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# 1 Nutritional labeling modifies meal composition strategies in a 2 computer-based food selection task

3 Lynn Abou Jaoudé<sup>1</sup>, Isabelle Denis<sup>1</sup>, Sabrina Teyssier<sup>2</sup>, Nathalie Beugnot<sup>3</sup>, Olga Davidenko<sup>1</sup>,  
4 Nicolas Darcel<sup>1</sup>✉

5 <sup>1</sup> UMR914 PNCA, INRAE AgroParisTech Université Paris-Saclay, Paris, France

6 <sup>2</sup> Univ. Grenoble Alpes, INRAE, CNRS, Grenoble INP, GAEL, 38000 Grenoble, France

7 <sup>3</sup> Crous de Versailles, Versailles, France

8 ✉ Corresponding author at INRAE – AgroParisTech, UMR Physiology of Nutrition and Eating  
9 Behavior, 16 Rue Claude Bernard, 75005 Paris, France; [nicolas.darcel@agroparistech.fr](mailto:nicolas.darcel@agroparistech.fr)

## 10 Abstract

11 Nutritional information via simplified labelling on products' front of pack has become  
12 common in retail stores and is now concerning now collective catering. While numerous  
13 studies have investigated the effects of such information policies on consumers' decisions in  
14 shops, few studies have focused on choices made in collective catering. In such settings  
15 consumers must compose a meal by combining dishes to be eaten during the same occasion.  
16 Each choice is then dependent of the selection of other foods, yielding a different decision  
17 problem as in a store where items are selected independently of one another. The aim of this  
18 study was to understand whether a nutritional labelling, (Nutri-Score<sup>®</sup>), modified the choices  
19 of consumers and more precisely modified the meal composition strategies - the associations  
20 between dishes made by consumers. A computerized menu composition task was designed,  
21 371 participants were randomly redirected either to an interface displaying the Nutri-Score<sup>®</sup>  
22 of dishes, or to an interface showing the dishes without Nutri-Score<sup>®</sup>. Bayesian logistic

23 regressions were used to explore dependency relationships between foods in presence or  
24 absence of Nutri-Score®. When considering dishes individually, no significant effects of the  
25 Nutri-Score® were observed, but significant effects of the Nutri-Score® on composition  
26 strategies could be observed. Two types of strategies seemed to emerge: homogeneous  
27 behaviors, where selected dishes had similar scores and compensatory behaviors where  
28 selected dishes had contrasted scores. In conclusion, the effect of a nutritional labelling can  
29 have complex consequences on food decisions that extend beyond the selection of food items  
30 taken individually.

### 31 **Keywords**

32 Nutritional labelling; meal composition; online food selection task; university students;  
33 Bayesian elicitation

## 34 **1. Introduction**

35 Front-Of-Pack nutritional labelling of food products is now commonly used to guide  
36 consumers towards healthier food purchases (Ducrot et al., 2016). Among the most  
37 implemented nutritional labeling of this type, the Nutri-Score® labelling system is based on a 5  
38 colors and 5 letters pictograms that aims to provide consumers with an accessible assessment of  
39 the nutritional quality of food items (Julia & Hercberg, 2017). This nutritional labelling system is  
40 increasingly present on manufactured food products and widely visible in retail stores in several  
41 countries. The Nutri-Score® system was initially developed in France and has recently been  
42 adopted, among others, by Belgium, Spain, Germany and Netherlands (Julia, 2020). The effect of  
43 such information on consumer choices is a complex issue that is yet to be determined and which  
44 is the subject of numerous academic works (Dubois et al., 2021). Irrespective of its actual  
45 effectiveness, the Nutri-Score® emerges to be a nutritional label that is being massively  
46 implemented in the retail sector. Since it is relatively simple to implement, potentially effective  
47 and relatively unexpensive for public authorities, several countries are even considering  
48 extending its display to other parts of the food system. In France for instance, the use of the  
49 Nutri-Score® labelling system in out-of-home catering and more precisely in collective catering  
50 is being seriously envisaged (HCSP, 2018; Ministère des solidarités et de la santé, 2019). The  
51 importance of this type of nutrition policy, if it is to be effective, is undoubtedly very high, since  
52 out-of-home catering and especially company restaurants and educational establishments'  
53 canteens, often accounts for a significant proportion of the meals consumed daily by the  
54 population (Saulais, 2015). For instance, in 2018, nearly 14% of the main meals eaten by the  
55 French population was eaten away from home and away from home catering is the habitual  
56 place of lunch during the week for 41.8% of the French population (ANSES, 2021).

57           While many studies have investigated the effects of nutritional labelling on in-store  
58 purchases (Packer et al., 2021), few have focused on the influence of such information systems  
59 on food choices in collective catering (Cerezo-Prieto & Frutos-Esteban, 2021; Christoph et al.,  
60 2016; Crosetto et al., 2016; Fernandes et al., 2015; Gomez & Le Minous, 2012; Hoefkens et al.,  
61 2011, p. 2, 2012; Kolodinsky et al., 2008; Merdji et al., 2019, p. 20; Seward et al., 2018; Werle &  
62 Pruski Yamim, 2019). Indeed, the rare studies carried out on the effects of information on choice  
63 behavior in collective catering have so far rather focused on measuring the effects of diverse  
64 labelling systems related to the environmental quality of food products (Merdji et al., 2019) or  
65 related to the origin of the ingredients or dishes (Fernandes et al., 2015). These studies showed  
66 that information given to the consumer has surprising effects that are often difficult to  
67 anticipate. One explanation for this is that the composition of a whole meal is a task that can  
68 involve complex trade-off mechanisms that result in making this composition quite distinct from  
69 the simple action of independently purchasing one several food products in a supermarket.

70           Indeed, in settings such as collective catering, the consumer's decision-making rules can  
71 be quite different from one in a supermarket. In collective catering, the consumer must compose  
72 a whole meal that will be consumed at a same eating occasion and that can include an association  
73 of starters, main courses, dairy products, desserts... In this case, new composition "rules" are  
74 considered in the decision-making process, they are related to often implicit associations or  
75 exclusions relationships between the chosen foods (e.g.: cheese comes with bread, only one  
76 dessert is generally selected, a fat and sweet food can be picked only if a food of better  
77 nutritional quality is also present to this meal etc.). This situation can be seen as a complex  
78 decision-making problem in which the decision maker selects items that establish intricate  
79 interrelationships.

80           There are therefore two issues that need to be addressed when looking at the effect of a  
81 nutritional labelling on consumption choices in out-of-home catering. Firstly, it is important to  
82 understand the composition rules that are applied by consumers when composing such meals.  
83 Secondly the process in which nutritional labelling modulates these complex and often  
84 nonconscious strategies in the making of a meal needs to be devised. The aim of this study ran  
85 in a simulation of a university canteen was to understand, on the one hand, the food choices  
86 strategies of college students in university collective catering, and on the other hand, whether  
87 and how the Nutri-Score® labelling system could influence this food selection process.

## 88 **2. Methods and measures**

### 89 2.1. Participants

90           Before the start of the data collection, the protocol received Ethics approval by the  
91 “Comité d’Éthique de la Recherche” of the University Paris Saclay (CER-Paris-Saclay-2020- 024  
92 /MS1). An invitation to participate in an online experiment consisting in a menu composition task  
93 was sent via a public mailing list ran by the French National Centre for Scientific Research  
94 (Information Relay in Cognitive Sciences, Paris, France, [www.risc.cnrs.fr](http://www.risc.cnrs.fr)). The inclusion criteria  
95 for the participants of the study are to be students with age above 18 and registered in a higher  
96 education establishment in France. Upon completion of the experience, participants could  
97 participate in a draw to win 30 €.

### 98 2.2. Online Experiment

99           An online experiment was developed using the PC IBEX platform (Zehr & Schwarz, 2018).  
100 It comprised two short questionnaires and a menu composition task. Before starting the  
101 experiment, the participants were informed about the study’s management policy of personal

102 data and were invited to give their consent to participate in the study. Participants were  
103 redirected to the experiment's page only if they gave their consent for participation to the study.

### 104 2.3. Measured parameters

105 The experiment started with the collection of personal information via a questionnaire:  
106 gender, age, height and weight and whether participants benefited from a scholarship. Then, the  
107 menu composition task consisted of visual interface displaying the menus proposed in a  
108 university restaurant in which participants were invited to compose the meal they would like to  
109 eat as if they were at the university canteen. The menus proposed for the experiment were real  
110 menus that had already been proposed by a local university canteen CROUS in the weeks  
111 preceding the experiment. For each menu, the participants composed their meal by selecting  
112 items and quantities among starters, main courses, dairy products and desserts. In the same way  
113 as in real conditions, points were associated with each dish to suggest the maximum number of  
114 items to be selected, the total number of points having to be below or equal to 6 (in real  
115 conditions, each point beyond the authorized number is charged). Five menus were successively  
116 proposed to the participants. Each participant was randomly seeing menus with or without the  
117 Nutri-Score® label for the entire duration of the task.

118 INSERT **Figure 1** HERE

### 119 2.4. Questionnaire

120 Following the task composition, the participant was invited to fill in information via a  
121 second questionnaire. The seven questions related to the following points: (i) the habitual  
122 frequency of visits of university restaurant; (ii) hunger and satiety at the time of passing the  
123 experiment; (iii) the general importance granted to nutritional quality and environmental issues

124 in selecting food products, (iv) the subjective perception of the nutritional quality of the meal  
125 composed in the preceding task

## 126 2.5. Data collection and storage

127 The data collection lasted over one month and took place between June 15<sup>th</sup> and July 17<sup>th</sup>,  
128 2020. After being anonymized, data collected during the experiment were downloaded from the  
129 server, stored locally for analysis. This data is made available open access on  
130 <https://osf.io/u2ky4/>.

## 131 2.6. Data analysis

132 Statistical analysis was conducted using R version 3.6.3 with RStudio version 1.4.1106.  
133 Data was analyzed using Bayesian logistic regressions to provide estimates of the probabilities of  
134 selecting each considered dish in relation with the display of the Nutri-Score® on the participant's  
135 interface and the other dishes already selected in the menu (interactions and moderation effects  
136 between these latter explanatory variables were investigated in a second step).

137 Bayesian logistic regression was chosen considering the sparsity of our observation  
138 matrix, since some considered events being relatively rare (e.g. selecting one specific dessert)  
139 and Bayesian logistic regression indeed, allows to avoid separation issues, which is a common  
140 problem in such cases, even when the sample size is large (Gelman et al., 2008). Preliminary tests  
141 (not shown) confirmed that Bayesian logistic regression yielded results close to those obtained  
142 by binary logistic regressions (explaining the probability of the choices of the foods considered)  
143 for the dishes whose choices were more frequent, allowing us to use Bayesian logistic regression  
144 for a more in-depth analysis.

145 Firstly, the items in the menu were grouped by their category (starter, main course, dairy  
 146 products, dessert and bread) and their Nutri-Score® (A, B, C, D or E). Secondly, a model food  
 147 category and different Nutri-Score® was designed as follow:

$$148 \quad p(\text{dish}_{ij}) \sim \text{labelling} \times (\text{age} + \text{gender} + \text{scholarship} + \text{BMI} + \text{frequency} + \text{hunger} + \\
 149 \quad \text{nutrition concerns} + \text{environmental concerns} + \sum_{\text{cat}, \text{cat} \neq i} (\sum_{\text{ns}} \text{is.dish}_{\text{cat}, \text{ns}}))$$

150 Where  $p(\text{dish}_{ij})$  is the estimated probability of selecting the dish belonging to the food category  
 151  $i$  and assigned with the Nutri-Score®  $j$ . Labelling being a binary explanatory variable indicating if  
 152 the Nutri-Score® labelling is displayed to the participant; *age*, *gender*, *scholarship*, *BMI*,  
 153 *frequency*, *hunger*, *nutrition concerns*, *environmental concerns* refer to information collected  
 154 via the questionnaires preceding or following the menu composition task; *is.dish<sub>cat,ns</sub>* is a  
 155 variable encoding if the dish belonging to the category *cat* and of Nutri-Score® *ns* was also  
 156 selected in the menu. Detailed analysis methods and R scripts are available on the osf.io  
 157 repository of this project (<https://osf.io/u2ky4/>).

### 158 3. Results

#### 159 3.1. Sample description

160 The sample collected consisted of 371 participants, resulting in 1855 observed meals.  
 161 **Table 1** presents the characteristics of the recruited sample.

Display of NS label	Total N = 371		Yes 186				No 185			
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
Gender	284 77%	87 23%	142 76%	44 24%	142 77%	43 23%				
Age (average)	22.9 (SD = 3.26)		22.7	23.5	23.1		22.4			
BMI (kg/m <sup>2</sup> ; average)	22.02 (SD = 3.3)		21.8	23.7	21.5		22.9			
Scholarship	Yes 102 27%	No 269 73%	Yes 41 29%	No 101 71%	Yes 9 20%	No 35 80%	Yes 38 27%	No 104 73%	Yes 14 33%	No 29 67%

162 **Table 1:** Study's online experiment sample description

163 3.2. Descriptive analysis

164 Figure 2 presents the number of selected dishes chosen according to the category  
165 (starters, main courses, dairy products, desserts) and Nutri-Score® of the items. Statistical  
166 analysis did not reveal a significant overall effect of the Nutri-Score® on the choices of any of the  
167 considered dishes.

168 INSERT **Figure 2** HERE

169 3.3. Meal composition strategies

170 **Figure 3** presents the meal composition strategies (i.e., the dependence relationships  
171 between selected dishes). Many dependency relationships were revealed by the analysis of the  
172 menu selection data. These are presented in detail in **Figure 3**, the main effects being exclusion  
173 mechanisms between foods such as desserts and dairy products (the estimated probability of  
174 selecting a dairy product is low if the participant has selected a dessert and vice versa) or  
175 compensation strategies in which a dish with a low Nutri-Score® is often associated with items  
176 with a higher Nutri-Score®.

177 INSERT **Figure 3** HERE

178 Effects of the Nutri-Score® on food composition strategies are presented in detail in figure 4. In  
179 this figure, we focus on the moderating effect of the Nutri-Score® label on the food choice  
180 strategies. These effects can be categorized in 2 main tendencies:

181 (i) Induction of homogeneous behaviors where displaying the Nutri-Score® resulted in menus  
182 with a lower variability with respect to Nutri-Score® rankings between the starters and desserts.  
183 And this induction applies to both ends of the Nutri-Score scale. These effects are illustrated by  
184 the following observations:

185  $OR(\text{starter } A|\text{dessert } A) = 1.92$

186  $OR(\text{dessert } B|\text{starter } B) = 1.83$

187  $OR(\text{dessert } D|\text{starter } D) = 1.91$

188

189 Where  $OR(\text{starter } A|\text{dessert } A)$  is the odds ratio describing the chances of choosing an A-scored  
190 starter given that an A-scored dessert had been selected when the Nutri-Score® was displayed  
191 compared to the chances of observing the same co-occurrence when the Nutri-Score® was not  
192 displayed. In the example presented here, the chances of observing “starter A when dessert A  
193 was selected” was 1.92 times greater when Nutri-Score® was displayed. Taken individually, these  
194 phenomena seem relatively infrequent, therefore for clarity purposes we decided to present odd  
195 ratios.

196 INSERT **Figure 4** HERE

197 (ii) Induction of compensatory behaviors where displaying the Nutri-Score® resulted in trade-off  
198 behaviors where the participants selected items with divergent Nutri-Scores. These effects are  
199 illustrated by the following observations:

200  $OR(\text{starter } D|\text{main } A) = 1.99$

201  $OR(\text{main } C|\text{dessert } D) = 0.16$

202  $OR(\text{dessert } B|\text{starter } C) = 3.00$

203  $OR(\text{dessert } D|\text{starter } A) = 1.44$

204  $OR(\text{dessert } D|\text{starter } B) = 3.34$

205  $OR(\text{dessert } D|\text{main } C) = 0.32$

206

207 In both figures **Figure 3** and **Figure 4**, we observe unsymmetrical heatmaps because the  
208 conditional probabilities aren't invertible. For instance, the estimated probability of taking bread  
209 in the presence of the Nutri-Score® label increases significantly when the consumer already

210 chose a starter with a score of A or B. Alternatively, there is no significant effect the other way  
211 around.

212 The appendix A shows the results of the food choice strategies of the Bayesian logistic  
213 regression operated on the whole model.

#### 214 **4. Discussion**

215 Based on a computerized menu selection task, this study showed that, when considered  
216 as a whole, i.e. indiscriminately for all individuals, the Nutri-Score® label had no significant effect  
217 on consumption choices, although it should be noted that the objective of this study was not to  
218 evaluate the overall effect of Nutri-Score® on item selection. When individual characteristics  
219 were considered, significant effects of Nutri-Score® appeared. Furthermore, the analysis of the  
220 evolution of the dependency relations between the selections of dishes showed that the Nutri-  
221 Score® can modify meal composition strategies. This study suggests that understanding the  
222 effects of nutrition labelling on food decisions would benefit from considering the complex logic  
223 of food choices implemented by consumers.

224 Concerning the changes induced by the Nutri-Score, when considering the effect  
225 obtained without taking into account the specificities of the participants, the analysis indicates  
226 that there is no significant effect on food choices. This result is consistent with the contrasting  
227 effects of this type of labelling sometimes observed in numerous studies on nutrition labelling  
228 (in controlled or real consumption situations) (Crosetto et al., 2020; Dubois et al., 2021; Ducrot  
229 et al., 2016). Indeed, if studies on the effects of point-of-purchase nutritional labeling in university  
230 canteens have mainly observed a favorable effect of their presence on food choices (Cerezo-  
231 Prieto & Frutos-Esteban, 2021; Fernandes et al., 2015; Kolodinsky et al., 2008; Seward et al.,  
232 2018); other studies didn't succeed in showing a significant effect of nutritional labelling

233 (Christoph et al., 2016; Hoefkens et al., 2011). Moreover, a study specifically targeting the Nutri-  
234 Score® in a university canteen setting found no significant effect of the implementation of this  
235 label on the short term (Werle & Pruski Yamim, 2019), this result is consistent with our findings.

236 The display of the Nutri-Score® in the choice interface significantly modified the  
237 probabilities of associations between food items. We were able to divide the strategies observed  
238 into two categories that were accentuated in the presence of the Nutri-Score® label:  
239 compensatory behaviors and homogeneous behaviors. Little has been said in the literature about  
240 food choices in the specific context of meal composition but trade-off effects in food decisions  
241 have already been observed. According to Merdji *et al.* food choices can be presented as series  
242 of trade-offs between determinants such as health, pleasure or sustainability (Merdji et al., 2019;  
243 Rozin et al., 1999). Our findings regarding the accentuation of homogeneous and compensatory  
244 behaviors when the Nutri-Score is displayed may originate from a modulation of trade-offs  
245 between dishes by stressing the importance of nutrition as a choice criterion.

246 This work was conducted on a study sample with marked specificities, making it difficult  
247 to generalize the observed results: students, predominantly women, frequenting university  
248 canteens in France. Focusing on this study sample is nevertheless relevant and informative in  
249 several respects. Firstly, students often have restrained budget dedicated to food purchases and  
250 low level of kitchen equipment, hence contrasting with other subgroups of the population.  
251 Students' behaviors however remain of particular interest since this subpopulation is often  
252 described for having an unbalanced diet (Levitsky et al., 2004) and this period in life is considered  
253 as a critical moment for adopting healthier eating behaviors. Secondly, the study sample was not  
254 evenly balanced and composed of 77% women and 23% men. However, observations from a  
255 total of 87 men were collected in this study probably ensuring reasonable statistical power. In

256 addition, it is interesting to note that, together with our observations, recent works have  
257 reported that responses to nutritional labelling were rather similar across gender (Sarda et al.,  
258 2020). Moreover, as the French food model is known to be very structured with three meals  
259 scheduled at fixed times of the day (Rozin et al., 1999) observations made in a French context  
260 can't be easily generalized to other regions or countries. It is nevertheless interesting to note  
261 that even in a highly structured context we have been able to observe changes in response to  
262 nutrition labelling. This therefore suggests that similar changes are likely to occur in other  
263 regional contexts.

264         The socio-economic category of the participants would be an interesting explanatory  
265 factor to investigate. In this work, although whether students benefited from a scholarship was  
266 recorded and used as a variable in the statistical models, this information alone wasn't sufficient  
267 to derive the socio-economic category of the participants since there are different types of  
268 scholarships (and some are not based on socio-economic criteria).

269         Lastly, a potential limitation to the generalizability of the results presented in this article  
270 is that this is an online study. The computer-based food choice experiment was conceived to be  
271 as close as possible from reality using menus chosen from a sample of real menus offered by a  
272 University Restaurant and opened only to students from French Universities. Nevertheless, it is  
273 legitimate to argue that such findings could not have been observed in a natural consumption  
274 situation. This question of the validity and generalizability of online studies in relation to reality  
275 has been much discussed in discrete choice experiments. The validity of such (hypothetical and  
276 online) discrete choice experiments method is well established and commonly used in economics  
277 and decision sciences (Richetin et al. (2022); (Brooks & Lusk, 2010; Louviere et al., 2000; Swait &  
278 Andrews, 2003). Studies comparing hypothetical and real choices (Carlsson & Martinsson (2001))

279 conclude with similarities in the results of their hypothetical and real choice experiments. Some  
280 authors have also pointed a higher risk of “desirability bias” in such online studies, since choices  
281 only marginally engage participants, they are more likely to respond in the way they imagine the  
282 experimenter expects them to respond (Costanigro et al., 2011). Here, since the labelling didn’t  
283 impact the nutritional quality of the choices, this bias is limited.

## 284 **5. Conclusion**

285 The novelty of this study relies in extending the observation of the effect of nutritional  
286 information beyond the selection of individual dishes, focusing rather on meal composition  
287 strategies. Nutri-Score® appeared not to have a significant effect on the overall choices but  
288 induced changes when considering the resulting composed meals. As this study consists of a  
289 computer-based experiment and not real-life observations, it would be interesting to make  
290 further observations in a real-life setting in a university canteen.

291

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302           Regional Health Agency.

## 303 **7. Author contributions**

304           **Lynn Abou Jaoudé:** methodology, investigation, formal analysis, writing – original draft,  
305           visualization; **Isabelle Denis:** methodology, validation; **Sabrina Teyssier:** methodology,  
306           validation; **Nathalie Beugnot:** conceptualization, funding acquisition; **Olga Davidenko:**  
307           methodology, validation; **Nicolas Darcel:** supervision, project administration, funding  
308           acquisition, conceptualization, methodology, formal analysis, writing – original draft. **All the**  
309           **authors** participated in writing – reviewing and editing.

310           **Declaration of interest:** none.

311

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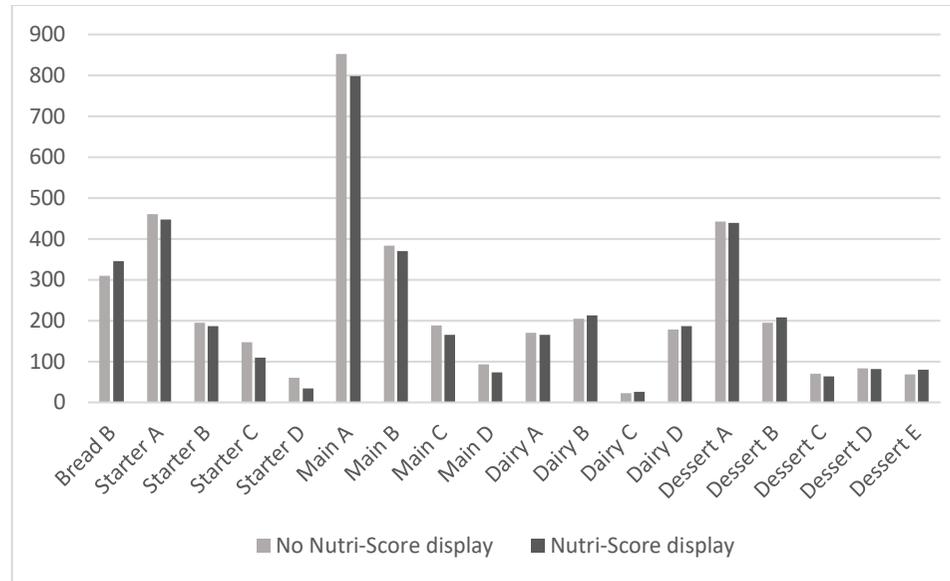
**Appendix A**  
**The food choice strategies results of Bayesian Logistic Regression**

	Bread B		Starter A		Starter B		Starter C		Starter D		Main A		Main B		Main C		Main D		Dairy A		Dairy B		Dairy C		Dairy D		Dessert A		Dessert B		Dessert C		Dessert D		Dessert E	
	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p	OR	p
Bread B			1,45		1,89		1,03		0,77		1,09	0,55	*	1,14		0,71		1,09		0,82		1,82		0,69		1,25	1,56	0,45	*	0,73		1,89				
Starter A	1,78	*									1,43	0,82		1,08		1,46		1,03		1,03		0,90		1,68		1,60	1,94	0,98		1,44	*	0,87				
Starter B	3,52	*									2,10	1,43		0,60		0,69		1,09		1,71		0,48		2,24	1,00	1,83	**	3,97	3,34	*	43,45					
Starter C	2,11										1,27	1,01		0,78		0,55		0,87		2,23		0,32		1,74	1,21	3,00	*	1,29	1,43		0,99					
Starter D	1,16										2,89	0,78		5,14		11,80		1,03		1,36		2,02		0,53	0,83	0,81	20,59	1,91	*	16,54						
Main A	0,90		1,09		1,15		0,84		1,99	*								0,94		1,00		0,78		1,12	0,85	0,97	1,14	1,09		1,12						
Main B	0,43	*	0,87		1,49		0,80		3,07									0,99		0,78		4,86		1,32	1,12	0,77	0,27	1,55		2,44						
Main C	0,85		1,39		0,64		0,58		6,56									0,99		1,12		0,42		0,56	1,18	0,36	0,44	0,32	*	1,62						
Main D	0,46		2,99		0,65		0,29		29,48									2,79		1,79		0,31		1,38	1,27	0,23	0,94	22,72	21,20							
Dairy A	0,86		1,10		1,40		1,10		1,35		0,77	0,95		0,69		3,90									1,34	0,77	4,11	1,23	8,02							
Dairy B	0,65		0,83		1,87		1,98		1,19		0,98	0,76		0,82		2,85									0,79	2,41	6,64	0,66	3,44							
Dairy C	1,07		1,42		0,79		0,60		2,07		0,38	18,47		0,26		0,86									2,90	0,32	5,63	2,60	3,91							
Dairy D	0,53		1,53		1,75		1,23		0,53		1,06	1,24		0,39		2,08									1,09	1,82	1,89	1,55	1,37							
Dessert A	1,45		1,92	*	1,06		1,09		0,80		0,73	1,20		0,74		1,21		1,61		1,05		1,49		1,37												
Dessert B	2,37		2,65		1,34		1,76		0,52		1,07	1,17		0,34		0,64		1,06		2,97		0,44		2,31												
Dessert C	0,54		1,13		5,61		1,16		14,05		2,21	0,28		0,41		2,22		4,20		6,07		3,76		1,74												
Dessert D	0,86		1,36		2,69		1,31		0,78		0,80	1,79		0,16	*	20,99		2,25		0,75		2,98		3,04												
Dessert E	2,77		0,74		53,52		1,12		9,32		0,53	2,82		0,63		28,28		12,23		3,80		3,32		1,17												

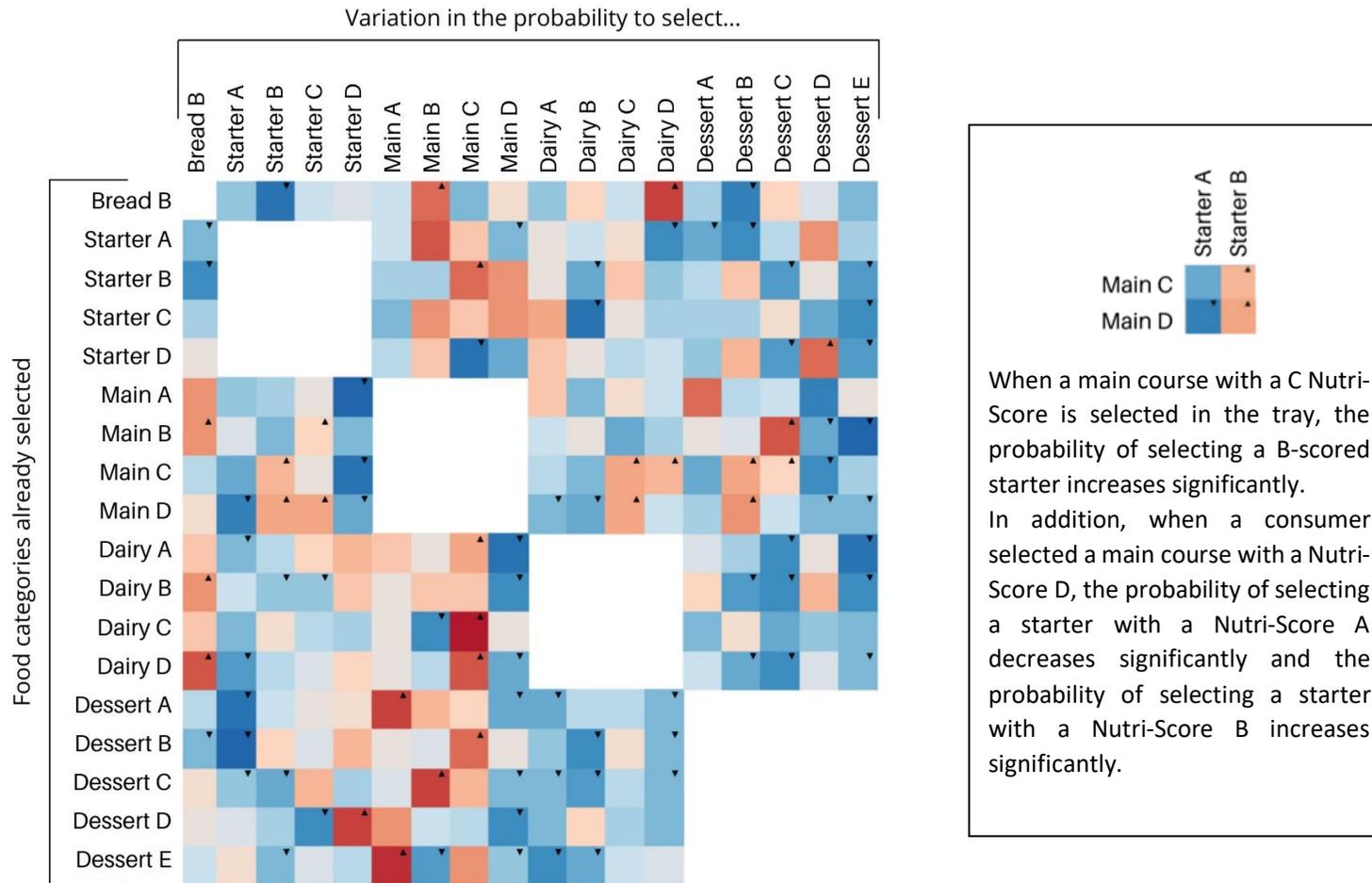
## FIGURES

THURSDAY							
Starters		Main courses		Dairy products		Fruits et desserts	
1 point	Betterave et pomme	3 points	Filet de merlu blanc	1 point	Saint Nectaire	1 point	Compote pomme abricots
1 point	Tomate	0 point	Sauce bonne femme	1 point	Carré de l'est	1 point	Pomme gala
1 point	Sardines à l'huile	3 points	Chausson bolognaise	1 point	Yaourt nature	1 point	Banane
2 points	Galantine de dinde	3 points	Quiche lorraine	1 point	Petit suisse aux fruits	1 point	Cocktail de fruits
1 point	Salade de riz	3 points	*^ Lasagne aux légumes grillés	1 point	Yaourt aux fruits mixés	1 point	Mousse noix de coco
1 point	Champignon à la coriandre	4 points	*Bagnat burger			2 points	Brownie maison
		0 point	Epis de maïs grillé				
		0 point	Pois cassé				
0 point Pain		* = <i>vegetarian meal</i>					
		^ = <i>no side dishes can be chosen with this meal</i>					

**Figure 1:** Example of a menu presented in the online experiment with the display of Nutri-Score. *The original version is in French; the titles and legends have been translated to English; the food items are still in French. This figure represents the fourth menu presented in the experiment. Participants randomly completed menus presented that way with the Nutri-Score® displayed and others completed an experiment where the Nutri-Score® label was not displayed. The “points” before each food items represent the cost of each item. In fact, a complete meal at the Crous university canteen costs 3.30 euros and consists of a total of 6 points.*



**Figure 2:** Number of items chosen according to category and Nutri-Scores with and without display of Nutri-Score® labeling



**Figure 3:** Heatmap showing the meal choices strategies. The x-axis represents the food categories already selected and that represent the condition in the equation. The y-axis represents the variation in the estimated probability to select each food category according to the food categories already selected. The colors go from blue when there is an inverse correlation to red when the correlation is positive. The darker the

*color, the higher the correlation or inverse correlation. The square at the right is an example of the reading method of the heatmap. The letters next to the food categories indicate the Nutri-Score® of the food category in question.*

