Combining discrete choice experiment, eye tracking and sensory tests to asses consumer preferences for nutritional and health claims

Petjon Ballco[1,2], Vincenzina Caputo[3], Tiziana de Magistris[1,2]

pballco@aragon.es   vcaputo@msu.edu   tmagistris@aragon.es.

[1]Center of Agro-food Research and Technology of Aragon (CITA) – Department of Agro-food Economy and Natural Resources.

[2]Agro-alimentary Institute of Aragon (IA2) – CITA – University of Zaragoza – Spain.

[3]Agricultural, Food, and Resource Economics, Michigan State University, East Lansing – Michigan – USA.

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Introduction

- In the last decade, obesity epidemic has been a big issue around the world.

- In Europe (EU-27) in 2014 nearly 53% of the population were either overweight (43,2%) or obese (13,7%).

2014

22.8% men
24.7% women

Mean Body Mass Index (BMI) (kg/m2)	
≤22.5	Underweight
22.6 - 24.9	Normal
25.0 - 27.4	Overweight
27.5 - 29.9	Preobese
≥30.0	Obese
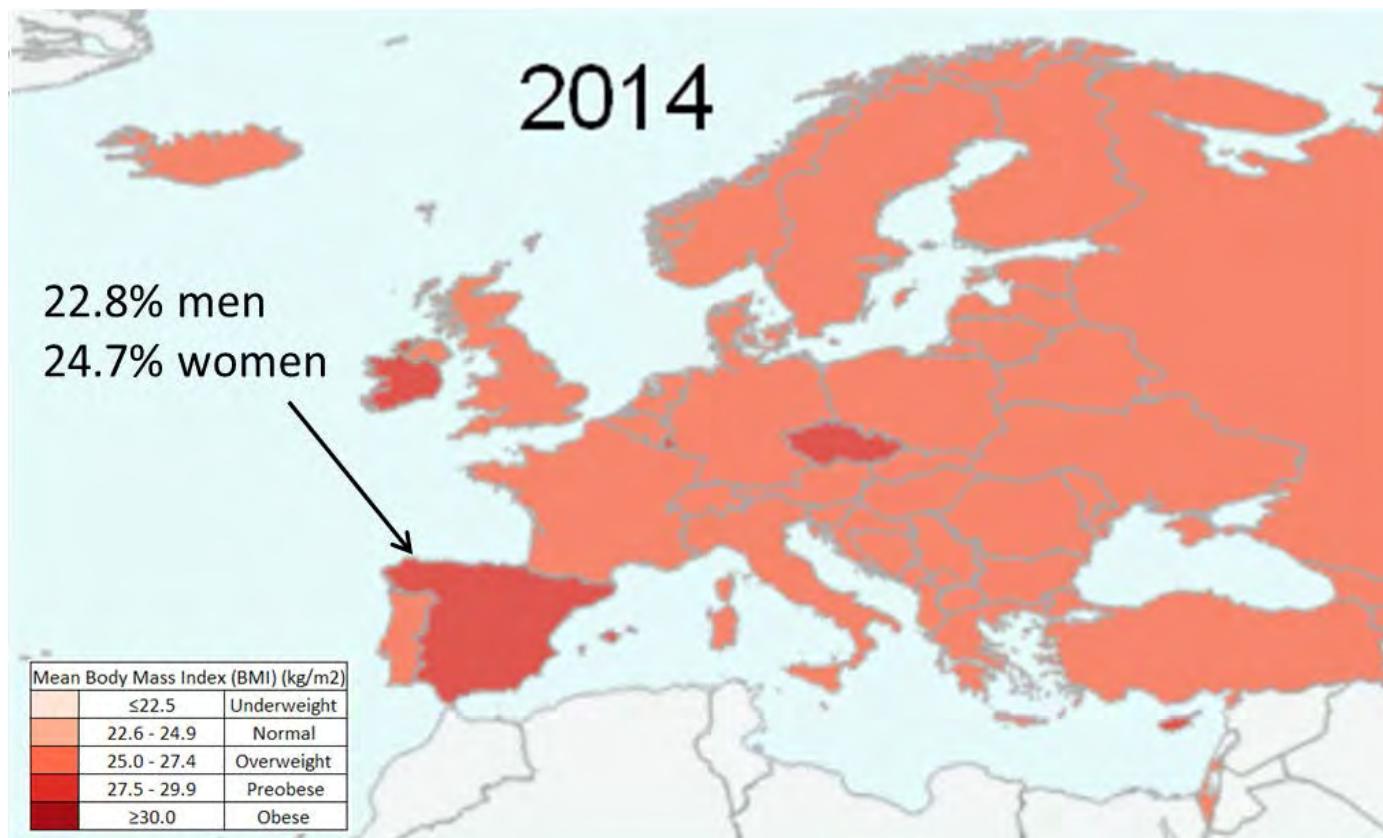
- For that, the European Food Safety Authority has introduced nutritional and health claims (NHCs) in food packaging to help consumers choose healthier convenience food.

| 1 Nutrition claims	2 Health Claims	3 Ingredient claims	4 Other regulated claims	5 Puffery claims (slogans)
"Source of calcium"	"Calcium helps to maintain strong teeth and bones"	"100% fruit" "With fresh milk"	"Organic" "Suitable for vegetarians"	"Red Bull gives you wings" "Haribo makes your children happy"
"High fiber"	"Food X helps decrease cholesterol, which contributes to reducing the risk of heart	"Free from preservatives" "With barn eggs"	"Hallal" "Gluten free"	"Get on with it!" "Bring out the tiger in you!"

COVERED by REG-1924/2006

Source: EAS
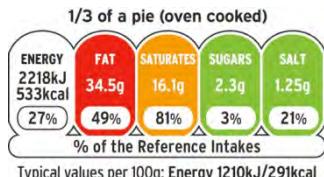
- Previous literature exploring consumer preference for food products with nutrition labels suggest that consumers:

  - Spend only a few seconds when selecting food products (Oliveira et al., 2016).
  - Do not attend to all front-of-pack (FOP) information available (Milosavljevic and Cerf, 2008).
  - Perceive healthy food products as less tasty (Suzuki and Park, 2018).

Investigate consumer attention to NHCs and whether this attention is related to final product choice, and explore whether taste influences the product choice of a healthy food product (yogurt).
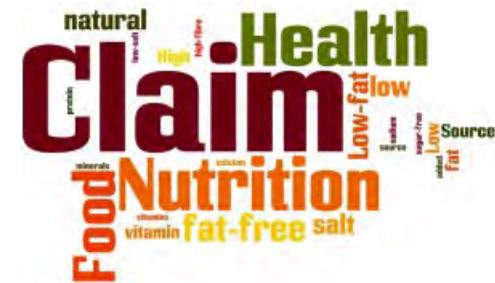
Taste – DCE (n=115)	No-taste – DCE (n=103)

1. Sensorial analysis (NHCs) [1]

2. Eye tracking and discrete choice experiment
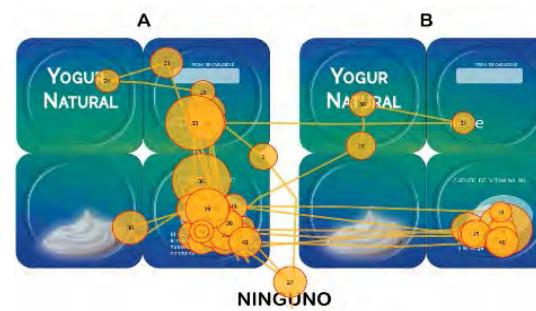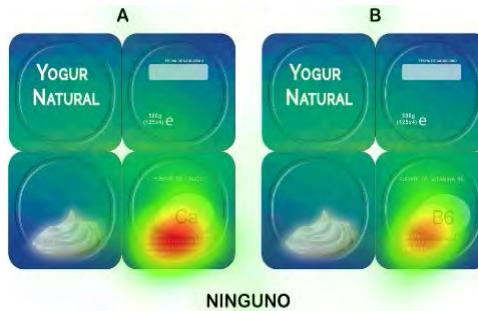
3. Questionnaire [2]

Table 3 – Experimental treatments. [1] Results from the sensorial analysis are not included in this paper. [2] Results from the questionnaire are not included in this paper.

Where: Zaragoza – Spain
When: 2016

Nº	NC levels	Presence (%)	HC levels	Presence (%)
1º	Fat-free	42.78	Reducing consumption of saturated fat contributes to the maintenance of normal blood cholesterol levels (A)*	-
2º	Source of calcium	21.25	Calcium is necessary for maintaining bones under normal conditions	2.17
			Calcium contributes to normal muscle function (A)	-
3º	Plain - Full fat (Baseline)	12.26	-	-
4º	Low sugars	11.99	Consumption of food containing sweeteners instead of sugar induces a lower blood glucose (A)	-
5º	Source of vitamin B6	10.63	With vitamin B6 that helps your defenses and reduces fatigue	10.33
			Vitamin B6 contributes to the normal functioning of nervous system (A)	-
6º	Source of fiber	1.09	Fiber contributes to an acceleration of intestinal transit	3.80
			Fiber contributes to an increase in fecal bulk (A)	-

Table 2 – Levels of NHCs used. Note: * Defines that a HC has not yet being introduced to the local market - absent (A).

Parameters	Model I				Model II			
	Taste		No taste		Taste		No taste	
	β (z)	SD	β (z)	SD	β (z)	SD	β (z)	SD
Opt-out	-0.51***(-5.95)	-	-0.43***(-4.42)	-	-0.64***(-12.25)	-	-0.71***(-11.08)	-
Nc[1]_fat	0.49***(2.78)	0.13(0.71)	-0.09(-0.33)	1.34***(4.73)	**0.15***(7.81)	**0.00(0.01)	**0.43***(3.36)	**0.78***(2.67)
Hc[2]_fat	**1.48***(6.25)	**4.86***(13.18)	**2.52***(8.20)	**4.18***(12.95)	**0.16***(5.88)	**0.15***(2.63)	**0.83***(4.01)	**0.83***(2.95)
Nc_sug	-0.99***(-4.02)	1.71***(5.02)	-0.52**(-2.12)	1.80***(4.86)	0.06***(4.28)	0.00(0.00)	-0.00(-0.10)	0.30**(2.12)
Hc_sug	**2.07***(7.65)	**4.62***(13.68)	1.02***(3.58)	3.64***(12.00)	0.05***(5.86)	0.01(0.19)	0.25***(4.44)	0.53***(3.15)
Nc_fib	-0.35**(-2.35)	1.54***(11.88)	0.55***(4.14)	1.23***(11.20)	0.07***(4.16)	0.00(0.00)	0.19***(4.30)	0.57***(3.13)
Hcp[3]_fib	1.12***(7.11)	1.17***(8.43)	2.05***(11.44)	2.23***(11.09)	0.12***(9.63)	0.00(0.02)	0.34***(5.35)	0.28***(2.64)
Hca[4]_fib	0.08(0.66)	0.00(0.02)	-0.12(-0.85)	0.37**(1.97)	-1.55(-0.80)	1.98(0.89)	-0.50(-1.01)	0.77(1.43)
Nc_vit	-0.34*(-2.40)	1.19***(7.23)	-0.31**(-2.31)	0.22**(1.96)	0.05***(4.94)	0.03(0.65)	0.08***(4.95)	0.00(0.07)
Hcp_vit	1.10***(5.42)	2.80***(15.95)	**2.70***(12.52)	**2.45***(13.23)	**0.16***(7.42)	**0.09**(2.14)	**0.57***(5.39)	**0.62***(4.14)
Hca_vit	1.18***(3.74)	3.08***(14.27)	1.64***(8.66)	2.64***(13.24)	0.13***(8.09)	0.06(1.30)	0.35***(5.88)	0.34***(4.16)
Nc_cal	0.03(0.24)	0.82***(8.10)	-0.15(-0.79)	1.36***(6.86)	0.06***(5.94)	0.00(0.09)	0.12***(6.66)	0.00(0.02)
Hcp_cal	**1.35***(6.73)	**2.40***(10.53)	**2.32***(11.78)	**1.93***(9.89)	0.11***(5.89)	0.10**(1.99)	0.40***(5.51)	0.32***(3.42)
Hca_cal	0.96***(5.95)	2.22***(12.25)	1.53***(8.52)	2.05***(10.38)	0.11***(7.65)	0.07*(1.92)	0.29***(5.52)	0.29***(2.80)
N	5060		4529		5060		4529	
Log-lik.	-3359.84		-3727.54		-4504.31		-3639.93	

Table 4 – Parameter estimates from a RPL model with and without visual attention measures across treatments (n=218)

Note: *,** and *** indicate statistical significance at 10%, 5% and 1% levels, respectively. [1]Nc means nutritional claim. [2]Hc means health claim. [3]Hcp means health claims present in the local market. [4]Hca means health claims absent from the local market.

- Consistent utility ranking of most valued NHCs in choice selection & visual attention (i.e., longer visual attention higher probability of purchase).
- Found no treatment effect of taste
  - Expected since yoghurts were plain with no fruits and flavors to make any distinction, therefore utility in our case was not affected by taste.
- HCs outperformed (higher utilities) NCs
  - Food companies should differentiate products by combining NCs with their corresponding HC (i.e., Hcp_fat, Hcp_vit, Hcp_cal nutritional and health claims) which exactly defines the beneficial properties of that nutrient in our health.