3$  individuals) was the same in all three conditions. The instructions were read out loud by the experimenter to ensure standardization in all conditions.

In the laboratory, respondents completed an online questionnaire, in which they choose the main dishes for the subsequent lunch in the restaurant, and they also answered to the survey aimed at identifying their socio-economic characteristics and individual traits. The main course of the lunch had two options: either pasta with broccoli (healthy option), either pasta with eggs and bacon (unhealthy option), the choice was framed with a mock-menu, identical to the one actually used by the restaurant. After completing the survey, individuals implemented their choices in the restaurant, without any other intervention or follow-up.

The informal restaurant was located nearby the University, thus little effort was required to reach the location. Furthermore, the restaurant was newly opened, thus participants had no experience about previous patronage (usual menu or specialties). Finally, our experiment mimicked usual lunch offers in non-weekend days, *i.e.*: two main-dishes options in the menu.

The study was conducted according to the guidelines included in the Declaration of Helsinki of 1975 and its later amendments and complied with the code of conduct of the University of Naples Federico II. Confidentiality and anonymity were assured during the entire experiment, and the privacy right of human subjects has been fully observed. In addition, no deceptive practice was applied and full disclosure of the final aim of the study was provided to all participants in the debriefing section.

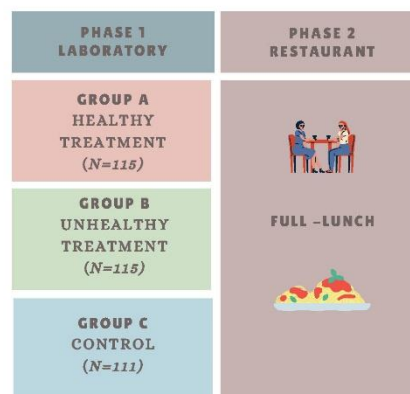


Figure 1. Experimental phases

#### 4.1 Participants

A random, convenience sample of 341 individuals aged between 19 and 30 years participated in the study<sup>1</sup>. Specifically, 35% were aged between 19 and 21 years old, 54% between 22 and 26 years, and 11% between 27; the mean value for age was 22.97, with a median of 23 years. 46% of the sample was composed by female respondents, and 21% of respondents stated that they were living in non-urban areas. Statistics on BMI (Body Mass Index) reported that 3% of respondents were underweight, 68% were of normal weight, 24% were overweight, and 4% were obese.

<sup>1</sup> Based on a priori power analysis, it was determined that a minimum sample of  $N=226$  participants (113 per group) was needed to detect differences in the means between groups with an *effect size* of  $d = 0.18$ , a *power* of 0.80, and an *alpha* level of 0.05 (Cohen, 1988). The effect size was based on the findings of similar studies on nudging techniques (Geaney et al., 2013; Tonkin et al., 2019).

## 4.2 Phase 1 in the laboratory

In the laboratory phase participants were endowed with a coupon for a free lunch in a restaurant, to be used on the same day (between 1:00 pm and 3:00 pm) and were asked to pre-commit with the food choice of the lunch occurring afterwards, subsequently an eating behaviour survey followed. The survey started with an online menu, which appeared on the individual booth pc, with two options for all respondents: either pasta with broccoli, or pasta with eggs and bacon. The structure was not the same for the three groups. According to the three different treatments, either a lunch menu with a “Dish of the Day” sign for broccoli pasta was already selected (*Healthy Treatment*); either a lunch menu with a “Dish of the Day” sign for eggs and bacon pasta was already selected (*Unhealthy Treatment*), or a lunch menu with no “Dish of the Day” sign and no option was pre-selected (Control). Figure 2 shows the healthy default treatment, translated from Italian. The order of the main dishes was randomized and balanced inside the three treatment conditions. No additional information on main dishes nutritional properties or calories content was provided. The two main dishes were selected as it was self-evident which was the healthy option, due to the presence of vegetables versus high fat ingredients (as bacon and eggs), even though no nutritional information was provided to participants. In addition, both dishes are typical and very popular as lunch main plates in Italian casual restaurants.

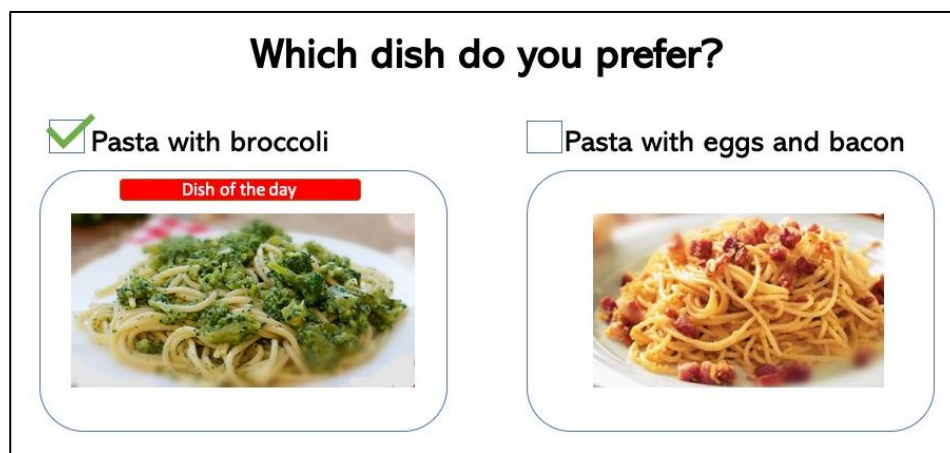


Figure 2. Lunch menu with healthy default option (Dish of the Day).

The post-selection survey collected information on: food consumption habits, 8-item GHI scale (Roininen et al., 1999), 2-items UTI scale (Raghunathan et al., 2006), risk preferences (Holt and Laury, 2002), a question on time preferences (Courtemanche et al., 2015) and socio-demographic data (the detailed questionnaire is provided in Appendix A). Finally, individuals received the lunch coupon indicating the chosen menu for the informal restaurant.

## 4.3 Phase 2 in the restaurant

Study participants consumed the chosen meal in the casual restaurant the same day of the laboratory phase, without any other intervention. The two main-course recipes (*i.e.*: pasta with broccoli and pasta with eggs and bacon) were developed by a professional nutritionist based on the share of calories and fat, in collaboration with a gastronomist and the restaurant chef. The two dishes were identical in overall weight of pasta and condiments, but different according to their health properties, the chef also guaranteed the maximum adherence with the traditional recipe.

From a nutritional point of view, the pasta with broccoli had a content in energy of 556 kcal Vs. 803 kcal<sup>2</sup> of pasta with eggs and bacon; similarly, the fat content of the former was 28 grams Vs. 48 grams of the latter,<sup>3</sup> of which saturated fats are 4 grams in the healthy meal Vs. 8 grams in the unhealthy meal. The cholesterol content of the healthy meal was estimated in 0 milligrams, while for the unhealthy option in 194 milligrams<sup>4</sup>.

## 4.4 Data analysis

Firstly, the internal consistency measures were computed for the validated scales applied in the survey. The GHI scale (Cronbach's  $\alpha=0.753$ ) and the UTI scale (Cronbach's  $\alpha=0.709$ ), resulted both highly reliable. Analysing the ratings

<sup>2</sup> The healthy option has 40% of the average daily caloric intake for women and 32% for men; while the unhealthy has over 57% of the average daily caloric intake for women and 46% for men.

<sup>3</sup> The healthy option has 70% of the average daily lipid intake for women and 57% for men; while the unhealthy has over 120% of the average daily lipid intake for women and almost 100% for men.

<sup>4</sup> According to Italian Health Ministry guidelines, for healthy subjects the maximum daily cholesterol intake should be lower than 300 milligrams a day.

expressed by respondents, the sample had a medium-to-high interest towards health issues linked to nutrition, being the mean value for GHI 3.46 out of 5. The mean value of UTI among the whole sample was 2.4 out of 7, meaning, on average, that respondents are convinced that it is largely possible to have meals that are tasty and healthy at the same time. While, according to the risk aversion, the sample appeared to be equally distributed between risk-taking and risk-averse individuals, being the mean value 0.53 (ranging from 0 to 1). According to time preferences, the average score obtained by respondents was 6.80 (range 0-10). This means that participants showed to be on average focused on present benefits, rather than willing to wait for future benefits.

Subsequently, Pearson's chi square test has been applied to verify whether one of the treatments had an effect on respondents' main-dish choice; detecting possible statistically significant differences in the patterns of selected meal. In addition, *t*-tests were also conducted in order to detect whether the food choice might have changed over different groups of individuals. Furthermore, sub-groups of respondents were created based on relevant socio-demographic characteristics and traits collected through the eating behaviour survey. To test our research hypotheses, we applied the following grouping variables: i) GHI scores (*i.e.*: lower Vs. higher compared with the median), ii) risk preferences (lower Vs. higher compared with the median); iii) UTI scores (lower Vs. higher compared with the median); iv) future Vs. present time preferences; v) age (*i.e.*: younger Vs. older compared with the median). Table 1 provides the descriptive statistics of the full sample.

**Table 1.**  
Respondents' characteristics

Variable (Min-Max)	Mean	S.D.	Median
Age (19-30)	22.97	2.79	23
General Health Interest GHI (1-5)	3.46	0.66	3.5
Unhealthy=Tasty Intuition UTI (1-7)	2.40	1.39	2.0
Risk preferences (1-10)	5.49	2.01	6.0
Time preferences (1-10)	6.80	2.64	6.2

## 5 Results

In the control condition, respondents could choose between the two meals provided on the menu without any reference to the "Dish of the Day". As shown in Table 2, 67% selected the unhealthy main dish against 33% of respondents who selected pasta with broccoli (healthy).

In the positive treatment, we tested if and how much the default option could influence the main dish choice by placing the healthy dish as the default option, also labelled as "Dish of the Day". 37.2% of this group confirmed the default choice, while the rest decided to opt out and actively select the unhealthy dish. This outcome reveals that the default option based on a healthy "Dish of the Day" marginally influenced choices. Indeed, only +3.9% of respondents decided to keep the default choice, compared with the control group. In the negative treatment, the "Dish of the Day" was the unhealthy option, in this case, 67% of respondents confirmed the selection, while 33% replaced the unhealthy dish with the healthy one. Compared with the control condition, the effect of this treatment is null. Therefore, the default option for the unhealthy choice had no effect.

**Table 2.**  
Choices across control/treatment conditions

	Conditions		
	Healthy Treatment	Unhealthy Treatment	Control group
Healthy Default option	43 (37%)	37 (33%)	38 (33%)
Unhealthy Default option	72 (63 %)	74 (67%)	77 (67%)
Total observations	115	111	115
<i>Pearson chi<sup>2</sup>(2) = 0.4865 Pr = 0.784</i>			

Since 3.9% of healthier choices induced by the nudging technique is a positive but small effect, further statistical tests were performed in order to understand whether it can be considered statistically significant. To this aim, we conducted the Pearson's chi square test through a contingency table (Table 2). The test revealed that differences among means of choices made across the treatments/control groups were not statistically significant. Subsequently, further insights were gathered exploring respondents' characteristics and individual traits.

A specific investigation was performed to verify whether different patterns of choice occurred in the diverse sub-groups. Figures from 3.a to 3.e. show that several significant differences have been found among sub-groups of respondents, as the healthy choice has been more frequent in older respondents, and in individuals with higher GHI and lower UTI. Outcomes suggest that age can play a role in the effectiveness of nudging interventions. In fact, individuals younger than 23 years are more resistant to treatments aimed at improving their healthy diet, probably due to their lower awareness -or lower concern- about the relation between diet and health.

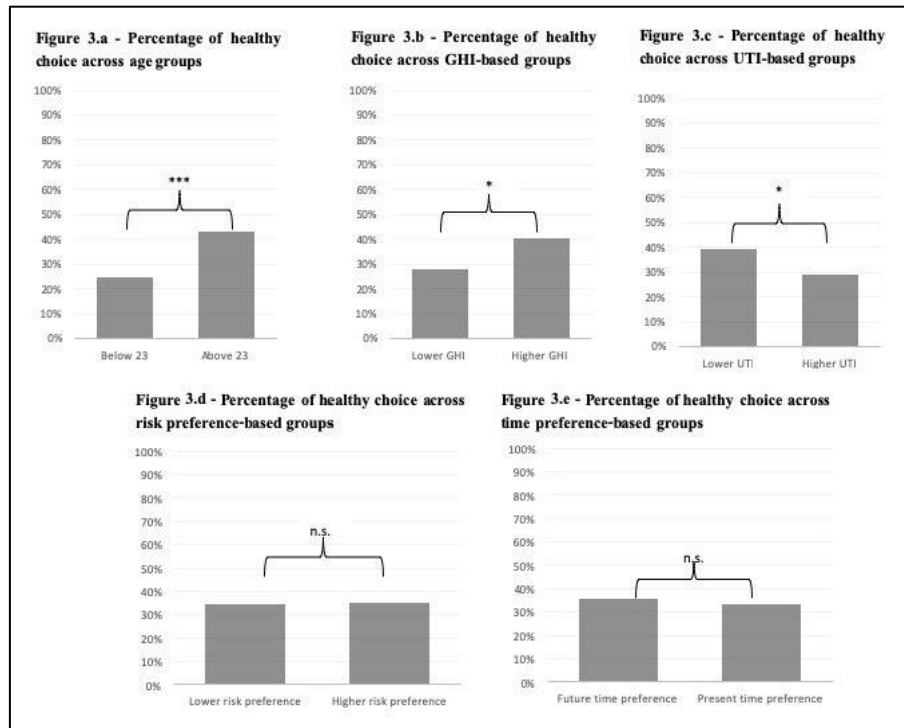


Figure 3. Healthy choices among different groups.

Furthermore, the findings revealed that respondents who scored higher on the GHI scale, on average, choose the healthy option more frequently than those with low GHI. Suggesting that individuals’ health concern is crucial for the effectiveness of healthy nudge interventions. In addition, the findings show that those who scored low on UTI selected more healthy choices, leading to suppose that participants willing to trade-off health for taste have been nudged more than others. Finally, the outcomes prove no significant differences among choices on the preferred main dish by groups with different risk and time preferences.

As reported in Table 3 the results suggest evidence for supporting H2 and H3, while, no outcome supported H1, H4, H5 and H6.

Table 3. Outcomes of the hypothesis tested

H <sub>1</sub>	Respondents nudged toward the healthy option will increase their choice of the default compared to respondents for which no treatment is provided.	Rejected
H <sub>2</sub>	Respondents with a higher concern for health are more likely to choose the healthy option.	Accepted
H <sub>3</sub>	Respondents who believe that only unhealthy food is tasty are less likely to choose the healthy dish.	Accepted
H <sub>4</sub>	Respondents with lower risk preferences are more likely to choose the healthy option.	Rejected
H <sub>5</sub>	Respondents who put less emphasis on future gains over the present ones, are more likely to choose the healthy option.	Rejected
H <sub>6</sub>	Older respondents will be more prone to choose the healthy option across the different treatment conditions.	Rejected

## 6 Discussion

When an individual is choosing a food, two scenarios are projected: either an immediate reward to satisfy hunger or long-term health benefits (Salmon et al., 2015). Individuals choosing the healthy option have to activate self-control,



thus motivation is needed (Grunert et al., 2010). However, other goals can be salient in the mind of individuals during choice, as money or pleasure goals (Bauer and Reisch, 2019). While, in the case of mindless selection (or also when there is a high cognitive load), subjects tend to make choices following heuristics or rules of thumb and the short-term benefits are privileged (Hofmann et al., 2008; Chapman et al., 2019). Sometimes, the default option can leverage the willing of saving efforts that often characterizes individuals, as this choice can represent both the “status quo” or the “normal” appropriate choice for that occasion (Bauer and Reisch, 2019).

The default option framed as “Dish of the Day” - the nudge intervention applied in the current research - proved to be slightly effective in shifting Millennials towards healthy choices. Indeed, only 3.9% of respondents have been nudged toward the healthy option. This effect, appears in line with previous studies, who hardly succeeded in shifting the choice of youngsters toward healthier options (dos Santos et al., 2018; Boehm et al., 2020).

Nevertheless, within this group, older respondents appeared to be more willing to make a healthy choice. Despite young individuals have a lower concern for healthiness of food, and, in general, are more concerned with their appearance than for diseases prevention, a small effect was played by the adopted nudge (Oakes and Slotterback, 2001). Several researches yielded that age can explain the degree of the individual’s health concern in food choice (Prescott et al., 2002; Ares and Gámbaro, 2007; Krystallis et al., 2008), however, this appears also within the burden of a limited age cohort, being subjects under 23 years less prone to choose the healthy option compared to older individuals.

Furthermore, findings revealed that individuals who are more willing to change their food choices are the ones more concerned with personal health. This outcome has also been obtained in previous studies, in which healthy food interventions appeared to be more successful for health conscious individuals (Ghazanfar and Camire, 2002; Bower et al., 2003). This is because, if eating healthy is already a personal priority, all the suggestions about healthy eating are taken more seriously into consideration by the individual (Finkelstein and Fishbach, 2010).

Moreover, respondents who scored low on the UTI scale performed more healthy choices. Since the experiment entailed a selection between taste and health, individuals who are convinced that healthy can be also tasty tended to make healthier choices, while others prioritized taste (Tangari et al., 2019). Indeed, being hedonic goals more salient during food choice -as they are closer in time- individuals are expected to opt for health only if pleasure is expected (Reinders et al., 2017; Turnwald et al., 2019). Furthermore, the belief that tasty food is unhealthy is scarcely present in the specific sample applied in this study, perhaps because of the location in Southern Italy where Mediterranean diet is still largely adopted (Benedetti et al., 2016; Ferro-Luzzi and Branca, 1995; Noale et al., 2014).

The current research did not find any different behaviour among respondents with diverse risk preferences, although previous studies highlighted that this trait may be connected with unhealthier food choices and lower BMI (Hendrickson and Rasmussen, 2013). Similarly, time preferences have proved no visible effect on choice, even if previous studies suggested that they influence the rate at which respondents trade current versus future benefits of their actions (Komlos et al., 2004).

## 7 Conclusions

The current study reveals a small effect of the default option framed as “Dish of the Day” on healthy food choices. The large majority of Millennials made their choice regardless of its healthy value or the type of treatment received. Nevertheless, compared to the control condition, the default option for the healthy dish – the healthy nudge- drove a 3.9% shift in choice, although not statistically significant.

Among the possible causes of the limited effectiveness of this nudging intervention among Millennials, there can be the limited general interest in health issues. This is confirmed by the fact that older participants and more concerned for health tended to choose the healthy option more frequently. Our study confirms the important change in healthy nutrition over the lifespan, being older individuals more prone to choose the healthy option, even in a restricted age cohort. This allows to suppose that nudge interventions, although ineffective on a young sample, may be more suitable on older individuals. Furthermore, individuals who are already concerned for health have been the ones who succeed in self-control and are able to focus on food benefits distant in time (Georgii et al., 2020).

Additionally, a wider preference for the healthy dish was found within the sub-group of respondents with low UTI -the belief that taste and health are not conflicting- which may be particularly large because of the location of the study in Southern Italy. Personal beliefs may play a central role in the acceptance of healthy food, even if with low sensory appeal. Although these interventions may not shift the choices of a large part of population, we still have to take into account that nudging is an unobtrusive measure, that is favourably accepted by consumers compared with prohibitions or taxes; and, it is almost inexpensive compared with monetary incentives – cost/benefits would still encourage those strategies (Truscott, 2019). The effects played by personal beliefs allows to suppose that expectations are important in determining actual choices of food. The categorization of individuals according to UTI

may be used as a rationale to segment the population for specific-tailored healthy food interventions. Further insights could be provided by other analyses that should be conducted on a wider variety of food matrices, not limited to a single main dish.

In the current study, respondents had the chance to consume their meal in a casual restaurant, this eating situation could leverage hedonic motives in the decision-making of respondents who temporarily neglect their healthy nutrition goals in favour of pleasure goals (Papies and Veling, 2013; Hlee et al., 2019). Therefore, future developments of this research could empirically test the same default option among other types of consumption locations, as a workplace cafeteria or canteen – where individuals perform everyday food choices.

## Acknowledgments

**Funder:** Project funded under the National Recovery and Resilience Plan (NRRP), Mission 4 Component 2 Investment 1.3 - Call for proposals No. 341 of 15 March 2022 of Italian Ministry of University and Research funded by the European Union – NextGenerationEU.

**Award Number:** Project code PE00000003, Concession Decree No. 1550 of 11 October 2022 adopted by the Italian Ministry of University and Research, CUP D93C22000890001, Project title “ON Foods - Research and innovation network on food and nutrition Sustainability, Safety and Security – Working ON Foods”.

## List of abbreviations

BMI: Body Mass Index

GHI: General Health interest

UTI: Unhealthy=Tasty Intuition

## References

- Adams, M.A., Bruening, M., Ohri-Vachaspati, P., Hurley, J.C. (2016), Location of School Lunch Salad Bars and Fruit and Vegetable Consumption in Middle Schools: A Cross-Sectional Plate Waste Study. *Journal of the Academy of Nutrition and Dietetics*, **116**:407–416. <https://doi.org/10.1016/j.jand.2015.10.011>.
- Alexander, G.L., Lindberg, N., Firemark, A.L., et al. (2018), Motivations of Young Adults for Improving Dietary Choices: Focus Group Findings Prior to the MENU GenY Dietary Change Trial. *Health Education and Behavior*, **45**:492–500. <https://doi.org/10.1177/1090198117736347>.
- Alfnes, F., Rickertsen, K., Ueland, Ø. (2008), Consumer attitudes toward low stake risk in food markets. *Applied Economics*, **40**:3039–3049. <https://doi.org/10.1080/00036840600994062>.
- Allman-Farinelli, M., Rahman, H., Nour, M., et al. (2019), The Role of Supportive Food Environments to Enable Healthier Choices When Eating Meals Prepared Outside the Home: Findings from Focus Groups of 18 to 30-Year-Olds. *Nutrients*, **11**:2217. <https://doi.org/10.3390/nu11092217>.
- Anderson, L.R., Mellor, J.M. (2008), Predicting health behaviors with an experimental measure of risk preference. *Journal of Health Economics*, **27**:1260–1274. <https://doi.org/10.1016/j.jhealeco.2008.05.011>.
- Anzman-Frasca, S., Braun, A.C., Ehrenberg, S., et al. (2018), Effects of a randomized intervention promoting healthy children’s meals on children’s ordering and dietary intake in a quick-service restaurant. *Physiology & Behavior*, **192**:109–117. <https://doi.org/10.1016/j.physbeh.2018.01.022>.
- Ares, G., Gámbaro, A. (2007), Influence of gender, age and motives underlying food choice on perceived healthiness and willingness to try functional foods. *Appetite*, **49**:148–158. <https://doi.org/10.1016/j.appet.2007.01.006>.
- Baker, J.L., Olsen, L.W., Sørensen, T.I.A. (2007), Childhood Body-Mass Index and the Risk of Coronary Heart Disease in Adulthood. *The New England Journal of Medicine*, **357**:2329–2337. <https://doi.org/10.1056/NEJMoa072515>.
- Bauer, J.M., Reisch, L.A. (2019), Behavioural Insights and (Un)healthy Dietary Choices: a Review of Current Evidence. *Journal of Consumer Policy*, **42**:3–45. <https://doi.org/10.1007/s10603-018-9387-y>.
- Bergeron, S., Doyon, M., Saulais, L., Labrecque, J.A. (2019), Using insights from behavioral economics to nudge individuals towards healthier choices when eating out: A restaurant experiment. *Food Quality and Preference*, **73**:56–64. <https://doi.org/10.1016/j.foodqual.2018.12.001>.

- Bhatarai, N., Prevost, A.T., Wright, A.J., et al. (2013), Effectiveness of interventions to promote healthy diet in primary care: Systematic review and meta-analysis of randomised controlled trials. *BMC Public Health*, **13**:1203.
- Boehm, R., Read, M., Henderson, K.E., Schwartz, M.B. (2020), Removing competitive foods v. nudging and marketing school meals: A pilot study in high-school cafeterias. *Public Health Nutrition*, **23**:366–373. <https://doi.org/10.1017/S136898001900329X>.
- Bower, J.A., Saadat, M.A., Whitten, C. (2003), Effect of liking, information and consumer characteristics on purchase intention and willingness to pay more for a fat spread with a proven health benefit. *Food Quality and Preference*, **14**:65–74. [https://doi.org/10.1016/S0950-3293\(02\)00019-8](https://doi.org/10.1016/S0950-3293(02)00019-8).
- Briers, B., Huh, Y.E., Chan, E., Mukhopadhyay, A. (2020), The unhealthy = Tasty belief is associated with BMI through reduced consumption of vegetables: A cross-national and mediational analysis. *Appetite*, **150**:104639. <https://doi.org/10.1016/j.appet.2020.104639>.
- Browne, S., Minozzi, S., Bellisario, C., et al. (2019), Effectiveness of interventions aimed at improving dietary behaviours among people at higher risk of or with chronic non-communicable diseases: an overview of systematic reviews. *European Journal of Clinical Nutrition*, **73**:9–23.
- Caracciolo, F., Cavallo, C., del Giudice, T., Panico, T., Vecchio, R., Cicia, G. (2020), Consumers (Dis)Preference for Bitterness in Extra Virgin Olive Oil: A Field Experiment. *International Journal on Food System Dynamics*, **11**(1), 14–25. <https://doi.org/10.18461/IJFSD.V11i1.36>.
- Castellari, E. (2016), Three Essays on Food Policy and Health Consumption Patterns. *Italian Review of Agricultural Economics*, **71**:561–569. <https://doi.org/10.13128/REA-18672>.
- Cavallo, C., Carlucci, D., Carfora, V., Caso, D., Cicia, G., Clodoveo, M.L., Del Giudice, T., Di Monaco, R., Roselli, L., Vecchio, R., De Gennaro, B., (2020), Innovation in traditional foods: A laboratory experiment on consumers' acceptance of extra-virgin olive oil extracted through ultrasounds. *NJAS Wageningen Journal of Life Science*, **92**: 100336.
- Chapman, L.E., Sadeghzadeh, C., Koutlas, M., et al. (2019), Evaluation of three behavioural economics “nudges” on grocery and convenience store sales of promoted nutritious foods. *Public Health Nutrition*, **22** (17): 3250-3260. <https://doi.org/10.1017/S1368980019001794>.
- Choi, J.J., Laibson, D., Madrian, B.C., Metrick, A. (2003), Optimal defaults. *American Economic Review*. **93** (2) : 180–185. <https://doi.org/10.1257/000282803321947010>.
- Choi, J.J., Laibson, D.I., Madrian, B.C., et al. (2005), Passive Decisions and Potent Defaults. In: Wide, D.A. (ed) *Analyses in the Economics of Aging*. University of Chicago Press, Chicago, pp 59–78.
- Cooremans, K., Geuens, M., Pandelaere, M. (2017), Cross-national investigation of the drivers of obesity: Re-assessment of past findings and avenues for the future. *Appetite*, **114**:360–367. <https://doi.org/10.1016/j.appet.2017.04.010>.
- Courtemanche, C., Heutel, G., McAlvanah, P. (2015), Impatience, Incentives and Obesity. *The Economic Journal*, **125**:1–31. <https://doi.org/10.1111/eoj.12124>.
- DeCosta, P., Møller, P., Frøst, M.B., Olsen, A. (2017), Changing children’s eating behaviour - A review of experimental research. *Appetite*, **113**:327–357.
- Dietz, W.H. (2017), Obesity and excessiveweight gain in young adults new targets for prevention. *JAMA* , **318**:241–242. <https://doi.org/10.1001/jama.2017.6119>.
- Dogbe, W., Gil, J.M. (2019), Linking risk attitudes, time preferences, and body mass index in Catalonia. *Economics & Human Biology*, **35**:73–81. <https://doi.org/10.1016/j.ehb.2019.05.005>.
- dos Santos, Q., Nogueira, B.M., Rodrigues, V.M., et al. (2018), Nudging using the ‘dish of the day’ strategy does not work for plant-based meals in a Danish sample of adolescent and older people. *International Journal of Consumer Studies*, **42**:327–334. <https://doi.org/10.1111/ijcs.12421>.
- Fenko, A., Nicolaas, I., Galetzka, M. (2018), Does attention to health labels predict a healthy food choice? An eye-tracking study. *Food Quality and Preference*, **69**:57–65. <https://doi.org/10.1016/j.foodqual.2018.05.012>.
- Ferro-Luzzi, A., Branca, F. (1995), Mediterranean diet, Italian-style: prototype of a healthy diet. *American Journal of Clinical Nutrition*, **61**:1338S-1345S. <https://doi.org/10.1093/ajcn/61.6.1338S>.
- Finkelstein, S.R., Fishbach, A. (2010), When healthy food makes you hungry. *Journal of Consumer Research*, **37**:357–367. <https://doi.org/10.1086/652248>.

- Fisher, H., Erasmus, A.C., Viljoen, A.T. (2016), Young adults' consideration of their food choices a propos consequences for their future health. *Internationa Journal of Consumer Studies*, **40**:475–483. <https://doi.org/10.1111/ijcs.12273>.
- Friis, R., Skov, L.R., Olsen, A., et al. (2017), Comparison of three nudge interventions (priming, default option, and perceived variety) to promote vegetable consumption in a self-service buffet setting. *PLoS One*, **12**:e0176028. <https://doi.org/10.1371/journal.pone.0176028>.
- Georgii, C., Schulte-Mecklenbeck, M., Richard, A., et al. (2020). The dynamics of self-control: within-participant modeling of binary food choices and underlying decision processes as a function of restrained eating. *Psychological Research*, **84**:1777–1788. <https://doi.org/10.1007/s00426-019-01185-3>.
- Ghazanfar, S., Camire, M.E. (2002), Influence of Health Attitudes on the Acceptability of Cranberry Juic. *Journal of Food Science*, **67**:3497–3501. <https://doi.org/10.1111/j.1365-2621.2002.tb09612.x>.
- Gibson, E.L., Kreichauf, S., Wildgruber, A., et al. (2012), A narrative review of psychological and educational strategies applied to young children's eating behaviours aimed at reducing obesity risk. *Obesity Review*, **13**:85–95. <https://doi.org/10.1111/j.1467-789X.2011.00939.x>.
- Grunert, K.G., Fernández-Celemín, L., Wills, J.M., et al. (2010), Use and understanding of nutrition information on food labels in six European countries. *Journal of Public Health (Bangkok)*, **18**:261–277. <https://doi.org/10.1007/s10389-009-0307-0>.
- Grunseit, A.C., Cook, A.S., Conti, J., et al. (2019). “doing a good thing for myself”: A qualitative study of young adults' strategies for reducing takeaway food consumption. *BMC Public Health*, **19**:525. <https://doi.org/10.1186/s12889-019-6731-3>.
- Hartwell, H., Bray, J., Lavrushkina, N., et al. (2020), Increasing vegetable consumption out-of-home: VeggieEAT and Veg+projects. *Nutrition Bulletin*, **45**:424–431. <https://doi.org/10.1111/nbu.12464>.
- Hendrickson, K.L., Rasmussen, E.B. (2013), Effects of mindful eating training on delay and probability discounting for food and money in obese and healthy-weight individuals. *Behavior Research and Therapy*, **51**:399–409. <https://doi.org/10.1016/j.brat.2013.04.002>.
- Hlee, S., Lee, J., Yang, S.B., Koo, C. (2019), The moderating effect of restaurant type on hedonic versus utilitarian review evaluations. *International Journal of Hospitality Management*, **77**:195–206. <https://doi.org/10.1016/j.ijhm.2018.06.030>.
- Hofmann, W., Friese, M., Wiers, R.W. (2008)., Impulsive versus reflective influences on health behavior: a theoretical framework and empirical review. *Health Psychology Review*, **2**:111–137. <https://doi.org/10.1080/17437190802617668>.
- Holt, C.A., Laury, S.K. (2002), Risk aversion and incentive effects. *American Economic Review*, **92**:1644–1655. <https://doi.org/10.1257/000282802762024700>.
- Howse, E., Hankey, C., Allman-Farinelli, M., et al. (2018). 'Buying Salad Is a Lot More Expensive than Going to McDonalds': Young Adults' Views about What Influences Their Food Choices. *Nutrients*, **10**:996. <https://doi.org/10.3390/nu10080996>.
- Janssen, I., Katzmarzyk, P.T., Srinivasan, S.R., et al. (2005), Utility of Childhood BMI in the Prediction of Adulthood Disease: Comparison of National and International References. *Obesity Research*, **13**:1106–1115. <https://doi.org/10.1038/oby.2005.129>.
- Johansen, S.B., Næs, T., Hersleth, M. (2011), Motivation for choice and healthiness perception of calorie-reduced dairy products. A cross-cultural study. *Appetite*, **56**:15–24. <https://doi.org/10.1016/j.appet.2010.11.137>.
- Just, D., Price, J. (2013), Default options, incentives and food choices: Evidence from elementary-school children. *Public Health Nutrition*, **16**:2281–2288. <https://doi.org/10.1017/S1368980013001468>.
- Just, D.R., Gabrielyan, G. (2018), Influencing the food choices of SNAP consumers: Lessons from economics, psychology and marketing. *Food Policy*, **79**:309–317. <https://doi.org/10.1016/j.foodpol.2018.03.003>.
- Kahneman, D., Knetsch, J.L., Thaler, R.H. (1991), Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias. *Journal of Economic Perspectives*, **5**:193–206. <https://doi.org/10.1257/jep.5.1.193>.
- Karpyn, A., Lessard, L., McCallops, K., et al. (2020), Healthy default beverage policies for kids' meals: A statewide baseline assessment of restaurant managers' perceptions and knowledge in Delaware. *Preventive Medicine Reports*, **20**:101272. <https://doi.org/10.1016/j.pmedr.2020.101272>.

- Keegan, E., Kemp, E., Prichard, I., et al. (2019). The effect of the spatial positioning of a healthy food cue on food choice from a pictorial-style menu. *Eating Behaviors*, **34**:101313. <https://doi.org/10.1016/j.eatbeh.2019.101313>.
- Kirk, S.F.L., Penney, T.L., McHugh, T-L.F. (2010), Characterizing the obesogenic environment: the state of the evidence with directions for future research. *Obesity Review*, **11**:109–117. <https://doi.org/10.1111/j.1467-789X.2009.00611.x>.
- Komlos, J., Smith, P.K., Bogin, B. (2004), Obesity And The Rate Of Time Preference: Is There A Connection? *Journal of Biosocial Sciences*, **36**:209–219. <https://doi.org/10.1017/S0021932003006205>.
- Krystallis, A., Maglaras, G., Mamalis, S. (2008), Motivations and cognitive structures of consumers in their purchasing of functional foods. *Food Quality and Preference*, **19**:525–538. <https://doi.org/10.1016/j.foodqual.2007.12.005>.
- Lachat, C., Naska, A., Trichopoulou, A., et al. (2011), Essential actions for caterers to promote healthy eating out among European consumers: Results from a participatory stakeholder analysis in the HECTOR project. *Public Health Nutrition*, **14**:193–202. <https://doi.org/10.1017/S1368980010002387>.
- Lähteenmäki, L. (2013), Claiming health in food products. *Food Quality and Preference*, **27**:196–201. <https://doi.org/10.1016/j.foodqual.2012.03.006>.
- Lai, C.Y., List, J.A., Samek, A. (2020), Got Milk? Using Nudges to Reduce Consumption of Added Sugar. *American Journal of Agricultural Economics*, **102**:154–168. <https://doi.org/10.1093/ajae/aaz022>.
- Larson, N.I., Perry, C.L., Story, M., Neumark-Sztainer, D. (2006), Food Preparation by Young Adults Is Associated with Better Diet Quality. *Journal of the American Dietetic Association*, **106**:2001–2007. <https://doi.org/10.1016/j.jada.2006.09.008>.
- Lin, I.Y., Mattila, A.S. (2010), Restaurant Servicescape, Service Encounter, and Perceived Congruency on Customers' Emotions and Satisfaction. *Journal of Hospitality Marketing & Management*, **19**:819–841. <https://doi.org/10.1080/19368623.2010.514547>.
- Lusk, J.L., Coble, K.H. (2005), Risk Perceptions, Risk Preference, and Acceptance of Risky Food. *American Journal of Agricultural Economics*, **87**:393–405. <https://doi.org/10.1111/j.1467-8276.2005.00730.x>.
- MacFarlane, A., Crawford, D., Worsley, A. (2010), Associations Between Parental Concern for Adolescent Weight and the Home Food Environment and Dietary Intake. *Journal of Nutrition Education and Behavior*, **42**:152–160. <https://doi.org/10.1016/j.jneb.2008.11.004>.
- Mai, R., Hoffmann, S. (2015), How to Combat the Unhealthy = Tasty Intuition: The Influencing Role of Health Consciousness. *Journal of Public Policy & Marketing*, **34**:63–83. <https://doi.org/10.1509/jppm.14.006>.
- Marques, I.C.F., Ting, M., Cedillo-Martínez, D., Pérez-Cueto, F.J.A. (2020), Effect of Impulsivity Traits on Food Choice within a Nudging Intervention. *Nutrients*, **12**:1402. <https://doi.org/10.3390/nu12051402>.
- McGill, R., Anwar, E., Orton, L., et al. (2015), Are interventions to promote healthy eating equally effective for all? Systematic review of socioeconomic inequalities in impact Health behavior, health promotion and society. *BMC Public Health*, **15**:457. <https://doi.org/10.1186/s12889-015-1781-7>.
- Milosavljevic, M., Navalpakkam, V., Koch, C., Rangel, A. (2012), Relative visual saliency differences induce sizable bias in consumer choice. *Journal of Consumer Psychology*, **22**:67–74. <https://doi.org/10.1016/j.jcps.2011.10.002>.
- Mohr, P., Wilson, C., Dunn, K., et al. (2007), Personal and lifestyle characteristics predictive of the consumption of fast foods in Australia. *Public Health Nutrition*, **10**:1456–1463. <https://doi.org/10.1017/S1368980007000109>.
- Moore, M. (2012), Interactive media usage among millennial consumers. *Journal of Consumer Marketing*, **29**:436–444. <https://doi.org/10.1108/07363761211259241>.
- Noale, M., Nardi, M., Limongi, F., et al. (2014), Adolescents in southern regions of Italy adhere to the Mediterranean diet more than those in the northern regions. *Nutrition Research*, **34**:771–779. <https://doi.org/10.1016/j.nutres.2014.08.001>.
- Novak, N.L., Brownell, K.D. (2012), Role of policy and government in the obesity epidemic. *Circulation*, **126**:2345–2352. <https://doi.org/10.1161/CIRCULATIONAHA.111.037929>.
- Oakes, M.E., Slotterback, C.S. (2001), Judgements of food healthfulness: Food name stereotypes in adults over age 25. *Appetite*, **37**:1–8. <https://doi.org/10.1006/appe.2001.0405>.
- Papies, E.K., Veling, H. (2013), Healthy dining. Subtle diet reminders at the point of purchase increase low-calorie food choices among both chronic and current dieters. *Appetite*, **61**:1–7. <https://doi.org/10.1016/j.appet.2012.10.025>.

- Pelletier, J.E., Laska, M.N. (2012), Balancing Healthy Meals and Busy Lives: Associations between Work, School, and Family Responsibilities and Perceived Time Constraints among Young Adults. *Journal of Nutrition Education and Behavior*, **44**:481–489. <https://doi.org/10.1016/j.jneb.2012.04.001>.
- Pereira, M.A., Kartashov, A.I., Ebbeling, C.B., et al. (2005), Fast-food habits, weight gain, and insulin resistance (the CARDIA study): 15-year prospective analysis. *The Lancet*, **365**:36–42. [https://doi.org/10.1016/S0140-6736\(04\)17663-0](https://doi.org/10.1016/S0140-6736(04)17663-0).
- Powell, P.K., Durham, J., Lawler, S. (2019), Food Choices of Young Adults in the United States of America: A Scoping Review. *Advances in Nutrition*, **10**:479–488. <https://doi.org/10.1093/advances/nmy116>.
- Prescott, J., Young, O., O’Neill, L., et al. (2002), Motives for food choice: A comparison of consumers from Japan, Taiwan, Malaysia and New Zealand. *Food Quality and Preference*, **13**:489–495. [https://doi.org/10.1016/S0950-3293\(02\)00010-1](https://doi.org/10.1016/S0950-3293(02)00010-1).
- Raghunathan, R., Naylor, R.W., Hoyer, W.D. (2006), The Unhealthy = Tasty Intuition and Its Effects on Taste Inferences, Enjoyment, and Choice of Food Products. *Journal of Marketing*, **70**:170–184. <https://doi.org/10.1509/jmkg.70.4.170>.
- Reinders, M.J., Huitink, M., Dijkstra, S.C., et al. (2017), Menu-engineering in restaurants - adapting portion sizes on plates to enhance vegetable consumption: A real-life experiment. *International Journal of Behavioral Nutrition and Physical Activity*, **14**:41. <https://doi.org/10.1186/s12966-017-0496-9>.
- Riddell, L.J., Ang, B., Keast, R.S.J., Hunter, W. (2011), Impact of living arrangements and nationality on food habits and nutrient intakes in young adults. *Appetite*, **56**:726–731. <https://doi.org/10.1016/j.appet.2011.02.010>.
- Roberto, C.A. (2020), How psychological insights can inform food policies to address unhealthy eating habits. *American Psychologist*, **75**:265–273. <https://doi.org/10.1037/amp0000554>.
- Robinson, E., Otten, R., Hermans, R.C.J. (2016), Descriptive peer norms, self-control and dietary behaviour in young adults. *Psychology & Health*, **31**:9–20. <https://doi.org/10.1080/08870446.2015.1067705>.
- Roininen, K., Lähteenmäki, L., Tuorila, H. (1999), Quantification of consumer attitudes to health and hedonic characteristics of foods. *Appetite*, **33**:71–88. <https://doi.org/10.1006/appe.1999.0232>.
- Rozin, P., Ashmore, M., Markwith, M. (1996), Lay American Conceptions of Nutrition: Dose Insensitivity, Categorical Thinking, Contagion, and the Monotonic Mind. *Health Psychology*, **15**:438–447. <https://doi.org/10.1037/0278-6133.15.6.438>.
- Saka, B., Kaya, O., Ozturk, G.B., et al. (2010), Malnutrition in the elderly and its relationship with other geriatric syndromes. *Clinical Nutrition*, **29**:745–748. <https://doi.org/10.1016/j.clnu.2010.04.006>.
- Salmon, S.J., De Vet, E., Adriaanse, M.A., et al. (2015), Social proof in the supermarket: Promoting healthy choices under low self-control conditions. *Food Quality and Preference*, **45**:113–120. <https://doi.org/10.1016/j.foodqual.2015.06.004>.
- Samuelson, W., Zeckhauser, R. (1988) Status quo bias in decision making. *Journal of Risk and Uncertainty*, **1**:7–59. <https://doi.org/10.1007/BF00055564>.
- Saulais, L., Massey, C., Perez-Cueto, F.J.A., et al. (2019), When are “Dish of the Day” nudges most effective to increase vegetable selection? *Food Policy*, **85**:15–27. <https://doi.org/10.1016/j.foodpol.2019.04.003>.
- Scaglioni, S., Arrizza, C., Vecchi, F., Tedeschi, S. (2011), Determinants of children’s eating behavior. *American Journal of Clinical Nutrition*, **94**:2006S–2011S. <https://doi.org/10.3945/ajcn.110.001685>.
- Stroud, C., Walker, L.R., Davis, M., Irwin, C.E. (2015), Investing in the health and well-being of young adults. *Journal of Adolescent Health*, **56**:127–129. <https://doi.org/10.1016/j.jadohealth.2014.11.012>.
- Tangari, A.H., Banerjee, S., Verma, S. (2019), Making a good thing even better? The impact of claim congruency on competing product goals and consumer evaluations. *Journal of Business Research*, **101**:12–22. <https://doi.org/10.1016/j.jbusres.2019.03.059>.
- Thaler, R.H., Sunstein, C.R. (2008), *Nudge: Improving Decisions About Health, Wealth, and Happiness*. Penguin Books, London.
- Tonkin, M., Kemps, E., Prichard, I., et al. (2019), It’s all in the timing: The effect of a healthy food cue on food choices from a pictorial menu. *Appetite*, **139**:105–109. <https://doi.org/10.1016/j.appet.2019.04.026>.

- Torma, G., Aschemann-Witzel, J., Thøgersen, J. (2018), I nudge myself: Exploring 'self-nudging' strategies to drive sustainable consumption behaviour. *International Journal of Consumer Studies*, **42**:141–154. <https://doi.org/10.1111/ijcs.12404>.
- Truill, W.B., Mazzocchi, M., Niedźwiedzka, B., et al. (2013), The EATWELL project: Recommendations for healthy eating policy interventions across Europe. *Nutrition Bulletin*, **38**:352–357. <https://doi.org/10.1111/nbu.12048>
- Truscott, J. (2019), Sugar consumption tax: A good idea or not? *Journal of Law and Medicine*, **26**:681–690.
- Turnwald, B.P., Bertoldo, J.D., Perry, M.A., et al. (2019), Increasing Vegetable Intake by Emphasizing Tasty and Enjoyable Attributes: A Randomized Controlled Multisite Intervention for Taste-Focused Labeling. *Psychol Sci*, **30**:1603–1615. <https://doi.org/10.1177/0956797619872191>.
- van Kleef, E., Seijdell, K., Vingerhoeds, M.H., et al. (2018), The effect of a default-based nudge on the choice of whole wheat bread. *Appetite*, **121**:179–185. <https://doi.org/10.1016/j.appet.2017.11.091>.
- van Kleef, E., van Trijp, H.C.M. (2018), Methodological Challenges of Research in Nudging. In: Ares, G., Varela, P., Methods in Consumer Research, Volume 1: New Approaches to Classic Methods. Elsevier, pp 329–349.
- Van Kleef, E., Vrijhof, M., Polet, I.A., et al. (2014), Nudging children towards whole wheat bread: A field experiment on the influence of fun bread roll shape on breakfast consumption. *BMC Public Health*, **14**:1–11. <https://doi.org/10.1186/1471-2458-14-906>
- Vecchio, R., Cavallo, C. (2019), Increasing healthy food choices through nudges: A systematic review. *Food Quality and Preference*, **78**:103714. <https://doi.org/10.1016/j.foodqual.2019.05.014>.
- Ventura, A.K., Birch, L.L. (2008), Does parenting affect children's eating and weight status? *International Journal of Behavioral Nutrition and Physical Activity*, **5**:15. <https://doi.org/10.1186/1479-5868-5-15>.
- Volkert, D. (2002), Malnutrition in the elderly — prevalence, causes and corrective strategies. *Clinical Nutrition*, **21**:110–112. [https://doi.org/10.1016/s0261-5614\(02\)80014-0](https://doi.org/10.1016/s0261-5614(02)80014-0).
- Wagner, H.S., Howland, M., Mann, T. (2015), Effects of subtle and explicit health messages on food choice. *Health Psychology*, **34**:79–82. <https://doi.org/10.1037/hea0000045>.
- Yang, Y.T., Benjamin-Neelon, S.E. (2019), Recent progress in children's meals law in restaurants in Baltimore City and California State: Making a healthy beverage option the default choice. *Preventive Medicine*, **123**:160–162. <https://doi.org/10.1016/j.ypmed.2019.03.031>.
- Zandstra, E.H., De Graaf, C., Van Staveren, W.A. (2001), Influence of health and taste attitudes on consumption of low- and high-fat foods. *Food Quality and Preference*, **12**:75–82. [https://doi.org/10.1016/S0950-3293\(00\)00032-X](https://doi.org/10.1016/S0950-3293(00)00032-X).
- Zhou, X., Perez-Cueto, F., Santos, Q., et al. (2018), A Systematic Review of Behavioural Interventions Promoting Healthy Eating among Older People. *Nutrients*, **10**:128. <https://doi.org/10.3390/nu10020128>.
- Zhou, X., Perez-Cueto, F.J.A., Dos Santos, Q., et al. (2019), Promotion of novel plant-based dishes among older consumers using the 'dish of the day' as a nudging strategy in 4 EU countries. *Food Quality and Preference*, **75**:260–272. <https://doi.org/10.1016/j.foodqual.2018.12.003>.

## **Appendix. Measurements applied in the survey**

### **A.1 General Health Interest scale items (Roininen et al., 1999)**

1. (R) The healthiness of food has little impact on my food choices.
2. I am very particular about the healthiness of food I eat.
3. (R) I eat what I like, and I do not worry much about the healthiness of food.
4. It is important for me that my diet is low in fat.
5. I always follow a healthy and balanced diet.
6. It is important for me that my daily diet contains a lot of vitamins and minerals.
7. (R) The healthiness of snacks makes no difference to me.
8. (R) I do not avoid foods, even if they may raise my cholesterol.

Answer scale: Agreement from 1 (totally disagree) to 7 (totally agree).

### **A.2 Unhealthy=Tasty Intuition (UTI) scale items (Raghunathan et al., 2006)**

1. Things that are good for me rarely taste good
2. There is no way to make food healthier without sacrificing taste

Answer scale: Agreement from 1 (totally disagree) to 7 (totally agree).

### **A.3 Risk preferences (Holt and Laury, 2002)**

Please state what is your tendency to take risks in everyday life from “Not at all willing to take any risk” to “Completely willing to take any risk”.

Answer scale: from 0 (not at all willing) to 10 (completely willing).

### **A.4 Time Preferences (Courtemanche et al., 2015)**

Suppose you won a 1000€ prize that you can withdraw immediately. You are proposed to withdraw your prize after a year, receiving a higher amount. What is the minimum amount that is able to convince you to wait for one year?

Answer range: from 0€ to 1000€.