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**D4.1 Assessment of enhanced choice architecture that optimises and exploits vegetable consumption.**

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# PREFACE

The research reported here supported by the European Commission under the Seventh Framework Programme for Support for training and career development of researchers Marie Curie Industry Academia Partnerships and Pathways (IAPP) – VeggiEAT Project No. 612326. The objective of the project is to critically evaluate vegetable acceptability through individual and environmental characteristics across the lifespan in institutional food service. This report refers specifically to the Deliverable D4.1-WP4 - *Assessment of enhanced choice architecture that optimizes and exploits vegetable consumption*. The study is based on the field work on nudging to promote VeggiEAT dishes in Denmark, France, Italy and United Kingdom, Final Report. The results contribute to the in-depth understanding that the dish of the day strategy (nudging) does not work for European citizens’ under the experiment conditions, when the alternative dishes (animal-based dishes) are very familiar to the consumers. Future studies with this nudging strategy with unfamiliar alternative dishes are needed to check the efficacy of this strategy.

University of Copenhagen (KU) coordinated the work, supported by Bonduelle, Bournemouth University, Institut Paul Bocuse and University of Florence. Correspondence should be addressed to Federico J. Armando Pérez-Cueto, University of Copenhagen, Department of Food Science, Rolighedsvej 26, 1958, Frederiksberg C, Denmark. Tel. +45 60 74 33 90. Email: apce@food.ku.dk.

Copenhagen, August, 2017.

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# EXECUTIVE SUMMARY

The objective of WP4 was to evaluate the determinants of vegetable acceptability and sustained consumption across age groups and institutional settings, namely school, and seniors. The study was replicated in Denmark, France, Italy and the UK, representing the main potential market for new vegetable products in Europe. Regarding the experimental protocol, the general principles were applied to all countries. Beyond these common principles, the procedure and implementation were decided according to the context in each country and results were analyzed as independent case studies.

A total of 380 adolescents and 345 elderly citizens from Denmark, France, Italy and United Kingdom participated in this study.

The two questionnaires applied consisted of sociodemographic characteristics and hunger scale (questionnaire 1); food related lifestyle (adherence to Mediterranean Diet, Food Frequency Questionnaire, Food Neophobia, Buffet View); personal values (Human Values Scale, self-efficacy, social norms and self-estimated health) and attitudes towards nudging.

The rationale for dish selection was that the dishes selected would not be spontaneously consumed, but are likely to be consumed if chosen (with the help of choice architecture). The experimental design was between subject and comprised two conditions: neutral and nudge. Participants then chose between three similar meals, one of them the VeggiEat dish. In the intervention situation, the VeggiEat dish was termed the “dish of the day”; in the control situation it was not. In both situations, the plant-based dish was displayed between the two alternative dishes.

The VeggiEAT dish consisted of vegetable “polpettes” (balls) incorporating peas and sweet corn, developed at Institut Paul Bocuse, France, in a previous stage of the Project. The development of this dish was based on the sensory determinants of stated liking and actual liking of canned vegetables peas and sweet corn. The alternative dishes were traditional meatballs (made with beef) or fish cakes (made with white minced fish). All the dishes were served with rice, salad and tomato sauce.

The key result is that this nudging strategy, ”dish of the day”, did not work for our sample under the experiment conditions. Most of the participants chose the animal-based dishes in both control and intervention groups. The two alternative dishes were very popular to adolescents and elderly, and this can be a reason for the low prevalence of the VeggiEAt dish among the sample. The participants also reported a high food neophobia, which could have prevented them from experimenting with the new plant-based dish.

Furthermore, all adolescents showed moderate adherence to Mediterranean scores and elderly from Denmark had the lowest score. As the Mediterranean diet is a plant-based diet, a low adherence to this dietary pattern can be reflected by the preference for animal-based dishes.

Seniors showed a more positive attitude towards nudging than adolescents, but it does not mean that all nudging strategies will work for this population. One the other hand, they are very traditional, which could have been an additional barrier for the success of the experiment.

In conclusion, under the study circumstances, “the dish of the day” was not the best strategy to move adolescents and seniors towards a healthier eating pattern.

# INTRODUCTION

Developing positive eating habits begins in childhood but is important to be stimulated throughout the whole life course. Among these habits is the consumption of fruits and vegetables, which are very good sources of vitamins, minerals and dietary fibre as well of other nutrients that perform essential roles in the proper functioning of the human body, and can help inhibit the increasing global rates of overweight, obesity and nutrition-related non-communicable diseases (NCDs) (Caine-Bish & Scheule, 2009; WHO, 2015). Despite initiatives designed to increase intake, the majority of Europeans from all age groups do not meet the dietary guidelines for fruit and vegetable intake, which recommend at least five portions a day (Elmadfa et al., 2009; Freshfel, 2015; Mintel, 2012). There is a distinction, however, between fruit and vegetable impact on health (Slavin, & Lloyd, 2012). Increasing evidence suggests greater benefits from a high consumption specifically of vegetables. Notwithstanding, while there have been studies of perceptions of freshness, psychosocial, environmental and life course factors influencing fruit consumption, there is very little data on vegetables and this constitutes an under researched area (Appleton et al., 2016).

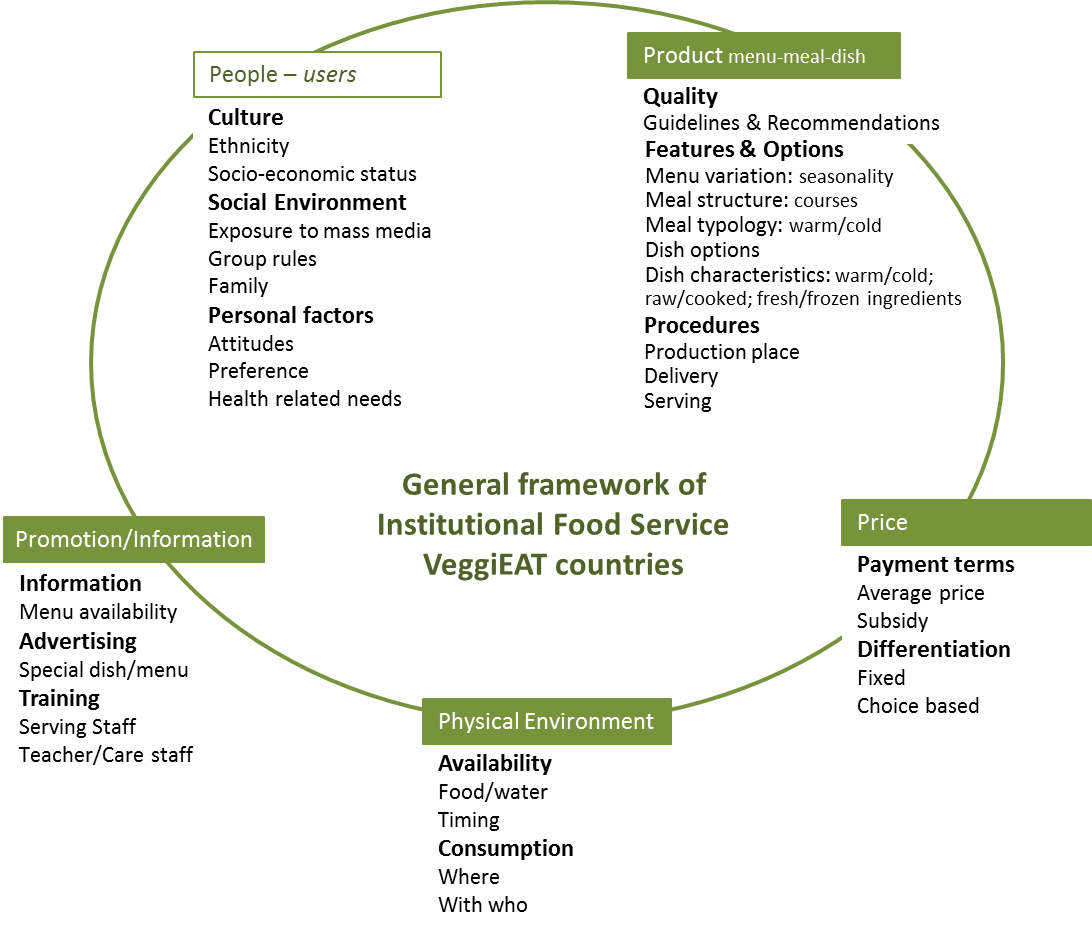
Food consumer behaviour is highly complex with many external and internal influences on perception, attitude and action. The product attributes, the individual characteristics of the consumer and the eating environment all play a key role in food-related decisions. Dietary habits and food choices are the result of decisions and actions that are based on two routines: one that requires very little active decision-making, and another where choice options are carefully considered. The dual process theories describe these two routines as automatic/heuristic and reflective/systematic processing of information available in choice situations. Choice architecture or nudging describes the way in which decisions are influenced by how choices are presented in these situations (Thaler & Sunstein, 2008). It is a tool that alters people’s behaviour in a predictable way without forbidding any options or significantly changing their economic incentives (Quest & Needham, 2008). Within public health nutrition this could mean altering the environment in foodservice provision such as product placement or labelling or even encouraging consumers to sit together for their meal.

The effect of nudging interventions on promotion of healthy foods, such as vegetables, has started attracting attention, particularly when it comes to making the healthier choices the easier ones (Hansen et al., 2016), and the potential role that food service providers can play in facilitating such choices (Skov et al., 2013). Most of the studies thus far lack of a measurable effect size (Appleton et al., 2016; Skov et al., 2013; Nørnberg et al., 2015).Despite the virulence of the debate around nudging strategies as public policies, little is known on the effects, if any, of their implementation through food service and their role in the promotion of a healthier dietary intake. Additionally, although previous research has been conducted on vegetable promotion, there is a paucity of data on the inclusion of vegetables as part of a composite meal, especially in a foodservice situation.

This VeggiEAT work package (WP4) aimed to address the automatic pathways in order to facilitate the choice of vegetables by consumers in real life foodservice settings designed for two very different but crucial age groups: adolescents and seniors. Evaluating the nudging in a real life approach is a methodology that has not been used before in this context. To address this objective, a VeggiEAT dish designed in WP3 was tested using the ‘dish of the day` as a nudging strategy to promote its consumption by adolescents and senior consumers in the four countries as part of the project: Denmark, France, Italy and UK.

## BACKGROUND FRAMEWORK

Foodscapes within school and senior care facilities are highly heterogeneous across countries and can therefore be difficult to describe and analyse in a coherent form. A common Framework to describe both foodscapes was developed based on a number of marketing references (Figure 1).



#### Figure 1. Vegetable based recipe development to Institutional Foodservice general framework. Adapted from the four P’s classification[[1]](#footnote-1), the four C’s classification[[2]](#footnote-2), and Service 7[[3]](#footnote-3).

# MATERIALS AND METHODS

**The choice architecture study**

* **Design:** Randomised field trial with random allocation to the intervention or the control situations.
* **Outcome of interest:** Dish choice

VeggiEat dish:

* Vegetables “polpettes” (balls) developed in WP3

§ Rationale for dish selection: the one which better filled nutrition requirements

§ Same portion and same shape in all countries (120g in total)

§ Side dish: starches (rice or pasta) + tomato sauce

§ Alternative dishes: meat balls and fish cakes

#### Conditions

§ Neutral= 3 choices of dish presented as equal opportunities

§ Nudging= target dish displayed as the “dish of the day”

\*The names of dishes were constant over the experiment in each country

#### Sample criteria

* Sample size on the basis of the pilot test conducted in Institute Paul Bocuse (IPB) in November 2015
* Minimum of 88 individuals in each centre and age group

§ Elderly: people over 65 🡪 44 (intervention) + 44 (control)

§ Adolescents: people between 12-18 🡪 44 (intervention) + 44 (control)

§ 50% male and female (preferable)

**Alpha:** 0.05

**Power:** 0.80

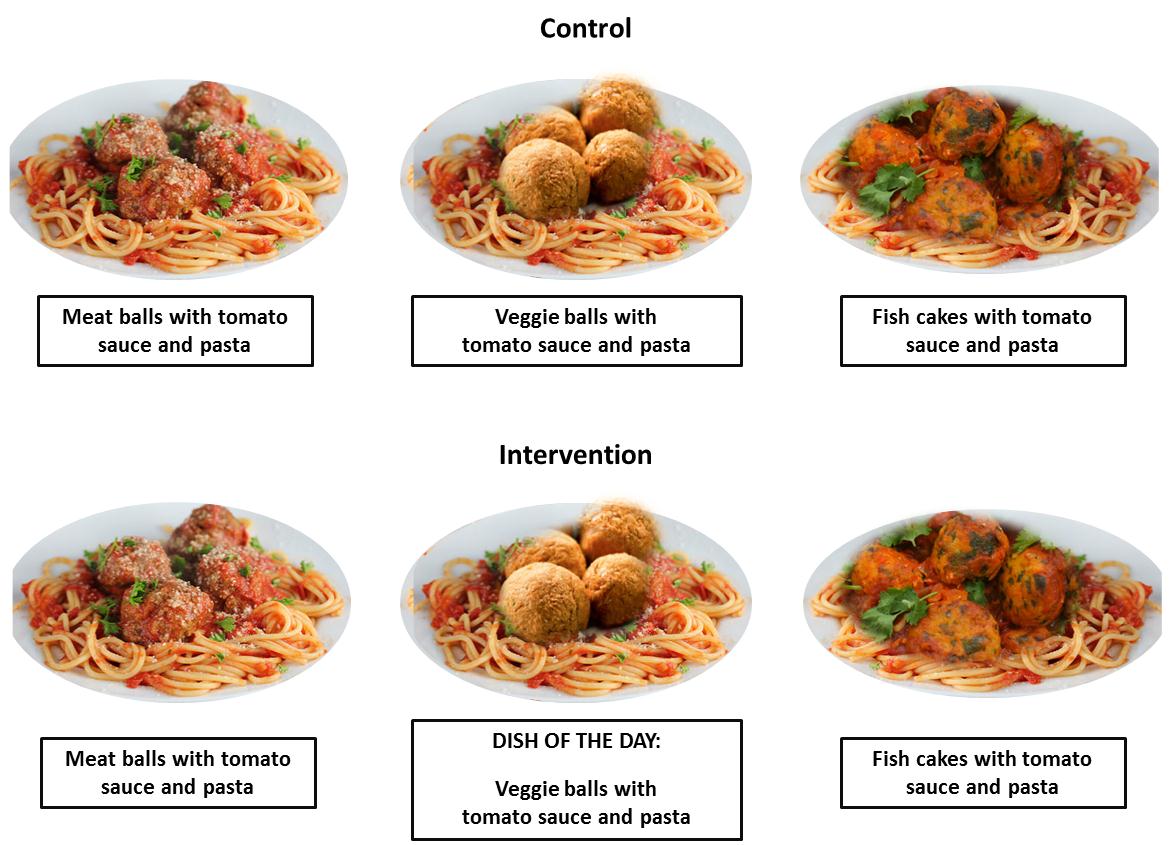
#### Logistics:

Each VeggiEAT centre (Copenhagen, Lyon, Florence and Bournemouth) contacted catering providers to explain the study and volunteer to participate. The recruitment of participants was conducted in schools, and senior societies and care centres, according to each particular scenario. The preparation of the VeggiEAT dish for the study followed the same recipe (APPENDIX 1) in all four countries.

#### Data collection:

Before initiating their meals, each participant was provided with a randomly generated identification number, read and signed a consent form (APPENDIX 2) and the first questionnaire (hunger/satiety scale – APPENDIX 3). Adolescents, if younger than 16 years old, were also required to provide a form signed by their legal guardian. Each centre was responsible to provide the form in the national language.

The choice architecture intervention employed was to use the “Dish of the Day” as a nudge. Participants were asked to choose in a control situation between three similar meals, one of them the VeggiEat dish, whilst during the intervention, the VeggiEat dish was termed the “Dish of the day”, and was displayed in between the other two dishes (Figure 2).



#### Figure 2 – Example of how the dishes in control and intervention conditions were presented:

**Control group:**

1. The 3 dishes available were labelled with their names and presented as equal opportunities (Figure 3)
2. The chosen dish requested by the participant was served and registered using the corresponding participant id
3. After the participant finished the lunch, the second questionnaire was administered (APPENDIX 4 for seniors and APPENDIX 5 for adolescents)



#### Figure 3 – Dishes presented as equal opportunities

**Intervention group:**

1. The VeggiEAT dish was labelled with its name and also described as the “Dish of the Day”. The other 2 alternative dishes were only labelled with their names and presented as equal opportunities (Figure 4).
2. The chosen dish requested by the participant was served and registered using the corresponding participant id.
3. The second questionnaire (APPENDIX 4 for seniors and APPENDIX 5 for adolescents)was applied.



#### Figure 4 – VeggiEAT dish presented using the nudging strategy

#### Data handling

Data were entered following a standardised procedure with codes agreed beforehand, and processed and analysed using statistical software.

**Data analysis:** dependent variable quantity consumed, random effect each individual, fixed effects gender, covariates age & background data.

#### Ethics

Ethical approval was sought and granted through standard procedures in all countries. Appropriate health and safety considerations, together with a risk assessment protocol, were carried out prior to the commencement of the research. Individual written informed consent was obtained from all individuals. Confidentiality and anonymity were assured at all times.

# RESULTS

#### Description about the recruitment process

#### Denmark

* **ADOLESCENTS**

The recruitment was achieved from 25 of January to 15 of February. The first step was to send an email to all schools with students from 12 to 17 years old in Copenhagen, Denmark, explaining about the VeggiEAT Project and inviting them to participate in our study. Three schools agreed to participate in the VeggiEAT study: Copenhagen International School (CIS), Ørestad Gymnasium and Trekronergade Freinetskole.

Data collection occurred on three occasions, in February, March and April 2017, during lunchtime (Copenhagen International School and Ørestad Gymnasium) and during dinnertime (Trekronergade Freinetskole). For Copenhagen International School, food was prepared and served at the school cafeteria. For the other two schools, food was prepared at the Gastrolab (Gastronomy laboratory at University of Copenhagen) and served in the Sensory Evaluation Room, at the University.

The ninety-four participants were randomly allocated to control and intervention groups.

* **SENIORS**

The recruitment was achieved through phone calls to senior centres located inside and outside Copenhagen area and through emails to the senior consumer panel of the University of Copenhagen**.** Participants over 65 years old were invited to take part in the study. Four data collection periods occurred from March to May 2017, during lunchtime. Three senior centres participated in the data collection: Aktivitetscenter Nødager, located in Lejre Commune; Aktivitets- og Frivilligcenter in Solrød Commune and Seniorhuset Korsagergård in Vallensbæk Commune. The last data collection was held at the University of Copenhagen with members from the University food panel. Ninety-seven participants who agreed to participate in the study were randomly allocated to control and intervention groups. Seniors from Vallensbæk were the intervention group (n=49) and seniors from Lejre, Solrød and food panel were the control group (n=48).

#### France

* **ADOLESCENTS**

In France, individuals were invited for the same meal in the same context, the Living Lab of the Institute Paul Bocuse, a real restaurant designed as a platform for data collection.

Choices were made individually from a menu card (prior to seeing the dishes) that indicated the veggie balls as dish of the day for the intervention group. The order of presentation of the dishes on the menu were randomized on each menu card to minimize ordering effects.

Recruitment was conducted via email from the IPB’s internal consumer database, as well as online through social networks ads. Participants came for dinner and completed the survey afterwards. The meal was offered as an incentive to attract respondents. The inclusion criteria, besides meeting the age constraints, was absence of food allergies.

* **SENIORS**

The recruitment followed the same methodology as for adolescents, with the exception that the seniors were invited for lunch at IPB.

#### Italy

* **ADOLESCENTS**

The recruitment was conducted in a secondary school located in Firenze, through school personnel. All students aged 14-16 years old were invited to participate. Data collection occurred on one occasion, in May 2017, during lunch time, at the canteen annex to the school ran by the school personnel. The meal consisted of three dishes: first course (risotto with mushrooms), main dish (baked balls served with green salad) and dessert (fruit tart).

The eighty-seven participants who signed up for the study were randomly allocated to control and intervention groups.

* **SENIORS**

The recruitment was conducted through mailing key people responsible for lunch clubs in Florence. Participants over 65 years old were invited to take part in the study. Data collection occurred May 2017 during lunch time, at a club located at Pian di Mugnone (FI).The meal consisted of three dishes: first course (pasta with fresh tomato sauce), main dish (baked balls served with green salad) and dessert (apple crumble with cream).

The forty-seven participants who signed up for the study were randomly allocated to control and intervention groups.

#### United Kingdom

* **ADOLESCENTS**

The recruitment was conducted in an educational establishment located in Bournemouth, through email and posters. All students aged 16-19 years old were invited to participate. Data collection occurred on three occasions, in January and March 2017, during lunch time, in a canteen run by the Hospitality students from Bournemouth University. The eighty six participants who signed up for the study were randomly allocated to control and intervention groups.

* **SENIORS**

The recruitment was conducted through mailing key people responsible for senior care centres, churches and lunch clubs in Bournemouth. Participants over 65 years old were invited to take part in the study. Data collection occurred on 21 December 2016 during lunch time, at a canteen located in Bournemouth University. The eighty seven participants who signed up for the study were randomly allocated for having their meals at two different times, in order to test control and intervention conditions.

* **MAIN RESULTS**:
* **ADOLESCENTS**

Socio demographic characteristics of our sample by country is found in Table 1.

In most countries, prevalence of males and females in the sample is around 50%, except in Italy where the prevalence of the male adolescents is slightly higher (60%). Mean age also varies, however it is within the range allowed for our sample (13-19 years old). Denmark is the country with higher prevalence of vegetarians, followed by the United Kingdom, France and Italy. In relation to frequency of eating out, in Denmark, Italy and United Kingdom more than 80% of the adolescents have their meals outside the home up to 2 times a week. In France, a higher proportion of adolescents consume meals outside the home (34% reported eating out from 3-4 days a week up to everyday). A similar scenario was found for eating in the school canteen.

**Table 1: Socio-demographic characteristics of adolescents by country**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Denmark (n=94)** | **France**  **(n=112)** | **Italy**  **(n=88)** | **United Kingdom**  **(n=86)** |
| **Sex (% female)** | 48.8 | 50.0 | 40.0 | 48.8 |
| **Age (years)** |  | | | |
| Mean (SD) | 14.8 (0.85) | 17.1 (1.17) | 15.4 (0.87) | 17.1 (0.96) |
| Range | 13-17 | 16-19 | 14-16 | 16-19 |
| **People who declared to be Vegetarian (%)** | 9.6 | 2.7 | 1.7 | 5.8 |
| **Frequency of eating out (%)** |  | | | |
| Never | 10.6 | 3.0 | 13.0 | 10.5 |
| Once a week or less | 57.5 | 38.0 | 55.0 | 52.0 |
| 2-days a week | 23.4 | 14.5 | 24.0 | 22.0 |
| 3-4 days a week | 3.2 | 20.0 | 8.0 | 10.5 |
| Everyday | 5.3 | 14.0 | 0 | 5.0 |
| **Frequency of eating in canteen (%)** |  | | | |
| Never | 32.0 | 27.5 | 50.0 | 25.6 |
| Once a week or less | 24.0 | 11.0 | 38.0 | 36.0 |
| 2-days a week | 13.0 | 13.0 | 1.0 | 16.3 |
| 3-4 days a week | 15.0 | 26.0 | 1.0 | 17.4 |
| Everyday | 16.0 | 22.5 | 0 | 4.7 |

When compared the choice of dish between control and intervention groups in each country (Table 2), no differences were found. The majority of adolescents, both in intervention and control groups, have chosen the animal-based dishes.

**Table 2: Proportional comparison with (%) of choice of dish between intervention and control groups in adolescents by country**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Country** | **Choice of Dish** | **Intervention** | **Control** | **P value** |
| Denmark | Meat balls | 30 (67.0) | 33 (67.4) | 0.81 |
| Veggie balls | 11 (24.0) | 10 (20.4) |
| Fish cakes | 4 (9.0) | 6 (12.2) |
| France | Meat balls | 44 (72.0) | 41 (74.0) | 0.94 |
| Veggie balls | 9 (15.0) | 7(13.0) |
| Fish cakes | 8 (13.0) | 7 (13.0) |
| Italy | Meat balls | 28 (65.0) | 26 (62.0) | 0.82 |
| Veggie balls | 8 (19.0) | 7(17.0) |
| Fish cakes | 7 (16.0) | 9 (21.0) |
| UK | Meat balls | 22 (51.0) | 22 (51.0) | 0.80 |
| Veggie balls | 8 (19.0) | 6 (14.0) |
| Fish cakes | 13 (30.0) | 15 (35.0) |

Means and Confidence intervals for the scales used in VeggiEAT questionnaires by country are seen in table 3. There is no difference between the mean of most scales when comparing countries, since the confidence intervals of the mean overlaps, except for self-efficacy, liking of the dish and hunger scale. In relation to self-efficacy, French adolescents scored higher when compared to the other countries. On the other hand, Italian adolescents scored lower when compared to Danish and French adolescents. When Italians were compared to adolescents from UK, no differences were found for this scale. For the liking of the dishes, adolescents from the UK reported a higher mean score and Italians had the lower mean score. Finally, for the hunger scale, a difference was found when comparing Danish adolescents with French ones (the first ones reported a higher score compared to the last ones).

**Table 3: Means and CI for scales used in VeggiEAT for adolescents**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variables**  **(mean and CI)** | **Denmark** | **France** | **Italy** | **United Kingdom** |
|  |  |  |  |  |
| Nudging scale | 26.9 (25.0; 28.8) | 27.8 (26.7; 28.8) | 27.8 (26.5;28.9 ) | 29.9 (28.1; 31.9) |
| Food Neophobia scale | 39.8 (38.6; 41.1) | 40.6 (39.6; 41.7) | 38.4 (36.8;39.9) | 40.1 (38.5; 41.8) |
| Mediterranean score | 6.8 (6.5; 7.1) | 6.8 (6.4; 7.2) | 6.8 (6.4; 7.1) | 6.9 (6.5; 7.4) |
| Self-efficacy scale | 29.9 (29.0; 30.8) | 36.2 (35.1; 37.2) | 27.6 (26.6; 28.6) | 28.8 (27.5; 30.1) |
| Buffet view scale | 15.7 (15.1; 16.3) | 15.7 (15.4; 16.2) | 14.7 (14.1; 15.4) | 15.4 (14.6; 16.1) |
| Liking scale | 3.5 (3.3; 3.7) | 3.6 (3.4; 3.7) | 2.8 (2.6; 3.0) | 4.0 (3.8; 4.2) |
| Hunger scale | 3.9 (3.7; 4.1) | 3.4 (3.2; 3.6) | 3.6 (3.3; 3.8) | 4.0 (3.6; 4.3) |

Table 4 shows the mean and confidence interval for each dimension of the Food Choice Questionnaire scale (Health, Mood, Sensory, Convenience, Natural, Price, Weight and Familiarity). For this scale, a difference was detected for price dimension when comparing Denmark with the UK (Danish adolescents scored lower than the ones from UK). In weight and familiarity dimensions, a difference was seen for Italy in relation to all countries (Italians scored higher).

**Table 4: Means and CI for each dimension of Food Choice Questionnaire scale in VeggiEAT for adolescents**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variables**  **(mean and CI)** | **Denmark** | **France** | **Italy** | **United Kingdom** |
| Health | 2.8 (2.6; 2.9) | 2.7 (2.6; 2.8) | 2.7 (2.6; 2.8) | 2.8 (2.7; 2.9) |
| Mood | 2.6 (2.5; 2.7) | 2.5 (2.4; 2.6) | 2.7 (2.6; 2.9) | 2.7 (2.6; 2.8) |
| Sensory | 3.1 (3.0; 3.2) | 3.1 (3.0; 3.2) | 2.9 (2.7; 3.1) | 3.2 (3.1; 3.3) |
| Convenience | 2.4 (2.6; 2.8) | 2.5 (2.4; 2.6) | 2.7 (2.5; 2.8) | 2.4 (2.2; 2.6) |
| Natural | 2.5 (2.3; 2.6) | 2.4 (2.3; 2.6) | 2.7 (2.5; 2.9) | 2.5 (2.3; 2.7) |
| Price | 2.3 (2.2; 2.5) | 2.5 (2.3; 2.6) | 2.6 (2.4; 2.8) | 2.8 (2.6; 2.9) |
| Weight | 2.1 (2.0; 2.3) | 2.0 (1.8; 2.1) | 2.7 (2.6; 2.9) | 2.3 (2.1; 2.5) |
| Familiarity | 2.0 (1.8; 2.1) | 1.9 (1.7; 2.0) | 2.4 (2.2; 2.6) | 2.2 (2.0; 2.4) |

For the Human Values Scale (Table 5), differences were found for French adolescents in Hedonism and Security dimensions. They scored lower and higher in these dimensions, respectively, when compared to the other countries.

**Table 5: Means and CI for each dimension of Human Values Scale in VeggiEAT for adolescents**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variables**  **(mean and CI)** | **Denmark** | **France** | **Italy** | **United Kingdom** |
| Conformity | 3.2 (3.0; 3.5) | 3.6 (3.4; 3.8) | 3.5 (3.2; 3.7) | 3.4 (3.1; 3.6) |
| Tradition | 3.1 (2.9; 3.3) | 3.3 (3.1; 3.6) | 3.0 (2.7; 3.2) | 3.0 (2.8; 3.3) |
| Benevolence | 2.0 (1.8; 2.2) | 2.0 (1.9; 2.2) | 2.4 (2.1; 2.7) | 2.1 (1.9; 2.4) |
| Universalism | 2.3 (2.1; 2.5) | 2.5 (2.3; 2.7) | 2.6 (2.4; 2.8) | 2.4 (2.2; 2.6) |
| Self -direction | 2.4 (2.2; 2.6) | 2.1 (1.9; 2.3) | 2.2 (1.9; 2.4) | 2.4 (2.2; 2.6) |
| Stimulation | 2.6 (2.3; 2.8) | 2.3 (2.1; 2.5) | 2.4 (2.1; 2.6) | 2.4 (2.2; 2.6) |
| Hedonism | 2.4 (2.2; 2.6) | 1.8 (1.6; 1.9) | 2.8 (2.5; 3.1) | 2.5 (2.2; 2.7) |
| Achievement | 2.8 (2.6; 3.0) | 2.6 (2.4; 2.8) | 3.0 (2.8; 3.3) | 2.4 (2.2; 2.7) |
| Power | 3.6 (3.3; 3.8) | 3.6 (3.3; 3.8) | 4.0 (3.7; 4.2) | 3.4 (3.2; 3.6) |
| Security | 2.8 (2.6; 3.0) | 3.5 (3.3; 3.7) | 2.9 (2.6; 3.1) | 2.7 (2.4; 2.9) |

Since no differences were found in the choice of the dish between control and intervention groups (main outcome), additional analyses of scales by group or by dish were not needed.

* **SENIORS**

Female citizens formed most of our sample (Table 6). Prevalence of vegetarians among the seniors was low, being higher in the UK (2.3%). The majority of the individuals eat out once a week or less.

**Table 6: Socio-demographic characteristics of seniors by country**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Denmark (n=97)** | **France**  **(n=114)** | **Italy**  **(n=47)** | **United Kingdom**  **(n=87)** |
| **Sex (% female)** | 67.0 | 60.5 | 55.3 | 62.0 |
| Mean (SD) | 73.9 (6.4) | 71.1 (5.2) | 70.7 (5.9) | 71.5 (4.9) |
| Range | 65-89 | 65-89 | 65-87 | 65-84 |
| **People who declared to be Vegetarian (%)** | 1.0 | 2.0 | 0 | 2.3 |
| **Frequency of eating out (%)** |  | | | |
| Never | 10.3 | 18.1 | 25.5 | 12.7 |
| Once a week or less | 68.0 | 66.4 | 57.4 | 58.6 |
| 2-days a week | 18.6 | 13.8 | 6.4 | 26.4 |
| 3-4 days a week | 3.1 | 0.9 | 6.4 | 2.3 |
| Everyday | 0 | 0.8 | 4.3 | 0 |

Table 7 shows the choice of the dish between control and intervention by country. Similar to the adolescents, no differences were found for this variable between the groups.

**Table 7: Proportional comparison with (%) of choice of dish between intervention and control groups in seniors by country**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Country** | **Choice of Dish** | **Intervention** | **Control** | **P value** |
| Denmark | Meat balls | 21 (42.9) | 18 (37.5) | 0.86 |
| Veggie balls | 12 (24.5) | 13 (27.1) |
| Fish cakes | 16 (32.6) | 17 (35.4) |
| France | Meat balls | 25 (42.0) | 19 (33.0) | 0.31 |
| Veggie balls | 8 (13.0) | 5 (8.0) |
| Fish cakes | 27 (45.0) | 34 (59.0) |
| Italy | Meat balls | 9 (39.0) | 7 (29.0) | 0.77 |
| Veggie | 4 (17.0) | 5 (21.0) |
| Fish balls | 10 (44.0) | 12 (50.0) |
| UK | Meat balls | 9 (20.0) | 17 (40.0) | 0.10 |
| Veggie balls | 10 (23.0) | 10 (23.0) |
| Fish cakes | 25 (57.0) | 16 (37.0) |

Means and Confidence intervals for the scales used in VeggiEAT questionnaires by country are seen in Table 8. French seniors showed high food neophobia compared to Danish ones. For the Mediterranean diet score, Danish seniors had the lowest score compared to all other countries. Furthermore, they also scored lower in the self-efficacy scale when compared to France and the United Kingdom. For this scale, France was the country with the highest score when compared to Denmark and Italy, but no statistical differences were found when compared to the United Kingdom. For the liking of the dishes, French seniors reported the lowest mean score.

**Table 8: Means and CI for scales used in VeggiEAT for seniors.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variables**  **(mean and CI)** | **Denmark** | **France** | **Italy** | **United Kingdom** |
|  |  |  |  |  |
| Nudging scale | 30.0 (28.5; 31.5) | 29.0 (27.5; 30.6) | 29.2 (26.2; 32.1) | 27.3 (25.4; 29.3) |
| Food Neophobia scale | 39.7 (38.4; 40.9) | 42.9 (41.4; 44.4) | 40.3 (37.1; 43.6) | 40.6 (39.1; 42.1) |
| Mediterranean score | 6.5 (6.1; 6.9) | 7.7 (7.3; 8.0) | 8.4 (7.8; 9.1) | 8.1 (7.6; 8.5) |
| Self-efficacy scale | 28.3 (27.1; 29.4) | 33.8 (32.9; 34.8) | 29.4 (27.9; 30.9) | 31.4 (30.4; 32.3) |
| Buffet view scale | 16.1 (15.5; 16.6) | 15.7 (15.3; 16.2) | 15.9 (14.7; 17.3) | 15.8 (15.3; 16.4) |
| Liking scale | 3.8 (3.7; 4.0) | 2.8 (2.6; 2.9) | 4.0 (3,8; 4.2) | 3.3 (3.1; 3.5) |
| Hunger scale | 4.0 (3.8; 4.2) | 3.9 (3.8; 4.0) | 3.9 (3.7; 4.1) | 4.1 (3.9; 4.2) |

Some differences were found in relation to the Food Choice Questionnaire Scale (Table 9). Italian seniors scored higher than all other countries in sensory, weight, price and familiarity dimensions; for mood dimension they scored higher when compared to France and the UK. For the Convenience dimension, Denmark scored lower than France and Italy, and Italy scored higher than UK. For the natural dimension, France and Italy scored higher than Denmark and the UK. For both weight and familiarity dimensions, Denmark scored lower than France.

**Table 9: Means and CI for each dimension of Food Choice Questionnaire scale in VeggiEAT for seniors.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variables**  **(mean and CI)** | **Denmark** | **France** | **Italy** | **United Kingdom** |
| Health | 2.9 (2.8; 3.1) | 2.9 (2.8; 3.1) | 3.3 (3.1; 3.4) | 3.2 (3.0; 3.3) |
| Mood | 2.8 ( 2.6; 2.9) | 2.7 (2.5; 2.8) | 3.1 (2.9; 3.3) | 2.5 (2.3; 2.7) |
| Sensory | 3.2 (3.1; 3.3) | 3.3 (3.2; 3.4) | 3.6 (3.5; 3.8) | 3.3 (3.2; 3.4) |
| Convenience | 2.2 (2.0; 2.4) | 2.6 (2.5; 2.7) | 2.9 (2.6; 3.2) | 2.4 (2.2; 2.5) |
| Natural | 2.9 (2.8; 3.1) | 3.4 (3.3; 3.5) | 3.4 (3.2; 3.6) | 2.9 (2.7; 3.1) |
| Price | 2.1 (1.9; 2.3) | 2.3 (2.2; 2.5) | 3.1 (2.8; 3.3) | 2.4 (2.2; 2.6) |
| Weight | 2.3 (2.1; 2.5) | 2.8 (2.6; 2.9) | 3.2 (3.0; 3.4) | 2.6 (2.4; 2.7) |
| Familiarity | 1.7 (1.6; 1.9) | 2.1 (2.0; 2.3) | 2.7 (2.4; 3.1) | 1.8 (1.7; 2.0) |

Table 10 shows each dimension of Human Values Scale. For conformity dimension, Italian seniors had the lower score compared to France and the UK and for tradition they scored lower than the UK. Danish seniors had the lowest mean for benevolence dimension. For universalism, Danish and Italian scored lower than France and the UK. For hedonism, Italians scored highest than the other countries and for achievement, they scored lower than France. Finally, French seniors scored higher for power and security dimension in relation to Danish and Italian seniors, respectively.

**Table 10: Means and CI for each dimension of Humans Values Scale in VeggiEAT for seniors**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variables**  **(mean and CI)** | **Denmark** | **France** | **Italy** | **United Kingdom** |
| Conformity | 3.0 (2.7; 3.3) | 3.2 (3.1; 3.4) | 2.5 (2.1; 2.8) | 3.4 (3.1; 3.7) |
| Tradition | 2.6 (2.4; 2.9) | 3.0 (2.8; 3.2) | 2.4 (2.1; 2.7) | 3.2 (2.9; 3.4) |
| Benevolence | 1.8 (1.6; 2.0) | 2.4 (2.2; 2.6) | 2.0 (1.7; 2.3) | 2.4 (2.1; 2.5) |
| Universalism | 2.0 (1.8; 2.2) | 2.6 (2.4; 2.8) | 1.9 (1.7; 2.2) | 2.6 (2.4; 2.7) |
| Self -direction | 2.3 (2.0; 2.6) | 2.4 (2.3; 2.6) | 2.4 (2.0; 2.6) | 2.6 (2.4; 2.8) |
| Stimulation | 2.9 (2.6; 3.2) | 3.3 (3.1; 3.5) | 3.4 (3.0; 3.8) | 3.3 (3.1; 3.6) |
| Hedonism | 2.3 (2.1; 2.6) | 2.5 (2.3; 2.7) | 3.3 (2.9; 3.6) | 3.3 (3.0; 3.5) |
| Achievement | 3.4 (3.2; 3.7) | 3.9 (3.7; 4.0) | 3.2 (2.9; 3.6) | 3.7 (3.5; 4.0) |
| Power | 4.2 (3.9; 4.4) | 4.8 (4,6; 4.9) | 4.2 (3.8; 4.6) | 4.6 (4.4; 4.9) |
| Security | 2.6 (2.3; 2.9) | 3.1 (2.9; 3.3) | 2.2 (1.8; 2.5) | 2.5 (2.3; 2.8) |

Similar to the adolescents, no statistical differences were found in the choice of the dish between control and intervention groups (main outcome), therefore additional analyses of scales by group or by dish were not justified.

# DISCUSSION

No differences were found in the choice of dishes between control and intervention groups in both adolescents and seniors. The animal-based dishes (meatballs and fish cakes) were the most popular dishes in both groups.

In relation to the scales, all adolescents had moderate adherence to the Mediterranean diet and seniors from Denmark had the lowest score. The low adherence to this dietary pattern from Danish people was expected, as Denmark is located outside the Mediterranean area. As the Mediterranean diet is a dietary pattern rich in plant-based foods (cereals, fruits, vegetables, legumes, nuts, seeds and olives), and low in meat-based dishes, it is expected that a population with a low adherence to this diet would choose more animal-based dishes instead of the plant-based ones.

Most of the adolescents and seniors in our sample showed high food neophobia, which could be one of the reasons why the intervention did not produce the expected result. The “vegetarian balls” would have been a novel dish compared with the meat and fish alternatives that they already knew. Familiarity seemed to have an important role for the choice of the alternative dishes. Some studies found that neophobia is higher in childhood (Adessi et al., 2005; Cooke,Wardle, & Gibson, 2003), tends to decrease until early adulthood (Koivisto-Hursti & Sjoden, 1996; Rigal et al., 2006) while others have found that it increases with age (Dovey et al., 2008; Henriques et al., 2009; Meiselman et al., 2010). In addition, most of the individuals in our sample ate out once a week or less, which may have made them less prone to try new dishes, contributing to high food neophobia, since there is a link between food neophobia and number of novel foods sampled (Koivisto & Sjöden, 1996; Koivisto & Sjöden, 1997; Raudenbush et al.,1998).

Senior participants tended to show a more positive attitude towards nudging, i.e. they were broadly in favour of using a targeted campaign to promote healthy eating, once they reported higher scores in the nudging scale than adolescents. However, using such initiatives does not necessarily mean that people will change their food habits. The adolescents showed a less positive attitude towards nudging, indicating that probably they are not very prone to be nudged or that nudging strategies in this group are less likely to work, which may have contributed to the failure of the strategy in this group.

On the other hand, older people are the population segment most closely linked to the traditions in general. As meat balls and fish cakes are popular and well known dishes, this could be the reason for the higher choices of them. Furthermore, seniors in this study grew up either during the Second World War or immediately after. In those days, the meaning of plant-based foods was associated with poverty and restriction, while animal-based foods were perceived more as associated to wealth and financial well-being.

The results from the Food Choice Questionnaire show what the respondents consider important in a food. For adolescents from the UK, price is more important than for Danish adolescents. For Italians, familiarity and the maintenance of weight is more important than for other adolescents. For seniors, the results varied more, but it is important to highlight that Italians consider sensory aspects, weight maintenance, price and familiarity dimensions more important than seniors from other countries.

Through the Humans Values Scale, the respondents selected how much each statement is or is not like them (varies from “very much like me” to “Not like me at all”; the higher the score, the less similar to the respondent). French adolescents had the lowest score in hedonism dimension and the highest in the security dimension (meaning that they are very concerned about have fun/ pleasure and that the security question is not so important for them). In relation to seniors, for conformity dimension, Italian seniors had the lower score compared to France and the UK (which means that they do not think people should follow rules at all times and always behave properly) and for tradition they scored lower than the UK (which means that tradition is something important for Italians). Danish seniors had the lowest mean for benevolence dimension (loyalty to their friends is important). For universalism, Danish and Italians scored lower than France and the UK (it is important for the first ones that people should be treated equally and to take care about nature). For hedonism, Italian seniors scored highest than the other countries (not so concerned about have fun/ pleasure) and for achievement, they scored lower than France (it is important to show their abilities). Finally, French elderly scored higher for power and security dimension in relation to Danish and Italian elderly, respectively (it is not important for French elderly to be rich or ‘secure’).

The determinants of food intake are various, such as biological, economical, physical, social, attitudes, beliefs and knowledge about food. As the subject is very complex, one kind of intervention to modify food choice behaviour clearly will not suit all population groups. Therefore, a different nudging strategy for each country and/or age group could have produced better results, since they are different populations living in different cultures and traditions, with different habits and beliefs.

As limitations for this study, although the sample size was adequate for our study according to sample size calculations, maybe a larger sample would allow us to find different associations. Despite the data being collected in different places, the Project team made an effort to keep everything as homogenous as possible. Finally, as the questionnaires were self-administered, the participants could have under or overestimated their answers (for example, frequencies and quantities).

# CONCLUSIONS

This particular nudging strategy (Dish of the day) under the study conditions was not sufficiently robust to produce a significant result.

Other nudges and strategies might well work. Where, for example, meals are paid for, price manipulation, the inclusion of an extra portion of salad or if the alternative dishes are also not familiar might produce entirely different results. The choice of the best nudging strategy is therefore paramount.

Future nudging studies for these populations are needed to find the best strategy to move seniors and adolescents food habits towards a healthier pattern.

**FURTHER STUDY**

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# SECTION 2: Assessment of enhanced choice architecture that optimises and exploits vegetable consumption.

## INTRODUCTION

The results of VeggiEAT experiments did not prove that the ‘dish of the day’ strategy was effective in this context and lead to a higher plant-based intake by adolescents and seniors.

However, previous systematic reviews and intervention studies have suggested strategies to optimize vegetable consumption and were used as background for the project.

The objective of this Section is to summarize evidence from previous studies that applied choice architecture (CA) to optimise and exploit vegetable consumption. It includes systematic reviews and intervention studies published inside and outside the VeggiEAT Project.

## Selection criteria

The following selection criteria for the literature search were used:

* Publication in English language
* Healthy participants with no recorded chronic diseases or pregnancies
* Experimental study or Systematic Review
* Meeting the criteria to be considered a nudge
  + provision of information (e.g. to activate a rational choice),
  + changes in the physical environment (e.g. light, décor, placement, etc.),
  + changes in the default policy (e.g. pre-weighed salad portions v. free serving of a salad bowl),
  + use of social norms and salience

No constraints were imposed to year and country of publication; neither to the target population (it included populations from childhood until elderly citizens).

# RESULTS

Figure 5: The flow diagram for the search process. The online draft from PRISMA 2009 was used to draw the diagram. Available at [www.prisma-statement.org](http://www.prisma-statement.org)



N=30

N=2

**(n=2)**

**(n=30)**

### 

### Table 11: Summary of results for the included Systematic Review.

| **Authors (Year, Country)** | **Nº of studies** | **Intervention** | **Sample (N)** | **Aim** | **Results** |
| --- | --- | --- | --- | --- | --- |
| P. DeCosta et al. (2017, Denmark)(55) | 7 | Environment changes, verbal prompt, food label, food presentation. | Convenience  Children (6443)1 | Investigate the effect of choice architecture interventions to change children’s eating behaviors. | Choice architectural strategies showed a positive increase selection and overall consumption of fruits and vegetables, in school settings. |
| L. R. Skov et al. (2016, Denmark)(3) | 12 | Distribution of free vegetables, changes in serving style and in the physical environment | Convenience  Adolescents (6169)2 | Investigate the effect of choice architectural nudges on promoting the intake of vegetables among adolescents. | Limited and inconclusive evidence.  The interventions more likely to increase vegetables intake were the ones promoting vegetables variety. |
| A.L. Wilson et al. (2016, Australia)(56) | 26 | Salience and priming | Convenience  Heterogeneous (5998)3 | Investigate the effectiveness of nudging on food and beverage choices. | Mixed findings. However, provides evidence that nudging can be effective for influencing healthier food and beverage choices. |
| Arno and Thomas (2016, Ireland)(57) | 42 | Changes to the environment, availability of food and knowledge based. | Convenience  Adults (57506) | Investigate the efficacy of nudge theory among adults towards healthier food choices. | The review and meta-analysis demonstrate that nudge strategies are effective and viable strategy to promote healthier eating choices in adults. |
| T. Bucher et al. (2016, Denmark)(58) | 18 | Positional changes | Heterogeneous (12949) | Investigate the positional changes on immediate food consumption or choice. | Consistent evidence that positional changes have nudged participants towards healthier food choices. |
| E. Libotte et al. (2014, Switzerland)(59) | 13 | Plate size manipulation (Literature review) | Heterogeneous (1235) | Investigate the influence of plate size on meal consumption, either in self-service situations or given by food providers. | Inconclusive effect of plate size on meal consumption. Controversy remains whether container size has an effect on energy intake. |
| L. R. Skov et al. (2013, Denmark)(30) | 12 | Health message  Plate and cutlery manipulation  Calorie labelling  Nutrition logo  Change in assortment  Pre-selecting foods | Convenience  Heterogeneity on age group (11502)4 | Investigate the usage of choice architecture interventions to change eating behavior in self-service eating settings. | 1. Health labeling is associated with healthier food choice; 2. Changing plate and cutlery size has inconclusive effect; 3. Assortment and pre-selection is associated with healthier food choices.   Overall, found inconsistent evidence. |

1One of the articles did not show the number of participants(60)

2One study without reference for the number of participants(61)

3Three studies without sample size reference(62-64) and one without specification of the sample size from canteen customers(50)

4 Two studies without sample size reference(65, 66)

### Table 12: Summary of results from experimental studies.

| **Authors (year, country)** | **Hypothesis** | **N** | **Sampling** | **Age** | **Setting** | **Duration** | **Design** | **Intervention** | **Main findings** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Friis et al  (2017, Denmark)(1) | Investigate the effect of nudge-like strategies to promote vegetable consumption. | 88 | Trial volunteers website | Mean age of 27.3, 25.9 and 26.3, respectively for variety, priming and default conditions | Food-lab based | 1 time | Cross-over | Allocation of the participants under three different conditions: priming, default and perceived variety. | Use of default serving was successful in achieving more vegetable consumption (124kcal vs. 90kcal in control), while priming and self-composing of salad at buffet start diminished total energy intake without affecting significantly total quantity eaten (169kcal and 124kcal respectively). |
| K.L. Loeb et al.  (2017, USA)(67) | Establish the default option more optimal in order to increase healthy choices; The effect was expected to be more pronounced when parents are educated and presented with empowerment primes to implement optimal options. | 62 parents/guardian1 | Flyers were given out in a local community center; Eligibility was determined by telephone with a screening questionnaire. | Parent/Guardian of a child aged between 3 and 9 years old. | Community center | 1 time intervention | 2 groups with 2 possible breakfast menus available (default and alternative). | 15-min educational video about childhood nutrition and, depending on randomization assignment, the video also contained either empowerment primes supporting parents in facilitating an environment of optimal defaults for their child, or neutral material related to food preparation safety. | Significant main effect for default condition on the quantity of healthier food children consumed in the breakfast experiment (97% of the parents remain with the healthier option and children ate 36.43% of these foods).  Parent-empowerment priming embedded in health-based education did not potentiate the effect of defaults. |
| V.Filimonau et al.  (2017, UK)(68) | Explore the role played by menu design in ‘nudging’ consumer choice. | 340 participants | Restaurant visitors | Mainly between 17-29, but other age groups were included (from 30 – 70 years old) | Restaurants with a food service provider from Bournemouth | 1 time intervention | Quasi-experimental (control vs. menu intervention) | ‘Traditional’ (i.e. menu item price, lists of ingredients and main allergens), vs card displaying nutritional, calorific and environmental information. | The key for success is to present the nutrition-related numerical values sparingly and preferably with color coding (mean of 2.42, where 1 = strongly agree).  A large number of diners remained undecided on whether or not the carbon footprint of ingredients would drive their food selection (only 11.5% stated they took it into account); unclear the influence and feasibility of carbon intensity values as a means to affect consumer choice. |
| AN Thorndike et al.  (2017, USA)(69) | If by improving the visibility and quality of fresh produce in corner stores would increase fruit/ vegetable purchases by families. | 575 participants | Participants of the study – Special Supplemental Program for Women, Infants and Children. | Not mentioned (adults) | Corner stores in Chelsea | 5-month period intervention | Randomized controlled study | On the intervention stores, changes vary according to what would be feasible and acceptable at the store. | Small changes in the placement and quality of fresh produce prompted increased purchase of fruits/vegetables (sales increase by 40USD/month, *p*=0.036). |
| C. J. Rising and N. Bol  (2016, Amsterdam)(70) | To examine the effect of menu calorie labeling and self-control on food and beverage choices. | 179 students | The recruited was done through social media net- works, university e-mail lists, and a snowballing technique. | Ages 18-25 years old | Restaurant of George Mason University | 1 time intervention | A 2 (calorie labeling: yes vs. no) by 2 (self-control: low vs. high) between-subjects experimental design. | Four menu versions were available, which differed on the presentation of calorie amount and the order of food and beverage options. | Participants who were nudged with calorie information on menu items were significantly 2.69 times more likely to select a lower calorie salad option and 2.47 times more likely to choose a lower calorie beverage option when compared to participants who did not receive calorie information on menu items.  High self-control explained the effect of a calorie-label nudge on selecting a lower calorie salad option (*p*<0.05). |
| Norbert L.W. Wilson, David R. Just, Jeffery Swigert, Brian Wansink  (2016, USA)(71) | The influence of placement and packaging on food choice towards a targeted product. | 443 participants | Clients visiting the pantries with randomized allocation | Not mentioned | Food pantries in New York State. | 4 weeks | Two interventions: order (front vs back) and packaging (boxed vs. Unboxed) | Order intervention: placement of the bars at the end of the line of desserts (Back) vs. placing at the beginning of the line of desserts (Front).  Packaging intervention: protein bars in the original packaging (Boxed) vs. wrapped bars repackaged in sealed, clear plastic bags (Unboxed). | Clients at food pantries may be successfully nudged toward selecting the lesser of evils (OR=1.688, 95% CI 1.0879-2.523).  Provides evidence for the effectiveness of simple behavioral interventions to encourage the selection of targeted foods. |
| Benjamin Missbach, Jürgen S. König  (2016, Austria)(72) | How middle choice preference performs when self-regulatory resources are manipulated and how it affects the middle choice preference for a low-caloric snack in a three choice *paradigma*. | 182 participants | Participants were individually recruited on campus (Faculty of Life Sciences, University of Vienna) and online. | Aged 23.6 years on average | Faculty of Life Sciences, University of Vienna | 1 time intervention | Applied a 2 (high depletion vs. low depletion of self-regulatory resources) by 2 (LC position: left vs. middle) between-subjects design using randomization. | The control condition (LC position: left) was arranged as follows: apple/lowest calorie content = left position; banana- chocolate/high calorie content = middle position; chocolate/high- est calorie content = right position. In the experimental condition (LC position: middle) the low-caloric cereal bar (apple) and banana-chocolate cereal bar switched positions. | Suggests that depletion of self- regulatory resources (either high or low depletion) inhibit middle position preferences, independent of product liking, gender and food characteristics; nudging healthy middle choice preferences is limited to the extent of self-regulatory resource availability. |
| G. F. Miller et al.  (2016, USA)(73) | Examined the effects of pre-ordering and pre-ordering with behavioral nudges on the selection of fruits, vegetables, and low-fat milk by National School Lunch Program (NSLP) | 71 students | Students were recruited in their homeroom classrooms (School in Florida) through demonstration of the program. | Students in the grades, five and six. | At home (online pre-ordering system) | 2 weeks baseline + 2 weeks intervention | Experimental design - Children who signed the assent form were randomized into one of the two treatment group | The first treatment group pre-ordered their lunches online using a unique software program; the second treatment group received behavioral nudges based on United States Department of Agriculture (USDA) MyPlate recommendations while pre-ordering. | Overall, the results demonstrate that pre-ordering the lunches, with or without nudges, increased the selection of fruits (27.7% vs. 51.4%), vegetables (15.8%vs. 29.7%) and low-fat milk (16.3% vs. 37.3%).  Also, nudging provides an additional encouragement to select healthy lunch components (35.6% of the students receiving the nudge have changed their order).  The effect of pre-ordering on the selection of vegetables appeared to dissipate over the two-week intervention period; the effect of pre-ordering with nudging did not dissipate for any of the meal components over the intervention period. |
| I. Kongsbak et al. (2016, Denmark)(74) | The effect of choice architectural intervention to reduce energy density of meal by proportionally increasing vegetable consumption. | 65 participants | Convenience | Mean age 23.8 years for control and 24.4 years for intervention. | FoodScape Laboratory (ad libitum buffet setting) | 1 time intervention | Quasi-experimental | Fruits and vegetables were placed at the beginning of the buffet and separating it into individual bowls. | The applied strategies increased the self-served quantity of F&V, while decreased the quantity of the other components and energy total intake (*p*<0.01). |
| Floor M. Kroese, David R. Marchiori, Denise T. D. de Ridder (2015, The Netherlands)(75) | The ‘effectiveness’ of a nudge involving food repositioning, where healthy foods are placed near the cash register.  To test whether the nudge is only effective if people were unaware or if it still works when people were notified of its purpose. | 91 participants | Snack shops of the train station | Mean age 39 years | Shops at the train station | 2 weeks (one week control + one week intervention) | Quasi-experimental | One shop control; on the second shop the cash register display was filled with healthy snacks instead, including fruits, several types of muesli bars, cereal biscuits and crackers; and In the third shop, the same product repositioning manipulation was installed and a sign was posted near the display saying ‘we help you make healthier choices’ | First, re-arranging the position of foods strongly impacts customers’ food choices; the addition of a sign next to the cash register desk, did not have any additional benefit to the sales of healthy food products, nor did it decrease the nudge’s effectiveness. |
| Hannah Ensaff, Matt Homer, Pinki Sahota, Debbie Braybrook, Susan Coan and Helen McLeod  (2015, UK)(76) | If a *set* of complementary changes to the choice architecture could effectively shift a school population’s food choice towards more plant-based foods. | Intervention group: 980; Control group: 1132 | Students with access to the canteen. | 11-18 years old | School dining environment. | 188 school days and 190 school days for intervention and control, respectively | No changes in the canteen vs. set of complementary changes. | (a) disposable pots for freshly prepared vegetarian daily specials; (b) stickers on sandwiches containing salad; (c) poster promoting sandwiches containing salad; (d) stickers and end of shelf labels for fruit pots; (e) pyramid stand holding whole fruit; and (f) window sticker promoting whole fruit. | Provides evidence of the role of choice architecture in improving adolescents’ dietary behavior within the school dining environment; students’ selections were shifted towards more favorable options. The designated food items selection increased during the intervention and during the post-intervention period - from 1.4% in baseline to 3.0% in intervention and 2.4% in post-intervention. |
| C.E. Cioffi et al. (2015, USA)(77) | The effect of nutrition labeling on pre-packaged food purchases in university dining facilities. | Unknown | Students purchasing at Cornell University’s main campus in Ithaca. | Unknown | Cornell University’s main campus in Ithaca | 36 weeks control; 36 weeks intervention. | Weekly sales data for a sample of pre-packaged food items without nutritional labels vs. with nutritional labels. | Labeling of food items. | Suggests that nutrition labels are effective to modify food-purchasing behavior in a university dining setting. Food labels reduced the mean of total kcals in 7% and the purchase of fatty products was also reduced by 7%. Additionally, the purchase of “low-calorie” and “low-fat” items increased (p<0.001) and the purchase of “high-calorie” and “high-fat” items increased (p<0.001) |
| Van Kleef et al.  (2015, The Netherlands)(78) | Examined the effectiveness of “verbal prompting” as a nudge to increase fruit salad sales in a natural setting. | 393 visitors | Visitors of the restaurant. | Unknown | Self-service restaurant located in a store. | 10 weeks control; 13 weeks intervention. | Quasi-experimental | 8 weeks with verbal prompt on Orange juice (with no measurements) + 1 week with data collection; 1 week with verbal prompt on fruit salad; 1 week with verbal prompt on pancakes and 1 week with verbal prompt on fruit salad and pancakes. | All verbal prompts increased sales, although orange juice was the most successful prompted side dish (increased from 20% to 35-42%, whereas fruit salad grew from 3% to 9%). |
| Van Kleef et al.  (2014, USA)(79) | The influence of the shape bread rolls on children’s bread choices. | 1113 children | Primary schools were randomly selected, and all children from five to eight grade were called to participate. | Unknown – Primary school | Classroom | 1 time intervention | A 2 (shape of white bread rolls provided: regular or fun) by 2 (shape of whole wheat bread rolls provided: regular or fun) between-subjects experimental design. | Fun bread rolls shape in white and whole wheat bread. | The shape of bread rolls significantly influenced the bread choices children have made; the consumption of whole wheat bread doubled when they had a fun shape (vs. white bread rolls with regular shape) (*p*<0.001). |
| Thorndike et al.  (2014, USA)(80) | Assess effectiveness of traffic-light labeling and choice architecture cafeteria intervention. | Cafeteria customers and 2285 employees | Cafeteria users | Unknown | Main cafeteria at Massachusetts General Hospital (MGH) in Boston. | 3-month baseline period; 6 months of the intervention and follow up of 24 months. | Longitudinal pre–post cohort follow-up study. | The traffic-light food labeling system was implemented in every item at the cafeteria based on three positive criteria (fruit/ vegetable, whole grain, and lean protein/low-fat dairy as the main ingredient) and two negative criteria (saturated fat and caloric content). | Simple traffic-light labeling and choice architecture intervention can improve healthy food and beverage choices of a diverse population over a sustained period of time. The proportion of sales red labeled items decreased significantly from 24% to 20% at 24 months and green labeled items increased significantly from 41% to 46%. |
| C. K. Nikolaou et al.  (2014, UK)(81) | Examined the effect of calorie-labelling on sales of food items at catering outlets on a city-center university campus. | 646 staff and 1166 students at University of Glasgow | Visitors of UK University catering outlets | Staff members aged 42.4 years on average and students aged 24.2 on average. | Three catering outlets. | 2-month (1-month baseline and 1-month intervention) | Quasi-experimental with sales data collection. | Calorie-labels were displayed prominently beside all sandwiches available. | Calorie-labelling was associated with substantially reduced sales of high-calorie labelled items (-17% sales in all labeled items), without any compensatory changes in unlabeled alternative items.  More females (63%) than males (40%) reported being influenced by calorie-labels when choosing foods. |
| Campbell-Arvai et al.  (2014, USA)(82) | The effectiveness of asymmetric interventions (defaults) to facilitate a pro-environmental behavior in a real-world setting | 320 participants | Students living on campus |  | Campus of a large university in the Midwestern United States | 2-week period | RCT – random selection of campus dining halls, and selection and allocation of participants on the groups. | A 2 (default) x 2 (information) x 2 (appeal) between-subjects factorial design. | The individuals who were assigned a default menu, both with and without information, were more likely to choose a meat-free menu item than those who did not receive a default menu (OR =4.10, *p*<0.01). |
| Andrew S. Hanks, David R. Just, Laura E. Smith, Brian Wansink  (2012, USA)(83) | Examines the application of making healthier foods more convenient in order to increase its consumption. | 602 control and 482 intervention | Students with access to the cafeteria | Unknown | Public high school in Corning, New York | 16-week period | Quasi-experimental | Introduction of a convenience line, where only was allowed what researchers considered healthier food options. | The introduction of a convenience line with only healthier foods, students took more items all together (increase by 18%). However, it did not increase consumption of those foods, so more foods were wasted. Convenience line most likely nudged the students to take healthier foods but food preferences may lead them to limit their consumption. |
| Saulais, L. et al (2017, France) – Data not published | (i) the nudge’s effectiveness will depend on the nature of the dish options, and be highest for the most unpopular options; and (ii) the more alternatives to the dish of the day, the stronger the effect of the intervention. | 294 participants | Consumers in a restaurant | Adults – mean age 54 years | Restaurant of Institut Paul Bocuse | 1 time intervention | living lab experiment | Three treatments tested the impact of the nature of DoD options: without nudging (Control, T1-0); with vg1 as DoD (T1a); or with nvg as DoD (T1b). For range of options, two other treatments introduced an additional option (vg2), either without nudge (T2-0), or with vg1 as the DoD (T2a). | In T1-0 and T2-0, respectively, 34.4% and 23.3% of consumers chose vg1. DoD affected choices with a higher impact for the less popular dish (25.2% more vg1 in T1a vs. T1-0; 7.6% more nvg in T1b). Introducing more options also increased the relative bias in favour of vg1, from 73% (T1a) situation to 129% (T2a). |

1Only study one was considered – study 2 is out of scope (related with physical activity).

# Literature search and general characteristics

Seven systematic reviews (3, 30, 55-59) and 19 studies met the inclusion criteria (Figure 5). The goal of these studies was to promote healthier food choices by applying choice architectural strategies. However, different strategies were applied in each study.

Most of the studies were conducted in dining facilities (as restaurants, cafeterias or canteens)(68, 70, 76-78, 80-83), three took place in stores(69, 71, 75), three in laboratory settings(1, 72, 74), one in a community center(67), one at home(73) and one in a classroom(79). For the systematic reviews, while the majority considered different settings (30, 56-58), two were run only in school settings (3, 55) and one in dining settings (59).

The target group also varies between studies. Adults were the target group for three studies (69, 75), six included young adults (1, 68, 70, 72, 74, 77), two selected adolescents(76, 83), children weretargeted in two studies (73, 79), one study focused on parents(67), and also one included young adults and adults simultaneously (81). For four studies, there is no information on the age of the participants (71, 78, 80, 82). On the other hand, the systematic reviews presented clearer age groups: one focused on children (55), one on adolescents(3), one on adults(57) and four considered mixed age groups(30, 56, 58, 59).

## Systematic reviews

Three systematic reviews reported CA strategies as a means to reach healthier food choices (55, 57, 58), and four found inconclusive results or mixed findings (3, 30, 56, 59).

Choice architecture strategies showed positive effects towards the intake of fruits and vegetables (F&V) among children (55). It was observed an increase of the likelihood of taking a piece of fruit by 23.4% and of vegetables by 23%(60), hot vegetables were increased for 16% (85) and 70% consumed a fruit serving vs. 40% in the control situation(86).

Some mixed findings were found among adolescents. Repeated exposure to vegetables were reported as an effective strategy to increase vegetable intake (an increase in consumption from an average of 3.6-5.41 servings, p<0.01) (87).

Results from a meta-analysis showed that nudging could be effective to influence healthier food choices among adults, increasing healthier consumption decisions by 15.3% (CI 95%: 7.58-23.0), as measured by frequency of healthy choices or by overall intake (57).

When there is no discrimination or information on the age group, positional changes, assortment, pre-selection and health labeling were the interventions more likely to move the participants towards a healthier diet (30, 58). Positional changes have a positive effect on food choice(58) as found in sixteen of the eighteen studies included. About the use of health messaging, the evidence was raised from the sales generated (p<0.01) thus it is not possible to establish if the increase observed in purchases leads to an increase of consumption (30).

Lastly, some interventions showed controversy such as the ones based on salience, priming and plate and cutlery manipulation (30, 56, 59).

## Manipulation on the menu provided

Three studies tested how changes in the menu affect food choices (67, 68, 82). When a healthier breakfast menu was given as default for children, the consumption of healthier food items was increased (p<0.01) (67). A previous study was conducted in a naturalistic setting and showed that the configuration of a default menu (OR=4.10, p<0.001)is the main reason for participants to choose a meat-free meal. Furthermore, a more appealing menu increased the probability of selecting a meat-free menu option (OR=2.05, p<0.001)(82). When the provision of nutritional and environmental credentials plus calorie information is given, the main determinants of food choice were nutritional values (M=2.42) and information about the provenance of ingredients (M=2.39) (68).

## Provision of information

Five studies provided information to participants, although in different ways: nutrition labeling(70, 77, 81), recommendations(73), traffic-light(80). For nutrition labeling, one study shows that calorie labeling increases the odds of food intake (70), another study showed a weekly reduction in calorie and fat content of about 7% (p<0.05)(77) and a different one a reduction of 30% in sales among high calorie items, 27% decrease for high fat products and an increase of 50% for options labelled as healthy(81). The results of one study about self-control showed that high self-control (low sense of impulsivity) explain the relation between calorie labeling and food choice (p=0.019)(70). When students received the nudge saying that their meal was not balanced, 35.6% changed their order. The main modifications in the order were: 6.7% added a fruit, 13.3% added a vegetable and 15.6% added low-fat milk (73). The implementation of a traffic-light system in a cafeteria resulted in a relative change in purchases, from baseline (no intervention) to 24-month follow up, of -20% for red items, -4% for yellow items and +12% for green items (p<0.001)(80).

## Positional changes

Five studies have used positional changes as a means to investigate its influence on the final choice (69, 71, 72, 74, 75). F&V visibility was increased in three different stores, rising its sales by $US 40/month. In addition, changes either in serving sequence of F&V and serving F&V in separated bowls, increased the quantity of self-served F&V (+63.3g, p=0.005), lowered total energy of the meal (-1326.3kJ, p=0.010), with no differences in the total amount of self-served food among the two groups(74). By placing the target product in first place doubles the likelihood of choosing it (95% CI = 1.333-3.438) and keeping the product in its original package also increases the probability of selecting that specific product (95% CI = 1.396, 3.481)(71). In a store, placing healthier products at the cash register significantly increased its frequency of sales (p<0.001) (75). The study conducted in a laboratory setting, intended to evaluate the role of self-regulatory in food choice, showed that it can inhibit middle choice preference (middle position was not favored; in high depletion groups p=0.25 and in low depletion groups p=0.53) (72).

## Other strategies

One study has compared three nudge-like interventions (priming, default option and perceived variety), where the difference in energy intake of 143kcal was significant (p<0.05) for the perceived variety and default interventions. Additionally, when the energy deriving from vegetables was specifically assessed an increase in intake of 34kcal was observed for the default setting (p<0.01)(1).

The influence of a bread’s shape on choice showed an increase on whole wheat bread consumption, when bread rolls had a fun shape (p<0.05). Moreover, children reported a higher liking score when bread rolls had a fun shape (p<0.05)(79). One study used verbal prompts at the check-out counter, in order to increase sales among target products namely orange juice, fruit salad and pancakes. This intervention effectively increased sales, and orange juice was the most successful prompted side dish (p<0.05) (78). In another study, the introduction of a convenience line selling only healthier food options, increased the selection of healthier foods while the choice of unhealthy foods decreased (p<0.05). However, the population (students) did not increase their intake and so it resulted in a higher waste of those foods (83).

## Set of complementary changes

One study was conducted introducing six main changes in a secondary school at the canteen, using nudging strategies towards plant-based foods. At the intervention school, an increase in all items targeted, during both intervention and long-term period was observed: selection of fruit items (p<0.01), selection of vegetarian daily specials (p<0.01) and selection of sandwiches with salad (p<0.01).Furthermore, it was detected an increase of salad items selection during the intervention, outside the study design. (76).

# DISCUSSION

Nudge strategies can successfully increase healthy nutritional choices. Although the studies adopted different nudge strategies, they presented positive results in most of the cases.

According to the results, positional changes are effective in achieving behavioural changes. Particularly placing veggies at the start of the buffet seems promising for catering. In addition, placing healthier products at the cash register significantly increased its frequency of sales (p<0.001) (75).This could be a nudge strategy to be used whenever it is interesting to stimulate the consumption of healthy food items.

On the other hand, nudging by priming (through the provision of cues in the environment that unconsciously drive decisions, such as visual stimuli and odours of food) is not the best strategy to promote a higher intake of F&V by young adults (1). Whereas the default experiment, done by the provision of a bowl with pre-portioned salad (200g) increased the energy intake from vegetables among participants, being a successful nudging strategy, the dish of the day strategy (nudging as a pre-set option of meal) used in the VeggiEAT experiment did not have positive results, under the study conditions.

As vegetables are one of the most difficult categories of food to introduce into a diet especially within a foodservice operation, an important aspect to be considered is the awareness of the preferred tastes. The odds of success when developing a new dish or product containing vegetables will be higher if vegetables with a high liking by the target population are used. In a previous VeggiEAT Work Package (WP2), peas and sweet corn were chosen according to consumer preference in Copenhagen (Denmark - DK), Lille (France - FR), Florence (Italy, IT) and Bournemouth (United Kingdom, UK). WP2 provided a detailed sensory description of canned peas and sweet corn samples commonly available in the market. As a result, it was found that sweetness, in opposition to bitterness and sourness, confirmed to drive actual liking for vegetables. The influence of saltiness on liking was positive for peas but negative for sweet corn. Similarly, softness was positively related to liking for peas and negatively for sweet corn. Richness in flavour and in colour was strongly correlated to liking for both peas and sweet corn. The most preferred variations of peas and sweet corn were used in the development of the VeggieEAT dish (veggie balls) in Work Package 3.

However, this was not sufficient to make the plant-based dish a success. One of the main problems, mentioned previously, is the familiarity of the alternative dishes. Both meatballs and fish cakes are popular and very familiar dishes in comparison with the unknown plant-based dish. Studies shows that the more familiar respondents are with a specific food, the more they will like and prefer it (see WP 2 report). In addition, as both VeggiEAT adolescents and seniors reported high food neophobia, this could also have prevented them from trying the new dish.

# CONCLUSIONS

Most of the studies included in this systematic review reported successful nudging strategies towards F&V consumption. Some strategies must be highlighted and can be replicated due to their positive results, such as positional changes in the buffet line, the provision of a default portion of salad, among others. Notwithstanding, It is important to take into consideration that some strategies can work better in some settings and for some target groups than others.

Finally, the determinants of food intake are very complex and many factors can affect the decision-making processes; it is important to try to consider if not all, most of the factors when designing future interventions.

# FURTHER STUDY

## FURTHER RESEARCH - CHOICE ARCHITECTURE EXPERIMENT AT BU

**INTRODUCTION**

Results from WP 4 were inconclusive and the limited available evidence from the systematic review suggests that a combination of different nudges might be more effective in a food choice environment (1). A study in Denmark found that a choice architecture approach could increase intake of healthy items and decrease consumption of other meal components among male university students through combining the order of placement on a buffet and separating the fruits and vegetables (2). A review that investigated the effect of positional changes of food placement on food choice has also identified that manipulation of food product order or proximity can influence participants towards a healthier food choice (3). Moreover, a recent meta-analysis has shown that nudging interventions that aim to increase fruit and/or vegetable choice generally have a moderately significant effect, the largest effects being from altering placement and from combined nudges (4). Therefore a further study was conducted to test the hypothesis if two nudges are more effective than one.

## MATERIALS AND METHODS

### The choice architecture study

* **Design:** Field trial of counting dishes from an operational perspective using control (Day 1), allocation of naming a plant based dish as ‘dish of the day’ (Day 2) and plus product placement at buffet start (Day 3).
* **Outcome of interest:** Vegetarian dish choice

#### Sample criteria

* All individuals consuming lunch– besides the subject’s gender, no personal data were recorded

#### Data collection:

The data collection occurred during lunch time at a self-serve buffet between 4 and 6 September 2017. Four researchers were positioned in an overt situation and recorded the dishes selected by each consumer from a menu composed of three main dishes (two animal-based and one plant-based).

On the first day (control day) all the dishes were offered as equal opportunities, presented as follows: main dish 1 (non-vegetarian), main dish 2 (non-vegetarian), main dish 3 (vegetarian). On the second day, the order of dishes was the same and the main dish 3 (vegetarian) was labelled “dish of the day”. On the third day, the main dish 3 (vegetarian) was again labelled “dish of the day”, and additionally, it was positioned at the start of the buffet.

The choice architecture intervention employed was designed to test if using the “Dish of the Day” as a single nudging, and combining it with product placement, would inflate (Or not) the choice of the targeted dish (vegetarian), overall and by gender.

#### Data analysis

Data were coded, entered and processed using Excel spreadsheets. Statistical analyses were performed with the statistical package Stata/SE version 14.0 (Stata Corp, College Station, TX, USA), with significance levels set at p<0.05. Numbers of vegetarian choices recorded overall and by gender were compared within experimental groupings using Pearson chi-square. The choices were compared among the 3 days; between Day 1 (control) and Day 2 (1 nudge); between Day 1 and Day 3 (2 nudges); and between Day 2 and Day 3.

#### Ethics

Ethical approval was given by BU University Ethical Committee and appropriate health and safety considerations, together with a risk assessment protocol, were carried out prior to the commencement of the research. Confidentiality and anonymity were assured at all times.

## RESULTS

Considering the three days, 275 observations were made. Overall, the percentage of people who included the vegetarian dish in their choices increased proportionally throughout the three days (Day 1: 56.9%; Day 2: 72.1%; Day 3: 74.7%), and this difference was statistically significant (p=0.049). No significant differences on vegetarian choices were found by gender when comparing the three days.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Control (n=58)** | **1 nudge (n=122)** | **2 nudges (n=95)** | **P value** |
|  | **N (%)** | **N (%)** | **N (%)** |
| **Total** | 33 (56.9) | 88 (72.1) | 71 (74.7) | 0.049\* |
| **Male** | 14 (51.8) | 41 (64.1) | 42 (76.4) | 0.075 |
| **Female** | 19 (61.3) | 47 (81.0) | 29 (72.5) | 0.129 |

Statistically significant at p<0.05 (Pearson’s Chi-square Test).

The comparison between the Control day (no nudges) and Day 2 (1 nudge) revealed a significant increment of 126.7% on the choice of the vegetarian dish (p=0.024). The same comparison between Control day and Day 3 (2 nudges) resulted in a significant increase of 131.3% on the choice of the vegetarian dish (p=0.015). No significant differences were found between the use of 1 or 2 nudges (p=0.739). For females, there was a statistically significant difference on the number of vegetarian choices between the Control day and Day 2 (p=0.043). For males, the significant difference was found between Control day and Day 3 (p=0.025).

## CONSIDERATIONS

The results presented here indicate that in a real foodservice situation, the use of nudging strategies might be a good approach to stimulate people to include a vegetarian option within their food choice. The percentage of people who chose the vegetarian option increased when one nudge was used, and increased even more when two nudges were employed. However, the increment of choices between 1 and 2 nudges was not significant, indicating the hypothesis embedded within the Veggieat project can be accepted (adopting a nudging strategy can influence food choice towards a plant based dish). An interesting finding from this research was that the use of a single nudge worked for females, but not for males, who were only affected when two nudges were combined.

Further research and analysis with diverse types of nudges should be performed considering gender differences, and also considering whether the choices of meat dishes decreased when plant dishes were selected.

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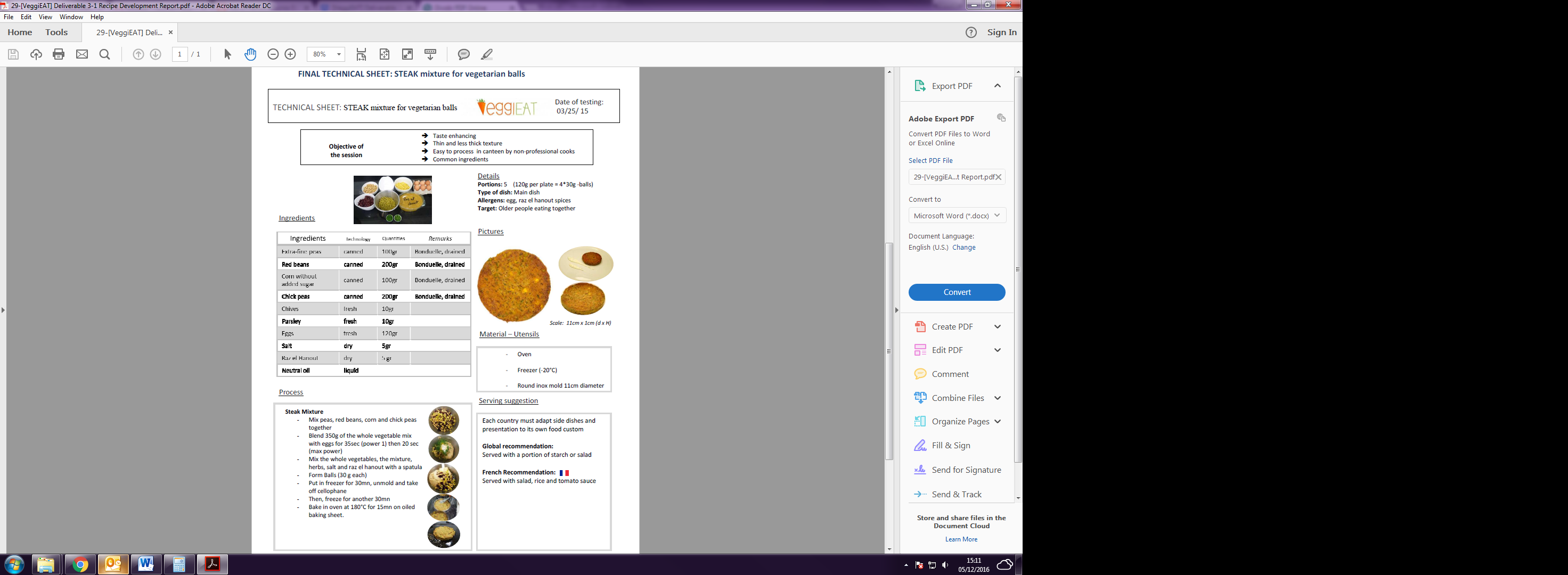
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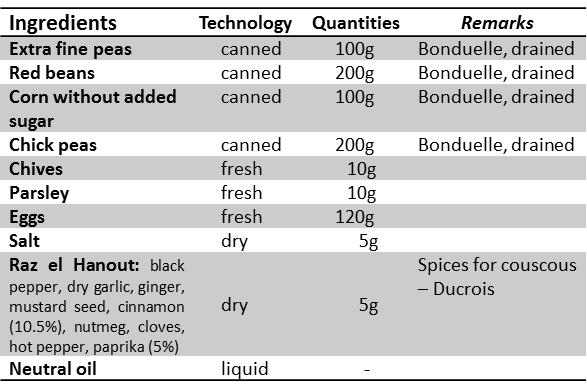
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APPENDIX 1**:** Recipe





**Paste from which the balls (30g) should be made**

APPENDIX 2**:** Informed consent form

**VeggiEat WP4 Study**

You have been contacted to take part in a research study of how people of your age enjoy some selected meals. Please read this form carefully and ask any questions you may have before agreeing to take part in the study.

**What the study is about:** the purpose of this study is the hedonic evaluation of new meal components by a sample of people in your age group.

**What we will ask you to do:** If you agree to be in this study, we will invite you for lunch and to fill a questionnaire with information about your attitudes and values, some general characteristics. You will be assigned a randomly generated number as identification key to keep track of future responses.

**Risks and benefits:** We do not anticipate any risks to you participating in this study other than those encountered in day-to-day life. The benefits for you consist of the enjoyment of the meals. Please, let us know if you have any food allergy or intolerance.

**Your answers will be confidential:** questionnaires will be kept private, and the identification key will be used to keep track of the answers, but it would be impossible for anybody to track you individually. Only researchers will have access to the records.

**Taking part is voluntary:** taking part in this study is completely voluntary. You may skip any questions you don’t want to answer. If you choose to withdraw at any point, you are free to do so at any time.

**If you have further questions:** The VeggiEat team is conducting this study. If you have further questions, please contact *responsible researcher* at *email* or *phone number*.

You will be given a copy of this form to keep for your own records.

**Statement of consent:** I have read the above information, and have received answers to any questions I asked. I consent to take part in the study, and I understand that I can withdraw at any time and without giving a reason.

Your Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_/\_\_\_/20\_\_\_

Your Name (Capital letters): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| Please, tick the box if you agree to be photographed and filmed. |  |

APPENDIX 3: First Questionnaire for adolescents and seniors



APPENDIX 4**:** Questionnaire 1- Adolescents

**ID Number:** XXXX

This questionnaire is designed to know a little about your personal characteristics. Please take a few minutes to answer the following questions. Do not hesitate in contacting us if you have any questions.

1. Which dish did you choose?

( ) Meat balls ( ) Veggie balls ( ) Fish cakes

1. How much did you like the dish?



1. How often do you usually eat out each week?

( ) Never

( ) Once a week or less

( ) 2 days a week

( ) 3-4 days a week

( ) Everyday

1. How often do you usually eat in the college canteen each week?

( ) Never

( ) Once a week or less

( ) 2 days a week

( ) 3-4 days a week

( ) Everyday

1. Choose according your food habits:

|  |  |  |
| --- | --- | --- |
| In my house olive oil is used for cooking | ( ) Yes | ( ) No |
| I consume more than 2 tablespoons of olive oil per day  (for cooking + addition in salads) | ( ) Yes | ( ) No |
| I eat 2 or more cups of vegetables per day (including raw vegetables) | ( ) Yes | ( ) No |
| I eat 3 or more fruits per day (including fresh juices) | ( ) Yes | ( ) No |
| I eat 1 or more pieces of red meat (including sausages) per day | ( ) Yes | ( ) No |
| I eat 2 or more teaspoons of butter per day | ( ) Yes | ( ) No |
| I drink less than 1 glass of soft drinks per day | ( ) Yes | ( ) No |
| I eat more than 3 cups of pulses per week | ( ) Yes | ( ) No |
| I eat fish 3 or more times per week | ( ) Yes | ( ) No |
| I eat sweets, confectionery and candies less than 3 times a week | ( ) Yes | ( ) No |
| I eat dried fruits one or more times per week | ( ) Yes | ( ) No |
| I prefer eating chicken than beef or sausages | ( ) Yes | ( ) No |
| I eat pasta, rice and other cereals 2 or more times per week | ( ) Yes | ( ) No |

1. Could you indicate what occasions you usually consume this type of food in?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Any day | Weekend or Special occasions | Alone | With family or friends | At  home | Outside home |
| Milk and dairy products | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| Meat (beef, pork, lamb, chicken) | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| Processed meat (sausages, bacon) | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| Fish and seafood | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| Vegetables | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| Fruits and fresh juices | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| Bread or cereals | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| Potatoes, rice and pasta | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| Sweets, snacks, confectionary | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| Soft drinks | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| Peanuts and other nuts | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |

1. Please, could you indicate the level of importance you assign to each of these food characteristics?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *It is important to me that the food I eat on a typical day:* | Not at all important  1 | A little important  2 | Moderately important  3 | Very important  4 |
| Tastes good | ( ) | ( ) | ( ) | ( ) |
| Is nutritious | ( ) | ( ) | ( ) | ( ) |
| Takes no time to prepare | ( ) | ( ) | ( ) | ( ) |
| Contains natural ingredients | ( ) | ( ) | ( ) | ( ) |
| Smells nice | ( ) | ( ) | ( ) | ( ) |
| Is low in calories | ( ) | ( ) | ( ) | ( ) |
| Is familiar | ( ) | ( ) | ( ) | ( ) |
| Is easy to prepare | ( ) | ( ) | ( ) | ( ) |
| Contains no additives | ( ) | ( ) | ( ) | ( ) |
| Is not expensive | ( ) | ( ) | ( ) | ( ) |
| Helps me control my weight | ( ) | ( ) | ( ) | ( ) |
| Helps me relax | ( ) | ( ) | ( ) | ( ) |
| Is high in fibre and roughage | ( ) | ( ) | ( ) | ( ) |
| Contains no artificial ingredients | ( ) | ( ) | ( ) | ( ) |
| Makes me feel good | ( ) | ( ) | ( ) | ( ) |
| Can be cooked very simply | ( ) | ( ) | ( ) | ( ) |
| Is like the food I ate when I was a child | ( ) | ( ) | ( ) | ( ) |
| Keeps me healthy | ( ) | ( ) | ( ) | ( ) |
| Cheers me up | ( ) | ( ) | ( ) | ( ) |
| Helps me to cope with life | ( ) | ( ) | ( ) | ( ) |
| Is low in fat | ( ) | ( ) | ( ) | ( ) |
| Contains a lot of vitamins and minerals | ( ) | ( ) | ( ) | ( ) |
| Is cheap | ( ) | ( ) | ( ) | ( ) |
| Has a pleasant texture | ( ) | ( ) | ( ) | ( ) |

1. Here we briefly describe some people. Please read each description and think about how much each person is or is not like you. Tick the boxes that show how much the person in the description is like you.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | *How much is this person like you?* | | | | | |
| Very much like me | Like me | Some-what like me | A little like me | Not like me | Not like me at all |
| **1** | **2** | **3** | **4** | **5** | **6** |
| 1. Thinking up new ideas and being creative is important to him/her. He/she likes to do things in her own original way | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 2. It is important to him/her to be rich. He/she wants to have a lot of money and expensive things | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 3. He/she thinks it is important that every person in the world be treated equally. He/she believes everyone should have equal opportunities in life | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 4. It's very important to him/her to show his/her abilities. He/she wants people to admire what he/she does | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 5. It is important to him/her to live in secure surroundings. He/she avoids anything that might endanger his/her safety | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 6. He/she likes surprises and is always looking for new things to do. He/she thinks it’s important to do lots of different things in life | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 7. He/she believes that people should do what they're told. He/she thinks people should follow rules at all times, even when no-one is watching | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 8. It is important to him/her to listen to people who are different from him/her. Even when he/she disagrees with them, he/she still wants to understand them | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 9. It is important to him/her to be humble and modest. He/she tries not to draw attention to herself | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 10. Having a good time is important to him/her. He/she likes to “spoil” him/herself | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 11. It is important to him/her to make his/her own decisions about what he/she does. He/she likes to be free and not depend on others | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 12. It's very important to him/her to help the people around him/her. He/she wants to care for their well-being | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 13. Being very successful is important to him/her. He/she hopes people will recognize his/her achievements | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 14. It is important to him/her that the government insure his/her safety against all threats. He/she wants the state to be strong so it can defend its citizens | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 15. He/she looks for adventures and likes to take risks. He/she wants to have an exciting life | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 16. It is important to him/her always to behave properly. He/she wants to avoid doing anything people would say is wrong | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 17. It is important to him/her to be in charge and tell others what to do. He/She wants people to do what he/she says | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 18. It is important to him/her to be loyal to his/her friends. He/she wants to devote herself to people close to him/her | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 19. He/she strongly believes that people should care for nature. Looking after the environment is important to him/her | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 20. Tradition is important to him/her. He/she tries to follow the customs handed down by his/her religion or his/her family | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 21. He/she seeks every chance he/she can to have fun. It is important to him/her to do things that give him/her pleasure | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |

1. How much do you agree or disagree with the following statements about trying new or different foods?

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Disagree strongly  1 | | 2 | 3 | 4 | 5 | 6 | Agree strongly  7 |
| I am constantly sampling new and different foods | ( ) | ( ) | | ( ) | ( ) | ( ) | ( ) | ( ) |
| I don't trust new foods | ( ) | ( ) | | ( ) | ( ) | ( ) | ( ) | ( ) |
| If I don't know what is in a food, I won't try it | ( ) | ( ) | | ( ) | ( ) | ( ) | ( ) | ( ) |
| I like foods from different countries | ( ) | ( ) | | ( ) | ( ) | ( ) | ( ) | ( ) |
| Ethnic food looks too weird to eat | ( ) | ( ) | | ( ) | ( ) | ( ) | ( ) | ( ) |
| At dinner parties, I will try a new food | ( ) | ( ) | | ( ) | ( ) | ( ) | ( ) | ( ) |
| I am afraid to eat things I have never had before | ( ) | ( ) | | ( ) | ( ) | ( ) | ( ) | ( ) |
| I am very particular about the foods I will eat | ( ) | ( ) | | ( ) | ( ) | ( ) | ( ) | ( ) |
| I will eat almost anything | ( ) | ( ) | | ( ) | ( ) | ( ) | ( ) | ( ) |
| I like to try new ethnic restaurants | ( ) | ( ) | | ( ) | ( ) | ( ) | ( ) | ( ) |

1. How much do you agree or disagree with the following statements about your buffet habits?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | Disagree strongly  1 | 2 | 3 | 4 | Agree strongly  5 |
| View the entire selection before selecting what to take on their plate | ( ) | | ( ) | ( ) | ( ) | ( ) |
| Follow the line and decide what to take as the dishes are presented | ( ) | | ( ) | ( ) | ( ) | ( ) |
| Take vegetables or salad and then the other dishes | ( ) | | ( ) | ( ) | ( ) | ( ) |
| Take meat and then the other dishes | ( ) | | ( ) | ( ) | ( ) | ( ) |
| Take pasta, rice, and potatoes first and then the other dishes | ( ) | | ( ) | ( ) | ( ) | ( ) |

1. How much do you agree or disagree with the following statements about your habits?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Disagree strongly  1 | 2 | 3 | 4 | Agree strongly  5 |
| Think I am healthier compared to others with my age | ( ) | ( ) | ( ) | ( ) | ( ) |
| Eat healthier than others with my age | ( ) | ( ) | ( ) | ( ) | ( ) |
| Would like to lose weight | ( ) | ( ) | ( ) | ( ) | ( ) |
| Eat more vegetables than most people at my age | ( ) | ( ) | ( ) | ( ) | ( ) |
| My friends eat vegetables every day | ( ) | ( ) | ( ) | ( ) | ( ) |
| My mom and dad eat vegetables every day | ( ) | ( ) | ( ) | ( ) | ( ) |
| My parents encourage me to eat vegetables every day | ( ) | ( ) | ( ) | ( ) | ( ) |

1. How much do you agree or disagree with the following statements about you?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Not at all true  1 | Hardly true  2 | Moderately true  3 | Exactly true  4 |
| I can always manage to solve difficult problems if I try hard enough | ( ) | ( ) | ( ) | ( ) |
| If someone opposes me, I can find the means and ways to get what I want | ( ) | ( ) | ( ) | ( ) |
| It is easy for me to stick to my aims and accomplish my goals. | ( ) | ( ) | ( ) | ( ) |
| I am confident that I could deal efficiently with unexpected events | ( ) | ( ) | ( ) | ( ) |
| Thanks to my resourcefulness, I know how to handle unforeseen situations | ( ) | ( ) | ( ) | ( ) |
| I can solve most problems if I invest the necessary effort | ( ) | ( ) | ( ) | ( ) |
| I can remain calm when facing difficulties because I can rely on my coping abilities | ( ) | ( ) | ( ) | ( ) |
| When I am confronted with a problem, I can usually find several solutions | ( ) | ( ) | ( ) | ( ) |
| If I am in trouble, I can usually think of a solution | ( ) | ( ) | ( ) | ( ) |
| I can usually handle whatever comes my way | ( ) | ( ) | ( ) | ( ) |

1. How much do you agree or disagree with the following statements:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Disagree strongly  1 | 2 | 3 | 4 | Agree strongly  5 |
| I think it would be acceptable if the canteen used celebrities to inform me about health related to eating vegetables | ( ) | ( ) | ( ) | ( ) | ( ) |
| I think it would be acceptable if the canteen held a competition where the winner would be the one with the largest vegetable intake in 1 week | ( ) | ( ) | ( ) | ( ) | ( ) |
| I think it would be acceptable if the canteen made scare campaigns to get me to eat more vegetables, e.g., by showing examples of diseases caused by low vegetable intake | ( ) | ( ) | ( ) | ( ) | ( ) |
| I think it would be acceptable if the canteen informed me about how many vegetables I eat compared to my friends and classmates | ( ) | ( ) | ( ) | ( ) | ( ) |
| I think it would be acceptable if the canteen automatically gave me a green salad with my lunch in order to get me to eat more vegetables if I easily could choose not to take it | ( ) | ( ) | ( ) | ( ) | ( ) |
| I think it would be acceptable if the canteen had posters with simple and easy tips on how I could eat more vegetables to get me to eat healthier | ( ) | ( ) | ( ) | ( ) | ( ) |
| I think it would be acceptable if the staff in the canteen asked me if I wanted more vegetables when buying my lunch | ( ) | ( ) | ( ) | ( ) | ( ) |
| I think it would be acceptable to change the names of the dishes in the canteen so the dishes containing many vegetables would sound more appealing and make me want to choose them | ( ) | ( ) | ( ) | ( ) | ( ) |
| I think it is acceptable if the college encouraged me to sign up for a “6 a day” or “I love vegetables” club to make me feel obligated to eat more vegetables | ( ) | ( ) | ( ) | ( ) | ( ) |
| I think it would be acceptable the canteen had posters showing happy and popular teenagers eating vegetables and a lonely and sad teenager eating unhealthy food to make me feel like eating more vegetables | ( ) | ( ) | ( ) | ( ) | ( ) |

**Thank you very much for your time!**

APPENDIX 5**:** Questionnaire 2 - Seniors

**ID Number:** XXXX

This questionnaire is designed to know a little about your personal characteristics. Please take a few minutes to answer the following questions. Do not hesitate in contacting us if you have any questions.

1. Which main dish did you choose?

( ) Meat balls ( ) Veggie balls ( ) Fish cakes

1. How much did you like the dish?



1. How often do you usually eat out each week?

( ) Never

( ) Once a week or less

( ) 2 days a week

( ) 3-4 days a week

( ) Everyday

1. Choose according your food habits:

|  |  |  |
| --- | --- | --- |
| In my house olive oil is used for cooking | ( ) Yes | ( ) No |
| I consume more than 2 tablespoons of olive oil per day  (for cooking + addition in salads) | ( ) Yes | ( ) No |
| I eat 2 or more cups of vegetables per day (including raw vegetables) | ( ) Yes | ( ) No |
| I eat 3 or more fruits per day (including fresh juices) | ( ) Yes | ( ) No |
| I eat 1 or more pieces of red meat (including sausages) per day | ( ) Yes | ( ) No |
| I eat 2 or more teaspoons of butter per day | ( ) Yes | ( ) No |
| I drink less than 1 glass of soft drinks per day | ( ) Yes | ( ) No |
| I eat more than 3 cups of pulses per week | ( ) Yes | ( ) No |
| I eat fish 3 or more times per week | ( ) Yes | ( ) No |
| I eat sweets, confectionery and candies less than 3 times a week | ( ) Yes | ( ) No |
| I eat dried fruits one or more times per week | ( ) Yes | ( ) No |
| I prefer eating chicken than beef or sausages | ( ) Yes | ( ) No |
| I eat pasta, rice and other cereals 2 or more times per week | ( ) Yes | ( ) No |

1. Could you indicate what occasions you usually consume this type of food in?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Any day | Weekend or Special occasions | Alone | With family or friends | At  home | Outside home |
| Milk and dairy products | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| Meat (beef, pork, lamb, chicken) | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| Processed meat (sausages, bacon) | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| Fish and seafood | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| Vegetables | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| Fruits and fresh juices | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| Bread or cereals | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| Potatoes, rice and pasta | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| Sweets, snacks, confectionary | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| Soft drinks | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| Peanuts and other nuts | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |

1. Please, could you indicate the level of importance you assign to each of these food characteristics?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *It is important to me that the food I eat on a typical day:* | Not at all important  1 | A little important  2 | Moderately important  3 | Very important  4 |
| 1. Tastes good | ( ) | ( ) | ( ) | ( ) |
| 1. Is nutritious | ( ) | ( ) | ( ) | ( ) |
| 1. Takes no time to prepare | ( ) | ( ) | ( ) | ( ) |
| 1. Contains natural ingredients | ( ) | ( ) | ( ) | ( ) |
| 1. Smells nice | ( ) | ( ) | ( ) | ( ) |
| 1. Is low in calories | ( ) | ( ) | ( ) | ( ) |
| 1. Is familiar | ( ) | ( ) | ( ) | ( ) |
| 1. Is easy to prepare | ( ) | ( ) | ( ) | ( ) |
| 1. Contains no additives | ( ) | ( ) | ( ) | ( ) |
| 1. Is not expensive | ( ) | ( ) | ( ) | ( ) |
| 1. Helps me control my weight | ( ) | ( ) | ( ) | ( ) |
| 1. Helps me relax | ( ) | ( ) | ( ) | ( ) |
| 1. Is high in fibre and roughage | ( ) | ( ) | ( ) | ( ) |
| 1. Contains no artificial ingredients | ( ) | ( ) | ( ) | ( ) |
| 1. Makes me feel good | ( ) | ( ) | ( ) | ( ) |
| 1. Can be cooked very simply | ( ) | ( ) | ( ) | ( ) |
| 1. Is like the food I ate when I was a child | ( ) | ( ) | ( ) | ( ) |
| 1. Keeps me healthy | ( ) | ( ) | ( ) | ( ) |
| 1. Cheers me up | ( ) | ( ) | ( ) | ( ) |
| 1. Helps me to cope with life | ( ) | ( ) | ( ) | ( ) |
| 1. Is low in fat | ( ) | ( ) | ( ) | ( ) |
| 1. Contains a lot of vitamins and minerals | ( ) | ( ) | ( ) | ( ) |
| 1. Is cheap | ( ) | ( ) | ( ) | ( ) |
| 1. Has a pleasant texture | ( ) | ( ) | ( ) | ( ) |

1. Here we briefly describe some people. Please read each description and think about how much each person is or is not like you. Tick the boxes that show how much the person in the description is like you.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | *How much is this person like you?* | | | | | |
| Very much like me | Like me | Some-what like me | A little like me | Not like me | Not like me at all |
| **1** | **2** | **3** | **4** | **5** | **6** |
| 1. Thinking up new ideas and being creative is important to him/her. He/she likes to do things in her own original way | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 2. It is important to him/her to be rich. He/she wants to have a lot of money and expensive things | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 3. He/she thinks it is important that every person in the world be treated equally. He/she believes everyone should have equal opportunities in life | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 4. It's very important to him/her to show his/her abilities. He/she wants people to admire what he/she does | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 5. It is important to him/her to live in secure surroundings. He/she avoids anything that might endanger his/her safety | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 6. He/she likes surprises and is always looking for new things to do. He/she thinks it’s important to do lots of different things in life | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 7. He/she believes that people should do what they're told. He/she thinks people should follow rules at all times, even when no-one is watching | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 8. It is important to him/her to listen to people who are different from him/her. Even when he/she disagrees with them, he/she still wants to understand them | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 9. It is important to him/her to be humble and modest. He/she tries not to draw attention to herself | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 10. Having a good time is important to him/her. He/she likes to “spoil” him/herself | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 11. It is important to him/her to make his/her own decisions about what he/she does. He/she likes to be free and not depend on others | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 12. It's very important to him/her to help the people around him/her. He/she wants to care for their well-being | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 13. Being very successful is important to him/her. He/she hopes people will recognize his/her achievements | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 14. It is important to him/her that the government insure his/her safety against all threats. He/she wants the state to be strong so it can defend its citizens | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 15. He/she looks for adventures and likes to take risks. He/she wants to have an exciting life | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 16. It is important to him/her always to behave properly. He/she wants to avoid doing anything people would say is wrong | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 17. It is important to him/her to be in charge and tell others what to do. He/She wants people to do what he/she says | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 18. It is important to him/her to be loyal to his/her friends. He/she wants to devote herself to people close to him/her | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 19. He/she strongly believes that people should care for nature. Looking after the environment is important to him/her | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 20. Tradition is important to him/her. He/she tries to follow the customs handed down by his/her religion or his/her family | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| 21. He/she seeks every chance he/she can to have fun. It is important to him/her to do things that give him/her pleasure | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |

1. How much do you agree or disagree with the following statements about trying new or different foods?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Disagree strongly  1 | 2 | 3 | 4 | 5 | 6 | Agree strongly  7 |
| I am constantly sampling new and different foods | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| I don't trust new foods | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| If I don't know what is in a food, I won't try it | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| I like foods from different countries | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| Ethnic food looks too weird to eat | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| At dinner parties, I will try a new food | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| I am afraid to eat things I have never had before | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| I am very particular about the foods I will eat | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| I will eat almost anything | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| I like to try new ethnic restaurants | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |

1. How much do you agree or disagree with the following statements about your buffet habits?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Disagree strongly  1 | 2 | 3 | 4 | Agree strongly  5 |
| View the entire selection before selecting what to take on their plate | ( ) | ( ) | ( ) | ( ) | ( ) |
| Follow the line and decide what to take as the dishes are presented | ( ) | ( ) | ( ) | ( ) | ( ) |
| Take vegetables or salad and then the other dishes | ( ) | ( ) | ( ) | ( ) | ( ) |
| Take meat and then the other dishes | ( ) | ( ) | ( ) | ( ) | ( ) |
| Take pasta, rice, and potatoes first and then the other dishes | ( ) | ( ) | ( ) | ( ) | ( ) |

1. How much do you agree or disagree with the following statements about your habits?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Disagree strongly  1 | | 2 | 3 | 4 | Agree strongly  5 |
| Think I am healthier compared to others with my age | | ( ) | ( ) | ( ) | ( ) | ( ) |
| Eat healthier than others their age | | ( ) | ( ) | ( ) | ( ) | ( ) |
| Would like to lose weight | | ( ) | ( ) | ( ) | ( ) | ( ) |
| Eat more vegetables than most people at my age | | ( ) | ( ) | ( ) | ( ) | ( ) |
| My friends eat vegetables every day | | ( ) | ( ) | ( ) | ( ) | ( ) |
| My parents used to eat vegetables every day | | ( ) | ( ) | ( ) | ( ) | ( ) |
| My parents used to encourage me to eat vegetables every day | | ( ) | ( ) | ( ) | ( ) | ( ) |

1. How much do you agree or disagree with the following statements about you?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Not at all true  1 | Hardly true  2 | Moderately true  3 | Exactly true  4 |
| I can always manage to solve difficult problems if I try hard enough | ( ) | ( ) | ( ) | ( ) |
| If someone opposes me, I can find the means and ways to get what I want | ( ) | ( ) | ( ) | ( ) |
| It is easy for me to stick to my aims and accomplish my goals. | ( ) | ( ) | ( ) | ( ) |
| I am confident that I could deal efficiently with unexpected events | ( ) | ( ) | ( ) | ( ) |
| Thanks to my resourcefulness, I know how to handle unforeseen situations | ( ) | ( ) | ( ) | ( ) |
| I can solve most problems if I invest the necessary effort | ( ) | ( ) | ( ) | ( ) |
| I can remain calm when facing difficulties because I can rely on my coping abilities | ( ) | ( ) | ( ) | ( ) |
| When I am confronted with a problem, I can usually find several solutions | ( ) | ( ) | ( ) | ( ) |
| If I am in trouble, I can usually think of a solution | ( ) | ( ) | ( ) | ( ) |
| I can usually handle whatever comes my way | ( ) | ( ) | ( ) | ( ) |

1. How much do you agree or disagree with the following statements:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Disagree strongly  1 | 2 | 3 | 4 | Agree strongly  5 |
| I think it would be acceptable if foodservice providers used celebrities to inform me about health related to eating vegetables | ( ) | ( ) | ( ) | ( ) | ( ) |
| I think it would be acceptable if foodservice providers held a competition where the winner would be the one with the largest vegetable intake in 1 week | ( ) | ( ) | ( ) | ( ) | ( ) |
| I think it would be acceptable if foodservice providers made scare campaigns to get me to eat more vegetables, e.g., by showing examples of diseases caused by low vegetable intake | ( ) | ( ) | ( ) | ( ) | ( ) |
| I think it would be acceptable if foodservice providers informed me about how many vegetables I eat compared to other customers. | ( ) | ( ) | ( ) | ( ) | ( ) |
| I think it would be acceptable if foodservice providers automatically gave me a green salad with my lunch in order to get me to eat more vegetables if I easily could choose not to take it | ( ) | ( ) | ( ) | ( ) | ( ) |
| I think it would be acceptable if foodservice providers had posters with simple and easy tips on how I could eat more vegetables to get me to eat healthier | ( ) | ( ) | ( ) | ( ) | ( ) |
| I think it would be acceptable if the staff in foodservice providers asked me if I wanted more vegetables when buying my lunch | ( ) | ( ) | ( ) | ( ) | ( ) |
| I think it would be acceptable to change the names of the dishes in restaurants so the dishes containing many vegetables would sound more appealing and make me want to choose them | ( ) | ( ) | ( ) | ( ) | ( ) |
| I think it is acceptable if foodservice providers encouraged me to sign up for a “6 a day” or “I love vegetables” club to make me feel encouraged to eat more vegetables | ( ) | ( ) | ( ) | ( ) | ( ) |
| I think it would be acceptable if foodservice providers had posters showing happy seniors eating vegetables and a lonely and sad senior eating unhealthy food to make me feel like eating more vegetables  **Thank you very much for your time!** | ( ) | ( ) | ( ) | ( ) | ( ) |

1. McCarthy, J. E. (1964). Basic Marketing. A Managerial Approach. Homewood, IL: Irwin [↑](#footnote-ref-1)
2. Lauterborn, B. (1990). New Marketing Litany: Four Ps Passé: C-Words Take Over. Advertising Age, 61(41), 26. [↑](#footnote-ref-2)
3. Bowman, P. (2013). Service 7 - Seven principles to help your professional service business deliver experiences clients will love. Leichhardt, AU: Short Stop Press [↑](#footnote-ref-3)