

Choice of the queue at the ENAC restaurant

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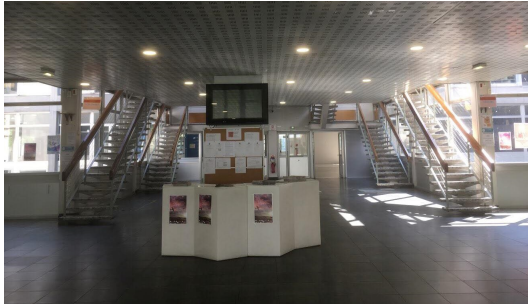
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Question of interest / Context

Well-known dilemma for ENAC workers !



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Output

Our results :

- **Main model** : $FREQ \uparrow$ GENDER, AGE, OPTIMISM
 \downarrow MENU, STARTER
- Second model : $AGE \uparrow$ CIVIL_SERVANT, CAR, FREQ...
 \downarrow COLLEGUES_INFLUENCE...
- Third model : $MAX_PRICE \uparrow$ CAR, DRINK, QUALITY
 \downarrow MENU, CHEESE, SPORT

Collection of data

The survey

- Spread on Facebook for students and by e-mail to the ENAC workers
- Ability to reach very diverse profiles
- Results of the survey : **263** answers

Choix du restaurant à l'ENAC lors du déjeuner / Choice of ENAC restaurant for lunch

Vous trouverez ici un sondage que nous réalisons dans le cadre de notre projet en Théorie Économique.
Il a pour but d'évaluer les raisons du choix des utilisateurs des restaurants de gauche et de droite, et d'y proposer des améliorations en fonction des besoins que vous leur ressortir.
Nous vous remercions du temps que vous nous consacrez!

This survey aims to evaluate the reasons of the choices by the users of both ENAC restaurants and to suggest improvements from the results and wishes you will express here.
Thank you for your time!

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Vous êtes / You are *

Une femme / A woman

Figure: The Google Form we used

Presentation

Necessity to model all characteristics of the ENAC population

- Different themes : personal information, course, lunch preferences...
- Different types of variables : binary, discrete, continuous, dummy

Total number of variables : $k = 28$

Personal information

- GENDER : 0 / 1
- AGE : continuous, in years
- NATIONALITY : dummy (cf annexe 2)
- BMI (Body Mass Index) : continuous
- OPTIMISM : discrete, 0 to 10
- SPORT : discrete, h/week
- CAR: 0 / 1

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Occupation

- STUDENT : 0 / 1
- CIVIL SERVANT : 0 / 1
- CAMPUS : 0 / 1
- COURSE : dummy (cf annexe 3)

Habits

- WEEK_FREQ : discrete, 0 to 5
- LEFT_FREQ : discrete, 0 to 5
- $FREQ = \frac{LEFT_FREQ}{WEEK_FREQ}$, 0 to 1
- TIME : continuous
- BEST_QUALITY : 0 / 1 / 2
- COLLEGUES_INFLUENCE : discrete, 0 to 10

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Preferences

- MAX_PRICE : continuous
- MAX_WAIT_TIME : discrete
- MENU : 0 / 1
- QUALITY : discrete, 0 to 10
- COLOR : 0 / 1 / 2

Likelihood to take...

- STARTER
- MAIN_COURSE
- CHEESE
- DESSERT
- FRUIT
- DRINK (other than water)

All discrete between 0 and 5.

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FREQ

How to explain the frequency at which someone chooses the left restaurant ?

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	Coefficient	Std. Error	t-Statistic	Prob.
GENDER	0.120650	0.072643	1.660851	0.0981
AGE	0.009181	0.004809	1.909293	0.0574
NATIONALITY	-0.014784	0.019702	-0.750355	0.4538
BMI	-7.71E-08	1.25E-06	-0.061893	0.9507
SPORT	-0.004959	0.015421	-0.321570	0.7481
OPTIMISM	0.052243	0.018613	2.806852	0.0054
COURSE	0.000824	0.011579	0.071174	0.9433
STUDENT	0.042943	0.124713	0.344337	0.7309
CIVIL_SERVANT	-0.065297	0.074431	-0.877273	0.3812
CAMPUS	-0.088246	0.084572	-1.043446	0.2978
CAR	0.085084	0.077417	1.099031	0.2729
COLLEAGUES_INFLUENCE	0.008631	0.010525	0.820063	0.4130
MAX_PRICE	0.018269	0.015622	1.169409	0.2434
MAX_WAIT_TIME	-0.006412	0.006839	-0.937460	0.3495
TIME	0.010938	0.034692	0.315282	0.7528
MENU	-0.407838	0.086694	-4.704315	0.0000
STARTER	-0.049755	0.023690	-2.100205	0.0368
MAIN_COURSE	0.075874	0.053099	1.428929	0.1543
CHEESE	-0.038211	0.034252	-1.115567	0.2657
DESSERT	-0.004100	0.025610	-0.160083	0.8730
FRUIT	0.023777	0.026277	0.904836	0.3665
DRINK	-0.015144	0.052505	-0.288421	0.7733
QUALITY	-0.040727	0.032520	-1.252375	0.2117
BEST_QUALITY	0.048900	0.062816	0.778465	0.4371
COLOR	0.052290	0.056852	0.919754	0.3586
R-squared	0.292915	Mean dependent var	0.718188	
Adjusted R-squared	0.221612	S.D. dependent var	0.568284	

Figure: Dependent variable : FREQ

FREQ

Variable	Expected effect	Observed effect	Significant ?
GENDER	no idea	0.12	significant
OPTIMISM	positive	0,06	significant
MENU	negative	-0,41	significant
STARTER	positive	0,04	significant
COLOR	insignificant	0,05	insignificant

Table: Analysis of variables' influence on FREQ

AGE

Can we predict
 someone's age from
 their lunch habits ?

	Coefficient	Std. Error	t-Statistic	Prob.
BMI	1.98E-05	2.29E-05	0.862230	0.3894
SPORT	-0.353550	0.266596	-1.326161	0.1860
OPTIMISM	-0.100998	0.348527	-0.289786	0.7722
CIVIL_SERVANT	5.085230	1.275010	3.988385	0.0001
CAR	4.952734	1.366933	3.623247	0.0004
FREQ	3.533145	1.144670	3.086607	0.0023
COLLEAGUES_INFLUENCE	-0.340131	0.189229	-1.797459	0.0735
MAX_PRICE	0.388662	0.276681	1.404730	0.1613
MAX_WAIT_TIME	-0.547150	0.113925	-4.802721	0.0000
TIME	1.539526	0.487412	3.158569	0.0018
MENU	0.825524	1.666368	0.495403	0.6208
QUALITY	1.545627	0.569281	2.715050	0.0071
BEST_QUALITY	-2.169760	1.141574	-1.900673	0.0585
COLOR	-2.421924	1.016423	-2.382792	0.0179
R-squared	0.401812	Mean dependent var	30.95437	
Adjusted R-squared	0.370582	S.D. dependent var	11.79848	

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Figure: Dependent variable : AGE

AGE

Variable	Expected effect	Observed effect	Significant ?
CIVIL_SERVANT	positive	5.1	significant
CAR	positive	4.9	significant
COLLEAGUES_INFLUENCE	positive	-0.3	significant
MAX_PRICE	positive	0.38	insignificant
TIME	no idea (+ or -)	1.5	significant
MENU	negative	0.8	insignificant
QUALITY	positive	1.5	significant
SPORT	negative	-0.35	insignificant
COLOR	no idea	-2.4	significant !

Table: Analysis of variables' influences on AGE

MAX_PRICE

Which of the person's characteristics impact the maximum price they are willing to pay for lunch ?

	Coefficient	Std. Error	t-Statistic	Prob.
GENDER	-0.399435	0.293374	-1.361520	0.1746
AGE	0.025093	0.018617	1.347904	0.1789
NATIONALITY	0.071279	0.082164	0.867530	0.3865
BMI	-1.62E-06	5.25E-06	-0.308442	0.7580
SPORT	-0.192989	0.063424	-3.042820	0.0026
OPTIMISM	0.025460	0.077429	0.328813	0.7426
COURSE	-0.087790	0.047500	-1.848191	0.0658
STUDENT	-0.224647	0.452627	-0.496319	0.6201
CIVIL_SERVANT	-0.145801	0.296446	-0.491829	0.6233
CAR	0.557291	0.324786	1.715871	0.0874
MENU	-0.626893	0.359474	-1.743918	0.0824
STARTER	0.187929	0.097009	1.937239	0.0539
MAIN_COURSE	0.122646	0.197525	0.620915	0.5352
CHEESE	-0.254714	0.143596	-1.773826	0.0773
DESSERT	0.141370	0.105028	1.346018	0.1795
FRUIT	0.003709	0.110103	0.033685	0.9732
DRINK	0.465554	0.219209	2.123790	0.0347
QUALITY	0.419387	0.116752	3.592121	0.0004
R-squared	0.136695	Mean dependent var	5.458517	
Adjusted R-squared	0.076793	S.D. dependent var	2.216702	

Figure: Dependent variable : MAX_PRICE

MAX_PRICE

Variable	Expected effect	Observed effect	Significant ?
COURSE	positive	-0.08	significant
CIVIL_SERVANT	positive	-0.14	insignificant
STUDENT	negative	-0.22	insignificant
OPTIMISM	positive	-0.02	insignificant
MENU	negative	-0.63	significant
DRINK	positive	-0.46	significant
QUALITY	positive	-0.42	significant

Table: Analysis of variables' influence on MAX_PRICE

BMI

	Coefficient	Std. Error	t-Statistic	Prob.
GENDER	-2038.787	3514.980	-0.580028	0.5624
AGE	297.5776	226.4135	1.314310	0.1900
NATIONALITY	532.6609	999.8661	0.532732	0.5947
SPORT	195.3139	766.7912	0.254716	0.7992
OPTIMISM	502.2130	945.9989	0.530881	0.5960
COURSE	-1040.848	571.7263	-1.820535	0.0699
STUDENT	-573.1509	5610.543	-0.102156	0.9187
CIVIL_SERVANT	-1003.885	3754.673	-0.267369	0.7894
CAMPUS	-3675.851	4226.337	-0.869748	0.3853
CAR	2740.092	3946.248	0.694354	0.4881
FREQ	283.8205	3267.318	0.086867	0.9308
MAX_PRICE	-417.3513	754.7756	-0.552947	0.5808
MENU	-3081.889	4558.176	-0.676123	0.4996
FOOD	-3.464510	8.174016	-0.423844	0.6720
QUALITY	-378.0630	1243.482	-0.304036	0.7614
COLOR	401.3176	2882.104	0.139245	0.8894
R-squared	0.033019	Mean dependent var	2743.503	
Adjusted R-squared	-0.025705	S.D. dependent var	25502.65	

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Figure: Dependent variable : BMI

If you often choose the left restaurant, what would make you change your mind ?

Answers	Frequency
More choice on the right restaurant	40%
Better quality on the right restaurant	40%
Less time to wait for the right restaurant	10%
A huge augmentation of the prices on the left restaurant	10%
Vegetarian or Bio menu on the right (nowadays only on the left)	5%
A priority at the exit for the right restaurant	less than 1%

Table: Left choosers

If you often choose the right restaurant, what would make you change your mind ?

Answers	Frequency
Less expensive choice on the left	70%
Students menu on the left	25%
The menu of the day which is not to the person's liking (especially pastas because of their baking)	20%
Better billposting on the left	10%
Nothing	10%

Table: Right choosers

Conclusion

- The three models we presented correspond for most at what we were expecting but (logically) some surprises
- Problems because $FREQ$ is between 0 and 1
- Some models are not good at all : multicollinearity ?
- People agreed on the main improvements : more choice, better quality and vegetarian and vegan food !
- We can suggest those remarks to Elior

Rebuttable hypothesis

- `FREQ` doesn't depend on gender ; the choice of tray color ;
- `FREQ` increases when : `AGE` increases ; `CIVIL_SERVANT` = 1 ; `STUDENT` = 0 ; `MAX_WAIT_TIME` decreases ;

Explanation of variables (1/2)

- NATIONALITY : dummy variable, equal to 0 if the person is French, 1 if Russian, 2 if German, 3 if Spanish, 4 if Malagasy, 5 if Indian, 6 if Dutch, 7 if Polish, 8 if Czech, 9 if Burkinabe, 10 if Chinese, 11 if Canadian, 12 if Turkish, 13 if Serbian ;

Explanation of variables (2/2)

- COURSE : dummy variable, equal to 0 if IENAC, 1 if IESSA, 2 if ICNA/MCTA, 3 if TAC/TSEEAC/GSEA, 4 if EPL, 5 if IATOM, 6 if Air France Cadet, 7 if working at the ENAC administration, 8 if Master IHM, 9 if ASNAT, 10 if contractual, 11 if MS AM, 12 if teachers-researchers, 13 if in the French Navy, 14 if working at the Directorate of Studies and Research, 15 if working at the Flight Training Directorate, 16 if doctoral student ;