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1 Promotion of novel plant-based dishes among older consumers 2 using the ‘dish of the day’ as a nudging strategy in 4 EU 3 countries

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23

24 **ABSTRACT:** A quasi-experimental study was designed to promote novel plant-based dishes using the nudging
25 strategy ‘dish of the day’ among older consumers in Denmark, France, Italy and the United Kingdom. Participants were
26 presented with three dish options: veggie balls, meatballs and fish cakes. In the intervention situation, participants were
27 informed that the ‘dish of the day’ was the novel plant-based ‘veggie balls’. Thereafter, participants were asked to
28 choose one of three dishes to intake and then fill a questionnaire. No statistically significant difference in dish choice
29 was found between the control group and intervention group in the four countries. Males were less likely to choose the
30 plant-based dish when compared with the females. Participants from the United Kingdom and Denmark were more
31 likely to choose the plant-based dish when compared with participants from France. High scores of security dimension
32 from the Human Value Scale was negatively associated with choice of plant-based dish, while high scores of the
33 sensory dimension from Food Choice Questionnaire and high scores of the universalism dimension from Human Values
34 Scale were positively related to the choice of the plant-based dish. The ‘dish of the day’ nudging approach did not
35 influence older people’s plant-based dish choice. Gender, country, and dimensions of sensory, universalism and security
36 were critical factors influencing an older people’s plant-based food choice.

37

38 **Key words:** Nudging; food choice; older people; plant-based dish; determinants.

39

40 **1. Introduction**

41 In the past century, life expectancy rose rapidly in Europe as well as in other parts of the world.
42 Along with a decline in fertility rates, WHO estimated an accelerated ageing of the population
43 (WHO, 2011; WHO, 2017): Between 2010 and 2050, the world is expected to experience a
44 substantial growth in the number of older people aged 65 years or over from an estimated 524
45 million increase to nearly 1.5 billion. In Europe, people aged 65 years and above will become a
46 large segment, accounting for 30% of the population by 2060 (European Commission, 2012).
47 Health problems arise from ageing process such as chronic disease (Joyce, Keeler, Shang, &
48 Goldman, 2005) and complications (Gregg, Engelgau, & Narayan, 2002) lower the quality of older
49 people's life, weaken their appetite (Donini, Savina, & Cannella, 2003) and flavour perception
50 (Stevens & Lawless, 1981). For instance, malnutrition as a complication affects older people's
51 health (Saka, Kaya, Ozturk, Erten, & Karan, 2010; Volkert, 2002) and shows high frequency among
52 older people at home or nursing homes in Europe (Committee of experts on nutrition, food and
53 consumer health, 2008). From the perspective of food, rapid ageing brings challenges for food
54 provision and food intake of this fast growing segment.

55 Intakes of healthy food can prevent or alleviate chronic diseases (Boeing et al., 2012;
56 Takahashi et al., 2012; Woodside, Young, & McKinley, 2013), especially intakes of plant-based
57 foods, such as vegetables, fruits, grain and legumes, which are associated with the cognitive
58 performance of older people (Nurk et al., 2010). Among plant-based foods, vegetables have
59 apparent advantages with high fibre and low sugar contents (Slavin & Lloyd, 2012). Although large
60 numbers of studies have investigated healthy eating on older people, few studies aimed to increase
61 older people' vegetables intakes (Appleton, Hemingway, & Saulais, 2016). Therefore, it is of
62 importance to search effective strategies to promote plant-based food intake, and finally, to improve
63 the health status and quality of life among older people.

64 According to the epidemiological report, minor modification of diets towards a healthier way
65 facilitates to reduce the risk of disease and age-related frailty (Trichopoulou, Costacou T, Bamia C,
66 & Trichopoulos, 2003; Trichopoulou et al., 2015). Even if the changes are made in one's later life,
67 it still has a positive effect on older people's physical condition and quality of life (Jankovic et al.,
68 2014; Trichopoulou et al., 2005; Trichopoulou et al., 2007). Therefore, strategies with the aim of
69 changing older peoples' choice towards healthier food can be highly promoted. Currently, dietary

70 education, meal service and multicomponent strategies have been applied to promote older people's
71 healthy eating (Zhou et al., 2018). For instance, nutritional dietary education has shown positive
72 outcomes on older people's dietary behaviour by raising their understanding and knowledge
73 regarding healthy eating (Bandayrel & Wong, 2011). However, older people's eating habits may
74 return to the original level once the interventions are concluded, because they require long-term
75 duration and continuous assessment.

76 People's eating behaviour is very complicated, and multiple aspects may influence people's
77 vegetable intake, ranging from interior elements (e.g. individual food preference, knowledge and
78 beliefs, etc.) to exterior elements (e.g. society and surrounding environments, etc.) (Shatenstein et
79 al., 2013). Each day, people will face around 250 food-related choices (Wansink & Sobal, 2007).
80 How to change older people's food choice towards a healthier way is a critical issue to promote
81 healthy eating among older people. As an emerging strategy, nudging approach has received
82 extensive attention in the field of behavioural science (Hansen, Skov, & Skov, 2016), and it has
83 been applied to change people's behaviour on health, wealth and happiness (Olstad, Vermeer,
84 McCargar, Prowse, & Raine, 2015; Thorndike, Riis, Sonnenberg, & Levy, 2014). Hausman and
85 Welch (2010) define the concept of nudges as: 'Nudges are ways of influencing choice without
86 limiting the choice set or making alternatives appreciably more costly in terms of time, trouble,
87 social sanctions, and so forth.' Nudge interventions mainly covers three aspects: (1) slightly
88 change choice conditions to influence individual choices; (2) identify rationality failures and make
89 good use of them; (3) mitigate the adverse effect of rationality failures (Mongin & Cozic, 2018).

90 Recently, nudging strategies has been introduced to change people's diet-related behaviour
91 (Boyland & Halford, 2013) and motivate them to make a healthier food choice (Broers, De
92 Breucker, Van den Broucke, & Luminet, 2017; Bucher et al., 2016; Stroebele-Benschop, Depa, &
93 de Castro, 2016). There is reason to believe that nudging could be applied to influence older
94 people's food choice and promote their' healthy eating (Hansen, Skov, & Skov, 2016).

95 Moreover, with the rising use of catering facilities, food-away-from-home makes up a larger
96 proportion of food consumption (Bes-Rastrollo et al., 2010; Kearney, Hulshof, & Gibney, 2001;
97 O'Dwyer, McCarthy, Burke, & Gibney, 2005; Orfanos et al., 2009). Incorporating the nudging
98 method into catering sectors can be an opportunity to improve consumers' eating behaviour (Friis et
99 al, 2017; Lachat et al., 2011). Default as an important nudging strategy influences much of people's
100 food choice (House of Lords, 2011). For instance, the use of a default vegetarian menu or
101 recommendations of vegetarian dish could increase people's plant-based dish choice (Bacon &

102 Krpan, 2018; Campbell-Arvai, Arvai, & Kalof, 2014). ‘Dish of the day’, as a default option in menu
103 is commonly used by the food service management to draw consumer’s attention and promote the
104 dish (Leenaert, 2012). Additionally, when customers are hungry, they are more likely to choose the
105 default option (Giesen, Geyskens, Goukens, & Havermans, 2013). Therefore, applying the concept
106 of ‘dish of the day’ into the meal service sector may generate opportunities to promote older
107 consumers’ outside-home healthy eating. However, only a few nudging methods were found to
108 promote healthier food choice specifically addressed towards older people. Majority of such
109 interventions were based on a crossover design and failed to provide a robust measurable effect size
110 (Appleton et al, 2016; Bucher et al, 2016; Hansen et al, 2016; Nørnberg et al, 2016; Skov et al.,
111 2013).

112 In addition, potential determinants of older people’s food choice could facilitate the promotion
113 of their healthy eating. Individual characteristics, knowledge and attitudes were found to be
114 associated with older peoples’ eating behaviour (Briley, 1989; Payette & Shatenstein, 2005;
115 Shatenstein et al., 2013). However, few of studies were found to investigate the determinants of
116 plant-based food choice among older people.

117 Considering the above issues, the present study was conducted within the frame of the
118 VeggiEAT project. Briefly, the project consisted of the promotion of plant-based dishes by
119 identifying personal drivers for vegetable consumption in adolescents and older consumers and by
120 further using nudges to make easier the plant-based choices (considered here as healthier).

121 The objectives of the present study were to investigate the effect of a nudging strategy (‘dish of
122 the day’) on plant-based dish choice compared with a control setting, and explore which
123 determinants influence plant-based dish choice among European older people. This study reports
124 data from four VeggiEAT participants’ countries: Denmark, France, Italy and the United Kingdom.

125

126 **2. Methods**

127

128 *2.1 Participants and recruitment*

129

130 Urban dwellers aged 65 years and above were recruited in cities from four European countries
131 (Denmark, France, Italy and the United Kingdom). Older people with dementia or other
132 neurological complications were excluded in this study with the consideration that cognitive
133 impairment may hinder their ability to answer the questionnaires and involvement in the data
134 collection. In Denmark, the recruitment was done through phone calls to the senior activity centres

135 and through emails to the University of Copenhagen's consumer panel. Finally, 97 participants
136 agreed to participate in the study. In France, participants were recruited by emails to the internal
137 consumer database of Institute Paul Bocuse, as well as online advertisements. A total of 118
138 participants in France enrolled in this experiment. In Italy and the United Kingdom, recruitment was
139 conducted via email to key people responsible for lunch clubs in Florence, and key people
140 responsible for senior care centres and lunch clubs in Bournemouth, and finally 46 and 87
141 participants signed up for the study in Italy and the United Kingdom respectively.

142

143 *2.2 Study procedure*

144

145 A quasi-experimental study was designed to investigate the impact of a 'dish of the day' nudge
146 intervention on older people's dish choice. The data collection occurred from December 2016 to
147 May 2017, at lunchtime. All recruited participants provided written informed consent and ethical
148 approval was obtained from appropriate authorities among the VeggiEAT project countries.

149 In Denmark, the data collection was held at senior activity centres, senior clubs, and at the
150 University of Copenhagen. In France, older people were invited for lunch at the living lab of the
151 Institute Paul Bocuse, a real restaurant designed as a platform for data collection. In Italy, the data
152 was collected at the club located at Pian di Mugnone (Florence). In the UK, the data collection was
153 held at a restaurant located at Bournemouth University.

154 At the beginning of this experiment, each participant was assigned a randomly generated
155 identification number and randomly allocated to the control group and intervention group, and they
156 were blinded to the purpose of this experiment. Participants were then asked to complete two
157 questionnaires (appendix A and B), one before the meal (with personal information and a hunger
158 scale) and one after the meal (with a Likert scale to evaluate their liking of the dish and other
159 potential determinants of food choice). Three choices of dish were presented as equal opportunities
160 in the control situation: fish cakes dish, meat balls dish, and veggie balls dish, but in the
161 intervention situation, the veggie balls dish was termed as 'dish of the day'. In both situations, the
162 veggie balls dish was displayed between the two alternative dishes. For the test session, participants
163 were asked to choose one dish from the menu and then fill out a questionnaire. The veggie balls
164 dish consisted of vegetable 'polpettes' (balls) incorporating peas and sweet corn, developed at the
165 Institute Paul Bocuse, France, in a previous stage of the VeggiEAT Project. The alternative dishes
166 were traditional meatballs (made with beef) or fish cakes (made with white minced fish). All the
167 dishes were served with rice, salad and tomato sauce. All dishes involved in this study were cooked

168 following the same recipe and served for free in the different countries. Socio-demographic
169 characteristics, participants dish choices and diet related data were collected and analysed after the
170 meal.

171

172 *2.3 Definition of variables*

173

174 Considering the complexity of eating behaviour and the possible determinants of plant-based
175 dish choice, the following variables were selected for this study: gender, country, group
176 (intervention group or control group), state of hunger, adherence to Mediterranean diet, food
177 neophobia, attitudes towards nudging, food choice motives and human values.

178 According to previous research, females were associated with higher intake of vegetables and
179 fruits, and they cared more about healthy eating and nutrition related knowledge (Appleton, McGill,
180 & Woodside, 2009; Baker & Wardle, 2001; Donkin et al., 1998). Thus, this variable was included
181 in this study to investigate the gender effect on participants' dish choice.

182 Country was included as explanatory variable in the analysis because people's eating habits
183 varies among different countries (Appleton et al., 2017). The United Kingdom, Denmark, France
184 and Italy were coded as 1, 2, 3, and 4 respectively for data analysis.

185 Participants with or without the intervention may have a different response in dish choice.
186 Therefore, group was considered as a variable to account for the possible effect on older
187 participants' dish choice.

188 State of hunger was self-rated by participants prior to the meal, using a 10-point hunger scale
189 (Omichinski, 1992), which varies from 1 to 10 (1: being extremely hungry and 10: being extremely
190 full). This scale is found in questionnaire 1 (appendix A)

191 The Mediterranean diet as a dietary pattern is a rich source of plant-based food. Participants
192 with higher adherence to this dietary pattern were expected to be more prone to choose a plant-
193 based dish. Each question from the Mediterranean diet adherence scale was scored 0 or 1 (Martínez-
194 González et al., 2012). Two questions focus on eating habits and the remaining items concentrate on
195 food consumption frequency. This scale is found in question 4 of the questionnaire 2 (appendix B).

196 Motives for food choice were measured using the Food Choice Questionnaire (Stephoe, Pollard
197 & Wardle J, 1995). It is a tool consisting of 24 items and covering 8 dimensions. Each item is
198 scored from 1 to 4 with four options—'not at all important', 'a little important', 'moderately
199 important' and 'very important'. Dimensions in this questionnaire include sensory, natural, mood,

200 health, price, weight, familiarity and convenience. This scale is found in question 6 of the
201 questionnaire 2 (appendix B).

202 Human values reference to ‘what is important to people in their lives and the goals they strive
203 to attain’ (Schwartz et al., 2015). In this study, human values were included to test which dimension
204 was associated with older people’s plant-based dish choice. The measurement was based on a 21-
205 item scale ranging from ‘very much like me’ to ‘not like me at all’ scoring 0-6 points. This scale
206 was developed by Schwartz (Schwartz, 2003) and covers 10 human values dimensions: self-
207 direction, power, universalism, achievement, security, stimulation, conformity, tradition, hedonism
208 and benevolence. This scale is found in question 7 of the questionnaire 2 (appendix B).

209 Food neophobia is defined as ‘a reluctance to eat and/or avoidance of novel foods’ (Pliner,
210 Hobden, & Hobden, 1992). In this study, the dish with veggie balls was a novel dish and it was
211 specifically developed for this experiment, thus it is expected that food neophobia could play a role
212 in the choice of the plant-based dish. It was measured using a 10-item food neophobia scale (Pliner,
213 Hobden, & Hobden, 1992). Each item was responded to a 7-point Likert scale ranging from
214 ‘disagree strongly’ to ‘agree strongly’. This scale is found in question 8 of the questionnaire 2
215 (appendix B).

216 Attitudes towards nudging were assessed on a 5-point Likert scale consisting of 10 statements
217 on hypothetical scenarios, which were related to the concept of nudging for food choice behaviour
218 (Dolan et al., 2012; Nørnberg et al., 2016). Each statement was measured with five options ranging
219 from ‘disagree strongly’ to ‘agree strongly’. This scale is found in question 12 of the questionnaire
220 2 (appendix B).

221

222 *2.4 Data analysis*

223

224 Pearson’s chi-square test and binary logistic regression were computed in this study. Primarily,
225 the difference of dish choice between the intervention group and control group across four different
226 countries was assessed by chi-square test. If results showed no statistically significant difference
227 between groups, choice of dish was recoded as a plant-based dish versus an animal-based dish.
228 Then binary logistic regression model was applied to test the relationship between participants’ dish
229 choice and all other independent variables.

230 Regarding the logistic regression model, univariate binary logistic regression was primarily run
231 to detect which dimensions from Food Choice Questionnaire and Human Values Scale was
232 statically significant in relation to the plant-based dish choice. Then backward selection was used

233 for multivariable logistic regression by incorporating independent variables such as gender,
234 attitudes towards nudging, Mediterranean diet adherence, food neophobia, state of hunger and
235 previously detected dimensions. Spearman correlations between variables were tested to avoid
236 multicollinearity. In order to avoid overfitting of the model, the rationale developed by Peduzzi,
237 Concato, Kemper, Holford, and Feinstein (1996) was applied to calculate the maximum number of
238 included independent variables based on the sample size and the proportion of positive cases
239 (percentage of participants who chose the plant-based dish). Cronbach's alpha was used to measure
240 the internal consistency of the Human Value Scale (Cortina, 1993). A p value of <0.05 was used to
241 define statistical significance. Missing data were imputed through mean imputation. All analyses
242 were run in SPSS 24.0 (IBM, New York, U.S.).

243

244 **3. Results**

245

246 *3.1 Participants' characteristics*

247

248 Table 1 shows the socio-demographic characteristics, eating habits and eating out frequency
249 among older people in the four countries. Participants' age ranged from 65 to 89 years and there
250 was a higher frequency of women. The percentage of vegetarians was less than 2.5% across all four
251 countries, and in Italy, none of the participants were vegetarian. More than half of the participants
252 chose to eat out once a week or less. In Italy and France, only a small proportion of participants
253 reported eating food-away-from-home every day while in Denmark and the United Kingdom, none
254 of them stated this information.

255

256

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264

265

266 **Table 1**

267 Socio-demographic characteristics, eating habits and eating out frequency of participants by country

Variables	Denmark (n=97)	France (n=118)	Italy (n=46)	United Kingdom (n=87)
Gender (%)				
Female	67.0	60.5	56.5	62.0
Male	33.0	39.5	43.5	38.0
Age (years) Mean (SD) range	73.9 (6.4) 65-89	71.1 (5.2) 65-89	70.7 (6.0) 65-87	71.5 (4.9) 65-84
Vegetarian (%)	1.0	2.0	0	2.3
Frequency of eating out (%)				
Never	10.3	18.1	26.1	12.7
Once a week or less	68.0	66.4	60.9	58.6
2 days a week	18.6	13.8	4.3	26.4
3-4 days a week	3.1	0.9	6.5	2.3
Every day	0	0.8	4.3	0

268

269 *3.2 Participants' dish choice*

270

271 Table 2 shows the results of dish choice between the intervention and control groups in each
 272 country. No statistically significant differences were found in dish choice between groups and
 273 across countries.

274

275 **Table 2**

276 Comparison of dish choice between groups across four countries

Country	Choice of Dish	Intervention Group n (%)	Control Group n (%)	Pearson Chi-Square Value	P Value
Denmark	Meat balls	21 (42.9)	18 (37.5)	0.291	0.865
	Veggie balls	12 (24.5)	13 (27.1)		
	Fish cakes	16 (32.7)	17 (35.4)		
France	Meat balls	25 (41.7)	19 (32.8)	2.281	0.320
	Veggie balls	8 (13.3)	5 (8.6)		
	Fish cakes	27 (45.0)	34 (58.6)		
Italy†	Meat balls	9 (39.1)	6 (26.1)	0.940	0.734
	Veggie balls	4 (17.4)	5 (21.7)		
	Fish cakes	10 (43.5)	12 (52.2)		
United Kingdom	Meat balls	9 (20.5)	17 (39.5)	4.426	0.109
	Veggie balls	10 (22.7)	10 (23.3)		
	Fish cakes	25 (56.8)	16 (37.2)		

277

278 *Statistically significant (P < 0.05);

279 † Fisher's Exact Test because 33.3% of the cells have expected counts less than 5

280

281 Since no statistically significant differences were found in dish choice between the control and
 282 intervention groups in all countries, the veggie balls dish was then renamed as a plant-based dish
 283 and the other two types of dishes were renamed as an animal-based dish and grouped together. Data
 284 from the four different countries were combined for further analysis. Potential determinants of the
 285 plant-based dish choice were analysed by applying binary logistic regression models.

286

287 *3.3 Association between each dimension of Food Choice Questionnaire and choice of plant-based* 288 *dish*

289

290 Table 3 illustrates the univariate logistic regression model regarding the association between
 291 each dimension of Food Choice Questionnaire and choice of plant-based dish. Although no
 292 dimensions were found to be significantly associated with the participants' choice of the plant-
 293 based dish, the p value regarding the convenience and sensory dimensions were close to the critical
 294 point, which indicated a marginal trend toward significance. Considering the possible bias caused
 295 by univariate analysis (Sun, Shook, & Kay, 1996; Bursac, Gauss, Williams, & Hosmer, 2008),
 296 sensory and convenience dimensions were finally incorporated to the multivariable logistic
 297 regression model as the potential determinants of plant-based dish choice.

298

299 **Table 3**

300 Odds ratios and 95% CI in the univariate logistic regression model investigating each dimension of the Food Choice
 301 Questionnaire in association with participants' choice of plant-based dish

Variables	Questions	Estimate	OR for plant-based dish	95% CI	P value
Convenience	(3,8,16)	-0.312	0.732	(0.530; 1.011)	0.058
Sensory	(1,5,24)	0.525	1.690	(0.997; 2.865)	0.052
Natural	(4, 9, 14)	0.036	1.037	(0.736; 1.462)	0.836
Mood	(12, 15, 19, 20)	0.198	1.219	(0.870; 1.709)	0.250
Health	(2,13,18,22)	0.314	1.369	(0.861; 2.177)	0.185
Price	(10,23)	0.000	1.000	(0.730; 1.371)	0.999
Weight	(6,11,21)	0.015	1.015	(0.733; 1.406)	0.927
Family	(7,17)	-0.226	0.798	(0.583; 1.091)	0.157

302

303 *Statistically significant ($P < 0.05$); OR=odds ratios

304

305 *3.4 Association between each dimension of Human Values Scale and choice of plant-based dish* 306

307 Table 4 shows the results of the univariate logistic regression analysis investigating each
 308 dimension of the Human Values Scale in association with plant-based dish choice. A full scale
 309 Cronbach's alpha of 0.78 indicated a relatively high internal consistency. Security and universalism

310 were found significantly related to the participants' plant-based dish choice. Cronbach's alpha for
 311 Security was 0.57 and for universalism was 0.63. The security score and participants' plant-based
 312 dish choice showed a reverse association while universalism score and the same dish choice
 313 presented a positive relationship. For the security dimension, participants with higher scores were
 314 30% less likely to choose the plant-based dish. Regarding the universalism dimension, participants
 315 with higher scores were 65.8% more likely to choose the plant-based option.

316

317 **Table 4**

318 Odds ratios and 95% CI in univariate logistic regression model investigating each dimension of Human Values Scale in
 319 association with participants' choice of plant-based dish

Variables	Questions	Estimate	OR for plant-based dish	95% CI	P value
Universalism	(3,8,19)	0.506	1.658	(1.125; 2.445)	0.011*
Security	(5,14)	-0.357	0.700	(0.538; 0.910)	0.008*
Power	(2,17)	0.123	1.131	(0.866; 1.476)	0.365
Hedonism	(10,21)	-0.105	0.900	(0.683; 1.186)	0.454
Achievement	(4,13)	-0.138	0.871	(0.663; 1.143)	0.318
Stimulation	(6,15)	0.229	1.257	(0.961; 1.645)	0.096
Self-direction	(1,11)	-0.076	0.927	(0.674; 1.274)	0.641
Tradition	(9,20)	-0.071	0.931	(0.686; 1.264)	0.649
Conformity	(7,16)	-0.140	0.869	(0.662; 1.143)	0.316
Benevolence	(12,18)	0.191	1.211	(0.828; 1.770)	0.323

320
 321
 322

*Statistically significant (P < 0.05); OR=odds ratios

323 *3.5 Determinants of participants' choice towards plant-based dish*

324

325 All of the candidate independent variables to be included in the multivariable logistic
 326 regression model were checked for multicollinearity through Spearman's correlations as they were
 327 not normally distributed (data were not shown). Included variables were either uncorrelated or
 328 negligibly correlated as all the correlation coefficients were lower than 0.3, indicating that they can
 329 be used together in the same model (Hinkle, Wiersma, & Jurs, 2003).

330 Table 5 shows the result of the multivariable logistic regression using the backward selection.
 331 Compared with females, males were 47.4% less likely to choose the plant-based dish. When France
 332 was defined as reference, the United Kingdom and Denmark had a 198.7% and 173.2% higher
 333 likelihood of choosing the plant-based dish respectively. An increase of 1 unit on the security
 334 dimension of the Humans Values Scale led to a 37.3% lower likelihood of choosing the plant-based
 335 dish. On the other hand, an increase of 1 unit on the sensory dimensions of the Food Choice

336 Questionnaire and on the universalism dimensions of the Human Values Scale leads to a 83.5% and
337 56.1% higher likelihood of choosing the plant-based dish respectively.

338

339 **Table 5**

340 Odds ratios and 95% CI in multivariable logistic regression model associated with participants' choice of plant-based
341 dish

Variables	Estimate	OR for plant-based dish	95% CI	P value
Gender ^a	-0.642	0.526	(0.283; 0.978)	0.042*
Country ^b				
<i>France</i>	Ref	Ref	Ref	Ref
<i>Denmark</i>	1.005	2.732	(1.265; 5.901)	0.011*
<i>The United Kingdom</i>	1.094	2.987	(1.320; 6.763)	0.009*
<i>Italy</i>	0.637	1.891	(0.695; 5.147)	0.212
Sensory	0.607	1.835	(1.024; 3.291)	0.042*
Universalism	0.445	1.561	(1.038; 2.349)	0.033*
Security	-0.467	0.627	(0.469; 0.837)	0.002*

342

343 a Reference category: Female; b Reference category: France; *statistically significant (P < 0.05); OR=odds ratios; Ref= reference

344

345 **4. Discussion**

346

347 This study investigated the effect of nudging on older people's dish choice through a 'dish of
348 the day' strategy and identified the potential determinants of plant-based dish choice in four EU
349 countries. The majority of participants had the habit of eating out-of-the-home once a week or less
350 and only a small proportion of participants declared to be vegetarian. The number of participants
351 who chose the plant-based dish was similar to those who chose fish cakes and meatballs. Five
352 variables were significantly associated with participants' plant-based choice including gender,
353 country, an importance given to sensory factors, universalism factors and security-based factors.
354 Females and participants from the United Kingdom and Denmark (compared with France) were
355 more willing to choose the plant-based dish. The more importance participants gave to sensory and
356 universalism factors, the more they chose the plant-based option. On the contrary, those who rated
357 security higher were less willing to make the same choice.

358

359 Previous studies have shown that changing eating patterns towards a healthier diet can improve
360 people's nutrition condition (Chernoff, 2001). Nudging as both a money-saving and a time-saving
361 strategy has been widely used to promote people's healthy behaviour (Skov, Lourenço, Hansen,
362 Mikkelsen, & Schofield, 2013). However, the effects of nudging intervention on healthy eating vary
in different operations. Some of studies showed that nudging could promote healthy eating (Dubbert,

363 Johnson, Schlundt, & Montague, 1984; Feldman, Mahadevan, Su, Brusca, & Ruzsilla, 2011;
364 McDaniel, Hunt, Hackes, & Pope, 2001) while some couldn't (Buscher et al., 2001; Feldman,
365 Mahadevan, Su, Brusca, & Ruzsilla, 2011). For instance, Feldman et al. (2011) investigated the
366 effect of nutritional menu labelling on older people's meal selection, and they didn't find substantial
367 effect on facilitating healthier meal choice, however, boxing menu items successfully encouraged
368 older people to choose the meal with healthy items. Considering the differences of nudging designs
369 and specific intervention operations, results may be influenced by multiple factors like stimuli,
370 sample design, social interaction and environment.

371 In this study, 'dish of the day' was selected as a nudging method to influence older people's
372 dish choice, however, no evidence was found for an increase in participants' choice of a plant-based
373 dish (veggie balls dish). Although previous studies have proven that default option increase
374 consumers' choice of plant-based food, the strategies were different from 'dish of the day' in this
375 study. Campbell-Arvai and Kalof (2014) investigated the effect of default menu on consumer's
376 meat-free dish choice, and result showed positive effect on consumer's healthy dish choice.
377 Different from this study, they provided the default menu closely to the consumers and put the
378 second menu option far away from consumers, which increase the possibilities of choosing
379 vegetables dish. In this study, the 'dish of the day' —veggi balls dish were treated equally with the
380 other two dishes, which may lower people's attention on the default dish. In addition, lack of
381 detailed information about 'dish of the day' may make the plant-based dish unappealing. Bacon and
382 Krpan (2018) found that menus with recommendations and introductions of vegetarian dish
383 increased the dish choice among infrequent vegetarian food eaters when compared with a menu
384 separating the place of vegetarian dish from other dish options. Therefore, an explanation to the
385 present study's findings could be that the way the nudge was not implemented sufficiently, and
386 probably if we would have provided a detailed introduction, with a picture or nutritional value of
387 this dish and provide more in-depth information regarding the advantages and dynamics of 'dish of
388 the day', older consumers may have increased their choice of the target plant-based dish.

389 In addition, dish samples or social interactions might influence the function of 'dish of the day'.
390 Compared with the plant-based dish, animal-based dishes are more popular, more familiar and more
391 traditional in these four EU countries, therefore, older people may regard it as an easier and inertial
392 choice when they were presented with the choices, and could explain the success of the fish-based
393 option. The plant-based dish in this study was made of peas, beans and corn, which is not a
394 common vegetable dish in these four EU countries. For instance, if the dish formulation were

395 adjusted, changing to a more familiar presentation and raw material, it might facilitate older
396 people's dish choice towards the target one. Furthermore, social interaction may be another
397 potential reason that influenced participants' dish choice as they were able to sit together for lunch
398 (Stroebele-Benschop, Depa, & de Castro, 2016). Perhaps, if we adjust the subliminal cues,
399 environment or we combine previous effective strategies together (Schröder & Lyon, 2013; Van
400 den Broucke, & Luminet, 2017), nudging strategies of promoting older people's healthy eating may
401 be more successful.

402 Beyond investigating the nudging effect, we also identified the potential determinants
403 influencing older people's plant-based dish choice. Logistic regression results showed that
404 participants from the United Kingdom and Denmark more often tried the plant-based dish when
405 compare with participants from France. Among these four different countries, the United Kingdom
406 had the largest number of vegetarians, which may drive older people's eating behaviour towards
407 plant-based food, because vegetarians avoid animal related products and have a plant-based dietary
408 habit (Phillips, 2005). Although fewer vegetarians were found in Denmark when compared with
409 France, potential flexitarians in Denmark may contribute to the increased likelihood of choosing the
410 plant-based dish as flexitarians are 'meat-reducers' and tend to hold positive attitude on the plant-
411 based dish (Clicerì, 2018; Dagevos & Voordouw 2013; Reipurth et al., 2018).

412 Gender as one of the most important factors has a statistically significant impact on older
413 participants' dish choice in this study. Compared with females, males were less likely to choose the
414 plant-based dish, which was consistent with previous studies that gender was strongly associated
415 with older people's vegetables and fruits consumption (Appleton, McGill, & Woodside, 2009;
416 Baker & Wardle, 2001; Donkin et al., 1998). Baker et al. (2001) demonstrated that compared with
417 old males, females consumed more vegetables and fruit per day and reported more knowledge about
418 nutrition, especially regarding plant-based foods. Therefore, compared with males, females may
419 have more possibilities to choose plant-based food and intake more plant-based food. Also, nudging
420 females towards healthier food could be easier than nudging males' if we provide more health
421 related claim (Kaur et al., 2017). Perhaps, treat different gender group with specialized strategies
422 may increase the efficiency of promoting older people's healthy eating.

423 According to the results from food choice motives, sensory factor was an important predictor of
424 plant-based dish choice among older people in this study. The more the older participants paid
425 attention to a food's taste, smell and texture, the more they were likely to select the plant-based
426 choice. Older people may suffer sensory loss from the ageing process including taste impairment,

427 weakened smell perception and chewing difficulties (Kohyama, Mioche, & Martin, 2002; Murphy,
428 1993), which lower their interest in meals. In this study, the newly designed plant-based dish may
429 easily draw attention from the older people who value its sensory properties. It is well known that
430 sensory properties influence older people's food preferences and this effect can be larger if
431 connected with perceived health value (Laureati, Pagliarini, & Calcinoni, 2008; Mathey, Siebelink,
432 de Graaf, & Van Staveren, 2001; Laureati, Pagliarini, Calcinoni, & Bidoglio, 2006; Richardson,
433 Shepherd, & Elliman, 1993) (Goff & Klee, 2006).

434 In addition, dimensions of universalism and security in Human Values Scale were found
435 significantly associated with older participants' plant-based choice. Schwartz et al. (1994) defined
436 the motivational goal of universalism as 'understanding, appreciation, tolerance, and protection, for
437 the welfare of all people and for nature'. In this study, participants who emphasized equal
438 opportunities, understanding of others and caring about nature were more likely to choose the plant-
439 based dish. Farragher, Wang, and Worsley (2016) demonstrated that the item of equality-
440 universalism from the Personal Values Scale was positively associated with salad vegetable
441 consumption, and supported the results of this present study. Therefore, increasing older people's
442 awareness of equality and enhancing their concern about nature could be an effective way to
443 facilitate the promotion of plant-based food. On the contrary, high scores of security were
444 negatively related with older people's plant-based dish. The value security from the Human Values
445 Scale means 'safety, harmony, and stability of society, of relationships, and of self,' for instance,
446 national security, social order and clean are the exemplary types (Schwartz et al., 1994). In this
447 study, when older participants placed more importance on safety, harmony and stability of society
448 and of self, they had less probability to choose plant-based dish. Universalism and security were
449 opposite conceptually in the value structure (Schwartz et al., 1994), in this study, these two
450 dimensions indicated an opposite association with older people's plant-based dish choice.

451 Although food neophobia and Mediterranean diet adherence were not strongly associated with
452 older people's plant-based dish choice in this study, they play an important role in eating behaviour
453 among older people. Older people appeared more food neophobia when compared with other age
454 groups (Stratton, Vella, Sheeshka, & Duncan, 2015) and familiarity is a key driver for older people
455 to make food choices (Painter, Wansink, & Hieggelke, 2002). In this study, we assumed the general
456 food neophobia may reduce the plant-based dish choice because of the novelty of veggi balls dish,
457 but the results showed that food neophobia was not a critical factor influencing dish choice. The
458 neophobia specifically for each menu dish was not tested in this study, which may be related with

459 older consumers' dish choice. Further studies are needed to confirm the relationship between
460 specific dish food neophobia and the choice of plant-based food among the older people. In addition,
461 comparing the nudging effect 'dish of the day' on novel and common plant-based food choice may
462 help to improve the strategy of promoting older people's healthy eating. Mediterranean diet is
463 regarded as a rich source of plant-based food in people's daily diet across EU countries and
464 supposed to influence older people's dish choice. However, in this study, adherence to a
465 Mediterranean diet didn't affect older people's dish choice. The potential reason could be that this
466 study was a cross-sectional design without long term following-up and older consumer only have
467 one chance to choose the dish, which may be influenced by dish options, surroundings, people,
468 mood or other possible factors.

469 Moreover, the attitudes towards nudging were not associated to the choice of the plant-based
470 dish. It is generally accepted that attitudes are necessary but not sufficient to achieve behavioural
471 change (Ariely, 2008; Dolan et al., 2012; Thaler & Sunstein, 2008). Although Pieniak et al. (2010)
472 found that attitudes towards organic vegetables were strongly associated with food intake, the
473 consumption data was based on participants' self-report instead of actual behaviour change, leading
474 the uncertainty of the results. In addition, the scale was not designed specifically for older people,
475 and few studies investigate the relationship between attitude towards nudging and plant-based dish
476 choice. Changing older people's attitude towards nudging may not help to promote older people's
477 eating behaviour, because sometimes people's decision may be influenced in an irrational way
478 responding to the surroundings (Ariely, 2008; Thaler & Sunstein, 2008).

479 This study is the first attempt to investigate a nudging effect on older people's dish choice
480 through a 'dish of the day' strategy in four EU countries. Gender, country, and an importance of
481 sensory, universalism and security factors were potential determinants of older people's plant-based
482 dish choice. Future research is needed on nudging method and to confirm the relationship between
483 the above determinants and older people's plant-based dish choice. However, there are some
484 limitations with this study that should be considered. First of all, there was a long questionnaire and
485 it required great patience from older participants to complete, which may weaken the quality of data
486 and also increase the missing data. Second, this study is a quasi-experimental design without
487 follow-up, therefore, it can't provide insights into any sustained effect on older people's dish choice.
488 Third, the animal-based dish as a classical dish had some advantages when compared with plant-
489 based dish in these four European countries. Furthermore, considering time-saving and various
490 national data collections, a shorter 21-item version of Human Values Scale was chosen for this

491 study (Schwartz, 2012), but the Cronbach's alpha of full scale, universalism and security suggested
492 the items within this scale had a relatively moderate internal consistency (Cortina 1993). At last, the
493 'dish of the day' as a nudging method did not increase older participants' plant-based dish choice.
494 Taking multiple factors into consideration and make the stimulus more appealing may enhance the
495 effectiveness of the intervention (Schröder & Lyon, 2013).

496

497 **5. Conclusions**

498

499 In summary, this study provided directions for future research in the promotion of older
500 peoples' diet towards a plant-based pattern by using a 'dish of the day' nudging strategy. Although
501 no statistically significant differences were found for dish choice in four EU countries, five
502 potential determinants were identified that relate to plant-based dish choice. Females and
503 participants from the United Kingdom and Denmark (compared with France) were more likely to
504 choose the plant-based dish. In addition, the higher the importance given by participants to sensory
505 properties, the more likely they were to choose the target dish. Every increment in the importance
506 given to universalism increased the odds of choosing the plant-based dish, while increments in the
507 security value had the opposite effect. In addition, confirming the relationship of these potential
508 determinants with plant-based food choice is needed as similar studies in this field for older people
509 are very small in number. Future interventions could build on the current study by improving the
510 application of the 'nudge' and taking into account the strategic knowledge of what to do or not to do
511 in the field, such as enhancing the explanations of plant-based foods, or incorporating effective
512 stimuli cues of nudging, a more comprehensive strategy could be developed to enhance older
513 people's plant-based food choice and finally to improve their health condition and quality of life.

514

515 **Ethical Standards Disclosure**

516

517 Ethical approval was obtained through the appropriate channels in all the VeggiEAT Project
518 countries. Relevant health and safety issues, together with a risk assessment protocol, were
519 addressed prior to the commencement of the research. Written informed consent was obtained from
520 all participants. Confidentiality and anonymity were assured at all times.

521

522 **Conflicts of Interest**

523

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530

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532

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539

540 **References**

541

542 Appleton, K. M., Dinnella, C., Spinelli, S., Morizet, D., Saulais, L., Hemingway, A., ... Hartwell, H. (2017).

543 Consumption of a high quantity and a wide variety of vegetables are predicted by different food choice motives in
544 older adults from France, Italy and the UK. *Nutrients*, 9(9), 1–17. <http://doi.org/10.3390/nu9090923>.

545 Appleton, K. M., Hemingway, A., Saulais, L., Dinnella, C., Monteleone, E., Depezay, L., ... Hartwell, H. (2016).

546 Increasing vegetable intakes: rationale and systematic review of published interventions. *European Journal of*
547 *Nutrition*, 55(3), 869-896. <https://doi.org/10.1007/s00394-015-1130-8> .

548 Appleton, K. M., McGill, R., & Woodside, J. V. (2009). Fruit and vegetable consumption in older individuals in

549 Northern Ireland: Levels and patterns. *British Journal of Nutrition*, 102(7), 949–

550 953. <http://doi.org/10.1017/S0007114509332122>.

551 Ariely, D. (2008). Predictably irrational: The hidden forces that shape our decisions. HarperCollins.

552 Bacon, L., & Krpan, D. (2018). (Not) Eating for the environment: The impact of restaurant menu design on vegetarian

553 food choice. *Appetite*, 125, 190-200. <http://doi.org/10.1016/j.appet.2018.02.006>.

554 Baker, A. H., Wardle, J. (2001). Sex differences in fruit and vegetable intake in older adults. *Appetite*, 40, 269–275.

555 [https://doi.org/10.1016/S0195-6663\(03\)00014-X](https://doi.org/10.1016/S0195-6663(03)00014-X).

556 Bandayrel, K., & Wong, S. (2011). Systematic literature review of randomized control trials assessing the effectiveness

557 of nutrition interventions in community-dwelling older adults. *Journal of Nutrition Education and Behavior*,

558 43(4), 251–262. <http://doi.org/10.1016/j.jneb.2010.01.004>.

559 Bes-Rastrollo, M., Basterra-Gortari, F. J., Sanchez-Villegas, A., Marti, A., Martinez, J. A., & Martinez-González, M. A.

560 (2010). A prospective study of eating away-from-home meals and weight gain in a Mediterranean population: The

561 SUN (Seguimiento Universidad de Navarra) cohort. *Public Health Nutrition*, 13(9), 1356–1363.

562 <http://doi.org/10.1017/S1368980009992783>.

563 Boeing, H., Bechthold, A., Bub, A., Ellinger, S., Haller, D., Kroke, A., ... Watzl, B. (2012). Critical review: vegetables

564 and fruit in the prevention of chronic diseases. *European Journal of Nutrition*, 51, 637–663.
565 <https://s.click.taobao.com/GsPUdQw>.

566 Boyland, E. J., & Halford, J. C. G. (2013). Television advertising and branding. Effects on eating behaviour and food
567 preferences in children. *Appetite*, 62, 236–241. <http://doi.org/10.1016/j.appet.2012.01.032>.

568 Briley, M. E. (1989). The determinants of food choices of the older people. *Journal of Nutrition for the Elderly*, 9, 39–
569 45. https://doi.org/10.1300/J052v09n01_05.

570 Broers, V. J. V., De Breucker, C., Van den Broucke, S., & Luminet, O. (2017). A systematic review and meta-analysis
571 of the effectiveness of nudging to increase fruit and vegetable choice. *European Journal of Public Health*, 27(5),
572 912–920. <http://doi.org/10.1093/eurpub/ckx085>.

573 Bucher, T., Collins, C., Rollo, M. E., McCaffrey, T. A., De Vlieger, N., Van der Bend, D., ... Perez-Cueto, F. J. A.
574 (2016). Nudging consumers towards healthier choices: a systematic review of positional influences on food
575 choice. *British Journal of Nutrition*, 115(12), 2252–2263. <http://doi.org/10.1017/S0007114516001653>.

576 Bursac, Z., Gauss, C. H., Williams, D. K., & Hosmer, D. W. (2008). Purposeful selection of variables in logistic
577 regression. *Source code for biology and medicine*, 3(1), 17.

578 Buscher, L. A., Martin, K. A., Crocker, S., Li, S., Neumark-Sztainer, D., Thornquist, M., & Cheskin, L. (2001). Point-
579 of-purchase messages framed in terms of cost, convenience, taste, and energy improve healthful snack selection in
580 a college foodservice setting. *Journal of the American Dietetic Association*, 101(8), 909–913.
581 [http://doi.org/10.1016/S0002-8223\(01\)00223-1](http://doi.org/10.1016/S0002-8223(01)00223-1).

582 Campbell-Arvai, V., Arvai, J., & Kalof, L. (2014). Motivating sustainable food choices: The role of nudges, value
583 orientation, and information provision. *Environment and Behavior*, 46, 453-475.
584 <https://doi.org/10.1177/0013916512469099>.

585 Chernoff, R. (2001). Nutrition and health promotion in older peoples. *The journals of gerontology. Series A, Biological*
586 *sciences and medical sciences*, 56(2), 47-53.

587 Clicerici, D., Spinelli, S., Dinnella, C., Prescott, J., & Monteleone, E. (2018). The influence of psychological traits,
588 beliefs and taste responsiveness on implicit attitudes toward plant-and animal-based dishes among vegetarians,
589 flexitarians and omnivores. *Food Quality and Preference*, 68, 276-291.
590 <https://doi.org/10.1016/j.foodqual.2018.03.020>.

591 Committee of experts on nutrition, food and consumer health. Nutrition in care homes and home care report and
592 recommendations: from recommendations to actions. (2008).
593 http://dske.dk/Politik/Internationalt/rapport_fra_sub_comitee_under_europaraadet_dec_08.doc.pdf Accessed 21
594 August 2017.

595 Cortina, J. M. (1993). What is coefficient Alpha? An examination of theory and applications. *Journal of Applied*
596 *Psychology*, 78, 98-104.

597 Dagevos, H., & Voordouw, J. (2013). Sustainability and meat consumption: is reduction realistic?. Sustainability:
598 Science, Practice and Policy, 9(2), 60-69. <https://doi.org/10.1080/15487733.2013.11908115>.

599 Dolan, P., Hallsworth, M., Halpern, D., King, D., Metcalfe, R., & Vlaev, I. (2012). Influencing behaviour: The
600 mindspace way. *Journal of Economic Psychology*, 33(1), 264–277. <http://doi.org/10.1016/j.joep.2011.10.009>.

601 Donini, L. M., Savina, C., & Cannella, C. (2003). Eating habits and appetite control in the older people: The Anorexia
602 of Aging. *International Psychogeriatrics*, 15(1), 73–87. <https://doi.org/10.1017/S1041610203008779>.

603 Donkin, A. J. M., Johnson, A. E., Lilley, J. M., Morgan, K., Neale, R. J., Page, R. M., & Silburn, R. L. (1998). Gender
604 and living alone as determinants of fruit and vegetable consumption among the elderly living at home in urban
605 Nottingham. *Appetite*, 30(1), 39–51. <http://doi.org/10.1006/appe.1997.0110>.

606 Dubbert, P. M., Johnson, W. G., Schlundt, D. G., & Montague, N. W. (1984). The influence of caloric information on
607 cafeteria food choices. *Journal of Applied Behavior Analysis*, 17(1), 85-92.
608 <http://dx.doi.org/10.1901/jaba.1984.17-85>.

609 Estruch, R., Ros, E., Salas-Salvadó, J., Covas, M. I., Corella, D., Arós, F., ... PREDIMED Study Investigators. (2013).
610 Primary Prevention of Cardiovascular Disease with a Mediterranean Diet. *New England Journal of Medicine*,
611 368(14), 1279. <http://doi.org/10.1056/NEJMoa1200303>.

612 European Commission. Directorate-General for Economic and Financial Affairs. The 2012 Ageing Report: Economic
613 and budgetary projections for the EU27 Member States (2010-2060). (2012).
614 http://ec.europa.eu/economy_finance/publications/european_economy/2012/pdf/ee-2012-2_en.pdf Accessed 21
615 August 2017.

616 Feldman, C., Mahadevan, M., Su, H., Brusca, J., & Ruzsilla, J. (2011). Menu engineering: A strategy for seniors to
617 select healthier meals. *Perspectives in Public Health*, 131(6), 267–274. <http://doi.org/10.1177/1757913911419897>.

618 Friis, R., Skov, L. R., Olsen, A., Appleton, K. M., Saulais, L., Dinnella, C., ... Perez-Cueto, F. J. A. (2017).
619 Comparison of three nudge interventions (priming, default option, and perceived variety) to promote vegetable
620 consumption in a self-service buffet setting. *PLOS ONE*, 12(5), 1–16.
621 <http://doi.org/10.1371/journal.pone.0176028>.

622 Giesen, J. C. A. H., Geyskens, K., Goukens, C., & Havermans, R. C. (2013). Changing the default. How to promote
623 healthier food choices. *Appetite*, 71, 475. <https://doi.org/10.1016/j.appet.2013.06.026>.

624 Goff, S. A., Klee, H. J. (2006). Plant volatile compounds: sensory cues for health and nutritional value? *Science*,
625 311(5762), 815-819. <http://doi.org/10.1126/science.1112614>.

626 Gregg, E. W., Engelgau, M. M., & Narayan, V. (2002). Complications of diabetes in older people people. *BMJ*,
627 325(7370), 916–917.

628 Hansen, P. G., Skov, L. R., & Skov, K. L. (2016). Making Healthy Choices Easier: Regulation versus Nudging. *Annual*
629 *Review of Public Health*, 37(1), 237–251. <http://doi.org/10.1146/annurev-publhealth-032315-021537>.

630 Hausman, D. M., Welch, B. (2010). Debate: To nudge or not to nudge. *Journal of Political Philosophy*, 18(1), 123-136.
631 <https://doi.org/10.1111/j.1467-9760.2009.00351.x> .

632 Hinkle D. E., Wiersma, W., Jurs, S. G. (2003). *Applied statistics for behavioral sciences* . (5th ed.). Boston: Houghton
633 Mifflin.

634 House of Lords Science and Technology Select Committee. (2011). Report on Behaviour Change. House of Lords.

635 Jankovic, N., Geelen, A., Streppel, M. T., de Groot, L. C. P. G. M., Orfanos, P., van den Hooven, E. H., ... Feskens, E.
636 J. (2014). Adherence to a healthy diet according to the World Health Organization guidelines and all-cause
637 mortality in elderly adults from Europe and the United States. *American Journal of Epidemiology*, 180(10), 978–
638 988. <http://doi.org/10.1093/aje/kwu229>.

639 Joyce, G. F., Keeler, E. B., Shang, B., & Goldman, D. P. (2005). The lifetime burden of chronic disease among the
640 older people. *Health Affairs (Millwood)*, 24(2), W5R18-29.
641 <https://www.healthaffairs.org/doi/10.1377/hlthaff.W5.R18>.

642 Kaur, A., Scarborough, P., & Rayner, M. (2017). A systematic review, and meta-analyses, of the impact of health-
643 related claims on dietary choices. *International Journal of Behavioral Nutrition and Physical Activity*, *14*(1), 93.

644 Kearney, J., Hulshof, K., & Gibney, M. (2001). Eating patterns – temporal distribution, converging and diverging foods,
645 meals eaten inside and outside of the home – implications for developing FBDG. *Public Health Nutrition*, *4*(2b),
646 693–698. <http://doi.org/10.1079/PHN2001156>.

647 Kohyama, K., Mioche, L., & Martin, J. F. (2002). Chewing patterns of various texture foods studied by
648 electromyography in young and elderly populations. *Journal of Texture Studies*, *33*(4), 269–283.
649 <http://doi.org/10.1111/j.1745-4603.2002.tb01349.x>.

650 Lachat, C., Naska, A., Trichopoulou, A., Engeset, D., Fairgrieve, A., Marques, H. Á., & Kolsteren, P. (2011). Essential
651 actions for caterers to promote healthy eating out among European consumers: Results from a participatory
652 stakeholder analysis in the HECTOR project. *Public Health Nutrition*, *14*(2), 193–202.
653 <http://doi.org/10.1017/S1368980010002387>.

654 Laureati M, Pagliarini E, Calcinoni O. (2008). Does the enhancement of chemosensory stimuli improve the enjoyment
655 of food in institutionalized older people? *Journal of Sensory Studies*, *23*(2), 234–250.
656 <http://doi.org/10.1111/j.1745-459X.2008.00152.x>.

657 Laureati, M., Pagliarini, E., Calcinoni, O., & Bidoglio, M. (2006). Sensory acceptability of traditional food preparations
658 by elderly people. *Food Quality and Preference*, *17*(1–2), 43–52. <http://doi.org/10.1016/j.foodqual.2005.08.002>.

659 Leenaert, T. (2012). Chapter 16 Meat moderation as a challenge for government and civil society: the Thursday Veggie
660 Day campaign in Ghent, Belgium. In *Sustainable food planning: evolving theory and practice*. (pp. 189-196).
661 Wageningen Academic Publishers. https://doi.org/10.3920/978-90-8686-187-3_16.

662 Martínez-González, M. A., García-Arellano, A., Toledo, E., Salas-Salvadó, J., Buil-Cosiales, P., Corella, D., ... Estruch,
663 R. (2012). A 14-item mediterranean diet assessment tool and obesity indexes among high-risk subjects: The
664 PREDIMED trial. *PLOS ONE*, *7*(8). <http://doi.org/10.1371/journal.pone.0043134>.

665 Mathey, M.-F. A. M., Siebelink, E., Graaf, C. de, & Staveren, W. A. Van. (2001). Flavor enhancement of food
666 improves dietary intake and nutritional status of elderly nursing home residents. *The Journal of Gerontology*,
667 *56*(4), 200–205.

668 McDaniel, J. H., Hunt, A., Hackes, B., & Pope, J. F. (2001). Impact of dining room environment on nutritional intake of
669 Alzheimer's residents: A case study. *American Journal of Alzheimer's Disease & Other Dementiasr*, *16*(5), 297–
670 302. <http://doi.org/10.1177/153331750101600508>.

671 Mongin, P., Cozic, M. (2018). Rethinking nudge: not one but three concepts. *Behavioural Public Policy*, *2*(1), 107-124.
672 <https://doi.org/10.1017/bpp.2016.16>.

673 Murphy, C. (1993). Nutrition and chemosensory perception in the elderly. *Critical Reviews in Food Science and*
674 *Nutrition*, *33*(1), 3–15. <http://doi.org/10.1080/10408399309527607>.

675 Nørnberg, T. R., Houlby, L., Skov, L. R., & Pérez-Cueto, F. J. A. (2016). Choice architecture interventions for
676 increased vegetable intake and behaviour change in a school setting: a systematic review. *Perspectives in Public*
677 *Health*, *136*(3), 132–142. <http://doi.org/10.1177/1757913915596017>.

678 Nørnberg, T. R., Skov, L. R., Houlby, L., & Pérez - Cueto, F. J. A. (2016). Attitudes and acceptability of behaviour
679 change techniques to promote healthy food choices among Danish adolescents. *Family and Consumer Sciences*
680 *Research Journal*, *44*(3), 264-279.

681 Nurk, E., Refsum, H., Drevon, C. A., Tell, G. S., Nygaard, H. A., Engedal, K., & Smith, A. D. (2010). Cognitive
682 performance among the elderly in relation to the intake of plant foods. The Hordaland Health Study. The British
683 Journal of Nutrition, 104(8), 1190–201. <http://doi.org/10.1017/S0007114510001807>.

684 O'Dwyer, N. a, McCarthy, S. N., Burke, S. J., & Gibney, M. J. (2005). The temporal pattern of the contribution of fat to
685 energy and of food groups to fat at various eating locations: implications for developing food-based dietary
686 guidelines. *Public Health Nutrition*, 8(3), 249–257. <http://doi.org/10.1079/PHN2004701>.

687 Olstad, D. L., Vermeer, J., McCargar, L. J., Prowse, R. J. L., & Raine, K. D. (2015). Using traffic light labels to
688 improve food selection in recreation and sport facility eating environments. *Appetite*, 91, 329–335.
689 <http://doi.org/10.1016/j.appet.2015.04.057>.

690 Omichinski, L. (1999). You count, calories don't. HUGS International.

691 Orfanos, P., Naska, A., Trichopoulou, A., Grioni, S., Boer, J. M. A., Van Bakel, M. M. E., ... Slimani, N. (2009).
692 Eating out of home: Energy, macro-and micronutrient intakes in 10 european countries. The european prospective
693 investigation into cancer and nutrition. *European Journal of Clinical Nutrition*, 63, S239–S262.
694 <http://doi.org/10.1038/ejcn.2009.84>.

695 Painter, J. E., Wansink, B., & Hieggelke, J. B. (2002). How visibility and convenience influence candy consumption.
696 *Appetite*, 38(3), 237–238. <http://doi.org/10.1006/appe.2002.0485>.

697 Payette, H., & Shatenstein, B. (2005). Determinants of healthy eating in community-dwelling elderly people. *Canadian*
698 *Journal of Public Health*, 96, S27-31. : <http://dx.doi.org/10.17269/cjph.96.1502>.

699 Peduzzi, P., Concato, J., Kemper, E., Holford, T. R., & Feinstein, A. R. (1996). A simulation study of the number of
700 events per variable in logistic regression analysis. *Journal of Clinical Epidemiology*, 49(12), 1373–9.
701 [http://doi.org/10.1016/S0895-4356\(96\)00236-3](http://doi.org/10.1016/S0895-4356(96)00236-3).

702 Phillips, F. (2005). Vegetarian nutrition. *Nutrition Bulletin*, 30(2), 132–167. <http://doi.org/10.1111/j.1467->
703 3010.2005.00467.x.

704 Pieniak, Z., Aertsens, J., & Verbeke, W. (2010). Subjective and objective knowledge as determinants of organic
705 vegetables consumption. *Food quality and preference*, 21(6), 581-588.
706 <https://doi.org/10.1016/j.foodqual.2010.03.004>.

707 Pliner, P., Hobden, K., & Hobden, K. (1992). Development of a scale to measure the trait of food neophobia in humans.
708 *Appetite*, 19(2), 105–120. [http://doi.org/10.1016/0195-6663\(92\)90014-W](http://doi.org/10.1016/0195-6663(92)90014-W).

709 Reipurth, M., Hørby, L., Gregersen, C. G., Bonke, A., & Cueto, F. J. P. (2018). Barriers and facilitators towards
710 adopting a more plant-based diet in a sample of Danish consumers. *Food Quality and Preference*.
711 <https://doi.org/10.1016/j.foodqual.2018.10.012>

712 Richardson, N. J., Shepherd, R., & Elliman, N. A. (1993). Current attitudes and future influence on meat consumption
713 in the U.K. *Appetite*, 21(1), 41-51. <http://doi.org/10.1006/appe.1993.1035>.

714 Saka, B., Kaya, O., Ozturk, G. B., Erten, N., & Karan, M. A. (2010). Malnutrition in the elderly and its relationship
715 with other geriatric syndromes. *Clinical Nutrition*, 29(6), 745–748. <http://doi.org/10.1016/j.clnu.2010.04.006>.

716 Schröder, M., & Lyon, P. (2013). Embedding healthy eating: Nudging or toolbox? *Nutrition and Food Science*, 43(4),
717 330–338. <http://doi.org/10.1108/NFS-03-2012-0028>.

718 Schwartz, S. H. (1994). Are there universal aspects in the structure and contents of human values? *Journal of Social*
719 *Issues*, 50(4), 19–45. <http://doi.org/10.1111/j.1540-4560.1994.tb01196.x>.

720 Schwartz, S. H. (2003). A proposal for measuring value orientations across nations. In: Questionnaire development
721 report of the European social survey. Jerusalem, (pp 259–319). ESS.

722 Schwartz, S. H. (2012). An overview of the Schwartz theory of basic values. *Online readings in Psychology and*
723 *Culture*, 2(1), 11. <https://doi.org/10.9707/2307-0919.1116>.

724 Schwartz, S. H., Breyer, B., & Danner, D. (2015). Human Values Scale (ESS). *ZIS - The Collection Items and Scales*
725 *for the Social Sciences*. <https://doi.org/10.6102/zis234>.

726 Shatenstein, B., Gauvin, L., Keller, H., Richard, L., Gaudreau, P., Giroux, F., ... Payette, H. (2013). Baseline
727 determinants of global diet quality in older men and women from the NuAge cohort. *Journal of Nutrition, Health*
728 *and Aging*, 17(5), 419–425. <http://doi.org/10.1007/s12603-012-0436-y>.

729 Skov, L. R., Lourenço, S., Hansen, G. L., Mikkelsen, B. E., & Schofield, C. (2013). Choice architecture as a means to
730 change eating behaviour in self-service settings: A systematic review. *Obesity Reviews*, 14(3), 187–196.
731 <http://doi.org/10.1111/j.1467-789X.2012.01054.x>.

732 Slavin, J. L., Lloyd, B. (2012). Health benefits of fruits and vegetables. *Advances in Nutrition*, 3(4), 506–516.
733 <https://doi.org/10.3945/an.112.002154>.

734 Steptoe, A., Pollard, T. M., & Wardle, J. (1995). Development of a measure of the motives underlying the selection of
735 food: the food choice questionnaire. *Appetite*, 25(3), 267–284. <http://doi.org/10.1006/appe.1995.0061>.

736 Stevens, D. A., & Lawless, H. T. (1981). Age-related changes in flavor perception. *Appetite*, 2(2), 127–136.
737 [http://doi.org/10.1016/S0195-6663\(81\)80006-2](http://doi.org/10.1016/S0195-6663(81)80006-2).

738 Stratton, L. M., Vella, M. N., Sheeshka, J., & Duncan, A. M. (2015). Food neophobia is related to factors associated
739 with functional food consumption in older adults. *Food Quality and Preference*, 41, 133–140.
740 <http://doi.org/10.1016/j.foodqual.2014.11.008>.

741 Stroebele-Benschop, N., Depa, J., de Castro, J.M. (2016). Environmental strategies to promote food intake in older
742 peoples: A Narrative Review. *Journal of Nutrition in Gerontology and Geriatrics*, 35(2), 95-112.
743 <https://doi.org/10.1080/21551197.2016.1173614>.

744 Sun, G. W., Shook, T. L., & Kay, G. L. (1996). Inappropriate use of bivariable analysis to screen risk factors for use in
745 multivariable analysis. *Journal of clinical epidemiology*, 49(8), 907-916.

746 Takahashi, K., Kamada, C., Yoshimura, H., Okumura, R., Iimuro, S., Ohashi, Y., ... Ito, H. (2012). Effects of total and
747 green vegetable intakes on glycated hemoglobin A1c and triglycerides in elderly patients with type 2 diabetes
748 mellitus: The Japanese Elderly Intervention Trial. *Geriatrics and Gerontology International*, 12(1), 50–58.
749 <http://doi.org/10.1111/j.1447-0594.2011.00812.x>.

750 Thaler, R., & Sunstein, C. (2008). *Nudge: Improving decisions about health, wealth and happiness*. New Haven: Yale
751 University Press.

752 Thorndike, A. N., Riis, J., Sonnenberg, L. M., & Levy, D. E. (2014). Traffic-light labels and choice architecture:
753 Promoting healthy food choices. *American Journal of Preventive Medicine*, 46(2), 143–149.
754 <http://doi.org/10.1016/j.amepre.2013.10.002>.

755 Trichopoulou, A., Bamia, C., Norat, T., Overvad, K., Schmidt, E. B., Tjønneland, A., ... Trichopoulos, D. (2007).
756 Modified Mediterranean diet and survival after myocardial infarction: The EPIC-Elderly study. *European Journal*
757 *of Epidemiology*, 22(12), 871–881. <http://doi.org/10.1007/s10654-007-9190-6>.

758 Trichopoulou, A., Costacou, T., Bamia, C., & Trichopoulos, D. (2003). Adherence to a Mediterranean diet and survival

759 in a Greek population. *New England Journal of Medicine*, 348(26), 2599–2608.
760 <http://doi.org/10.1056/NEJMoa025039>.

761 Trichopoulou, A., Kyzozis, A., Rossi, M., Katsoulis, M., Trichopoulos, D., La Vecchia, C., & Lagiou, P. (2015).
762 Mediterranean diet and cognitive decline over time in an elderly Mediterranean population. *European Journal of*
763 *Nutrition*, 54(8), 1311–1321. <http://doi.org/10.1007/s00394-014-0811-z>.

764 Trichopoulou, A., Orfanos, P., Norat, T., Bueno-de-Mesquita, B., Ocké, M. C., Peeters, P. H. M., ... Trichopoulos, D.
765 (2005). Modified Mediterranean diet and survival: EPIC-elderly prospective cohort study. *BMJ (Clinical*
766 *Research Ed.)*, 330(7498), 991. <http://doi.org/10.1136/bmj.38415.644155.8F>.

767 Volkert, D. (2002). Malnutrition in the elderly — prevalence, causes and corrective strategies. *Clinical Nutrition*, 21(1),
768 110–112. [http://doi.org/10.1016/S0261-5614\(02\)80014-0](http://doi.org/10.1016/S0261-5614(02)80014-0).

769 Wansink, B., & Sobal, J. (2007). Mindless eating : The 200 daily food decisions we overlook. *Environment and*
770 *Behavior*, 39(1), 106–123. <http://doi.org/10.1177/0013916506295573>.

771 Woodside, J. V., Young, I. S., & McKinley, M. C. (2013). Fruits and vegetables: measuring intake and encouraging
772 increased consumption. *Proceedings of the Nutrition Society*, 72(2), 236–245.
773 <http://doi.org/10.1017/S0029665112003059>.

774 World Health Organisation. Global health and ageing. (2017). [https://www.nia.nih.gov/sites/default/files/2017-](https://www.nia.nih.gov/sites/default/files/2017-06/global_health_aging.pdf)
775 [06/global_health_aging.pdf](https://www.nia.nih.gov/sites/default/files/2017-06/global_health_aging.pdf) Accessed 31 August 2017.

776 World Health Organisation. World report on ageing and health. (2011).
777 http://apps.who.int/iris/bitstream/10665/186463/1/9789240694811_eng.pdf Accessed 20 August 2017.

778 Worsley, A., Wang, W. C., & Farragher, T. (2016). The associations of vegetable consumption with food mavenism,
779 personal values, food knowledge and demographic factors. *Appetite*, 97, 29–36.
780 <http://doi.org/10.1016/j.appet.2015.11.005>.

781 Zhou, X., Perez-Cueto, F., Santos, Q., Monteleone, E., Giboreau, A., Appleton, K., ... Hartwell, H. (2018). A
782 Systematic Review of Behavioural Interventions Promoting Healthy Eating among Older People. *Nutrients*, 10(2),
783 128. <http://doi.org/10.3390/nu10020128>.

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ID Number: _____

We are very pleased to welcome you to our study!

Before choosing your meal, please answer these few questions:

You are: () Male () Female

Do you consider yourself to be a vegetarian/vegan? () No () Yes _____

Could you tell us, how hungry do you feel now? (Please, circulate a number)

1	2	3	4	5	6	7	8	9	10
Starving and feeling weak/dizzy	Very hungry, irritable, low energy, large amounts of stomach growling	Pretty hungry, stomach is beginning to growl	Beginning to feel hungry	Satisfied, neither hungry nor full	Slightly full/pleasantly full	Slightly uncomfortable	Feeling Stuffed	Very uncomfortable stomach aches	So full you feel sick

Please, do not hesitate in contacting us if you have any question.

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820 APPENDIX B. Questionnaire 2

821 **ID Number:**

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

824

825 1. Which main dish did you choose?

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

827

828 2. How much did you like the dish?



829 Don't like it at all. Don't like it. Don't know. Like it. Like it very much.

830 3. How often do you usually eat out each week?

831 () Never

832 () Once a week or less

833 () 2 days a week

834 () 3-4 days a week

835 () Everyday

836 4. 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

837

838 5. 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	()	()	()	()	()	()

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

<i>It is important to me that the food I eat on a typical day:</i>	Not at all important	A little important	Moderately important	Very important
	1	2	3	4
1. Tastes good	()	()	()	()
2. Is nutritious	()	()	()	()
3. Takes no time to prepare	()	()	()	()
4. Contains natural ingredients	()	()	()	()
5. Smells nice	()	()	()	()
6. Is low in calories	()	()	()	()
7. Is familiar	()	()	()	()
8. Is easy to prepare	()	()	()	()
9. Contains no additives	()	()	()	()
10. Is not expensive	()	()	()	()
11. Helps me control my weight	()	()	()	()
12. Helps me relax	()	()	()	()
13. Is high in fibre and roughage	()	()	()	()
14. Contains no artificial ingredients	()	()	()	()
15. Makes me feel good	()	()	()	()
16. Can be cooked very simply	()	()	()	()
17. Is like the food I ate when I was a child	()	()	()	()
18. Keeps me healthy	()	()	()	()
19. Cheers me up	()	()	()	()
20. Helps me to cope with life	()	()	()	()
21. Is low in fat	()	()	()	()
22. Contains a lot of vitamins and minerals	()	()	()	()
23. Is cheap	()	()	()	()

24. Has a pleasant texture

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7. 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 () () () () () ()

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

	Disagree strongly					Agree strongly	
	1	2	3	4	5	6	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	()	()	()	()	()	()	()

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

	Disagree strongly			Agree strongly	
	1	2	3	4	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	()	()	()	()	()

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

	Disagree strongly			Agree strongly	
	1	2	3	4	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	()	()	()	()	()

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

	Not at all	Hardly	Moderately	Exactly
	true	true	true	true
	1	2	3	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 () () () ()

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

	Disagree strongly				Agree strongly
	1	2	3	4	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	()	()	()	()	()

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