



APPLIED EXPERIMENTAL ECONOMICS

LAB EXPERIMENTAL ECONOMICS IN ACTION: NUTRITIONAL LABELS

Paolo Crosetto



Al Roth (Nobel prize in Economics – Kidney exchange)

Many experiments (...) fall on an imaginary continuum somewhere between experiments associated with testing and modifying formal economic theories ("Speaking to Theorists"), and those associated with having a direct input into the policy-making process ("Whispering into the Ears of Princes").

Al Roth, *Laboratory Experimentation in Economics* (1986)



What does this mean?

Speaking to theorists

- ▶ Most of what you do with Anna
- ▶ Decision theory: prospect theory, RDU, Allais and Ellsberg, ...
- ▶ Session 2: Risk



What does this mean?

Speaking to theorists

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Whispering into the Ears of Princes

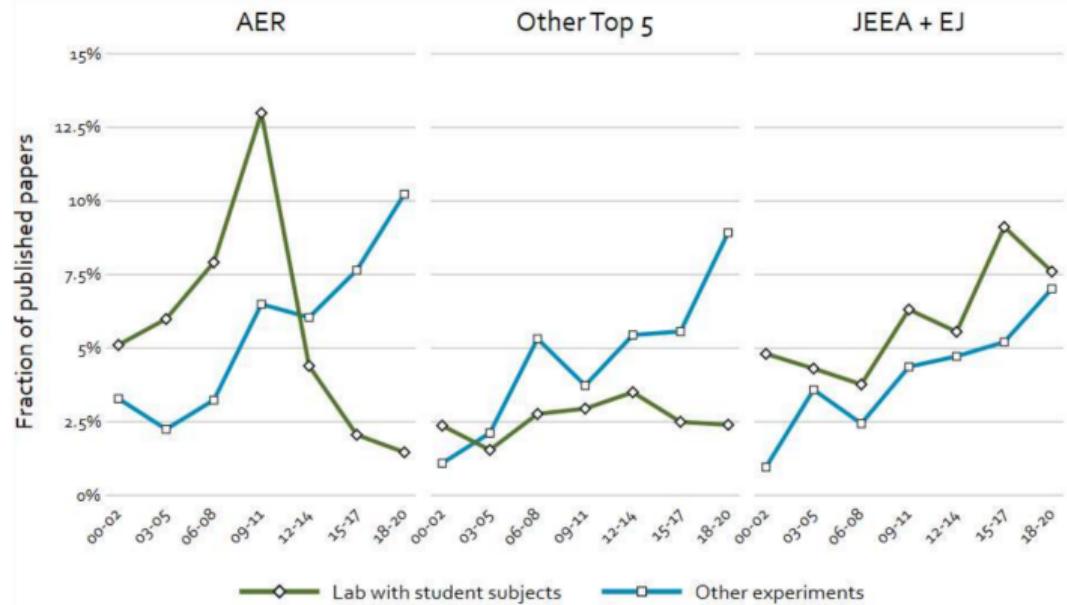
- ▶ Most of what we will do today
- ▶ Session 3: Behavioral biases
- ▶ Behavioral economics: biases, nudges, boost, behavioral change, ...

Today

Lab experiments as a policy tool



The rise & Fall of lab experiments



Reuben et al. (2021)



...in the meantime...(1)

Behavioral (or "Nudge") Units Explosion

- ▶ Most OECD countries have a Behavioral Unit
- ▶ Behavioral interventions frequently featured at the EU's Commission JRC
- ▶ Behavioral interventions at work during the pandemics
- ▶ ...



...in the meantime... (2)

RCTs are the best way of determining whether a policy is working

UK Behavioural Insights Team (2012)

RCTs are the purest and most accurate observation of behaviour, unlike experiments which take place in a laboratory

Bavel et al. (2013)

I speak on behalf of many more. For we represent a movement that is much broader than any one of us. We believe that the Prize recognizes not only what this movement has accomplished, but also what it could accomplish in the future.

Esther Duflo, Nobel Prize Banquet Speech (2019)



Intro – which role for the lab?

What can we learn for the lab?





Two main roles in an applied policy context

Getting into the mind of subjects



Two main roles in an applied policy context

Getting into the mind of subjects

- ▶ focus on cognitive aspects
- ▶ clearly identify mechanisms
- ▶ (if needed) sidestep preferences
- ▶ heuristics, choice processes



Two main roles in an applied policy context

Getting into the mind of subjects

Building counterfactuals

- ▶ focus on cognitive aspects
- ▶ clearly identify mechanisms
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- ▶ heuristics, choice processes



Two main roles in an applied policy context

Getting into the mind of subjects

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- ▶ clearly identify mechanisms
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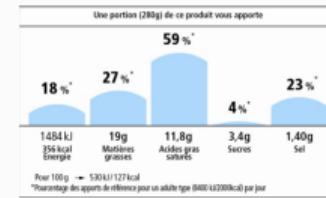
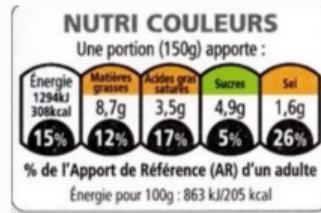
Building counterfactuals

- ▶ explore different scenarios
- ▶ integrate preferences with control
- ▶ track macro consequences
- ▶ cheaply explore solutions



The rest of the talk

Using the lab to directly contribute to policy

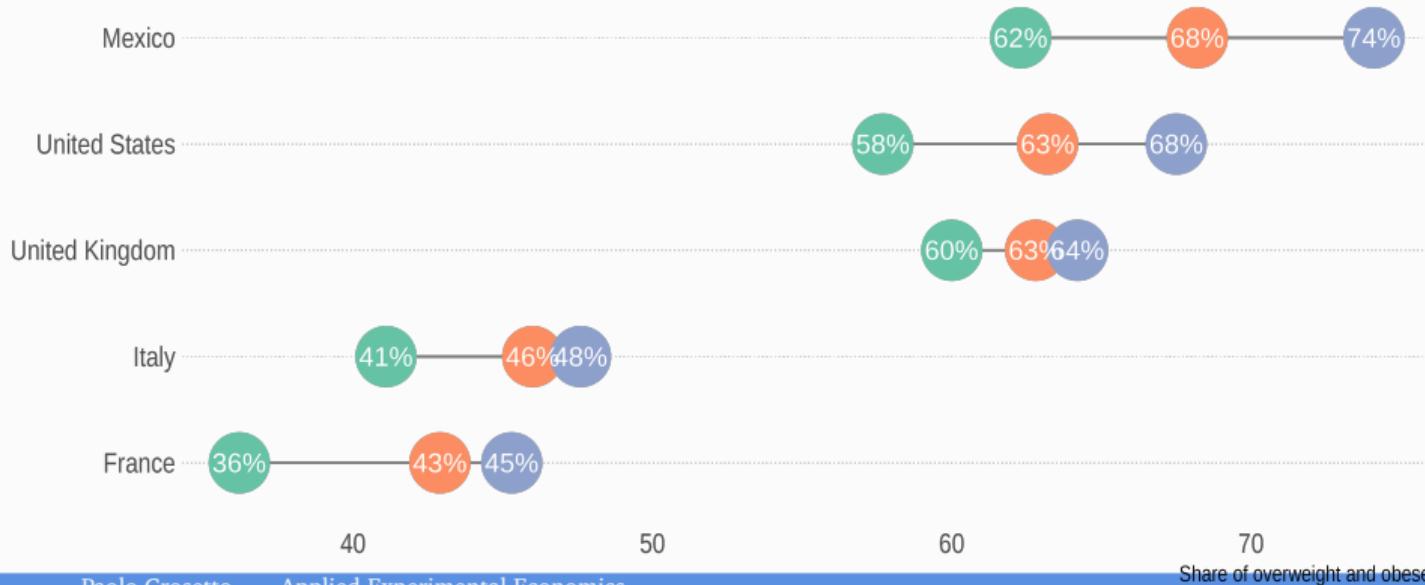




We're getting fatter

Evolution of the share of overweight and obese people: 2000, 2010, 2020

Selected OECD countries, all population aged 15+





... and this has huge **costs**

Health-related costs

Direct medical costs (2019):

- ▶ US: 300bn
- ▶ UK: 22bn
- ▶ Global: 1 to 3% GDP

Direct + indirect (projected 2030):

- ▶ Africa 1% GDP
- ▶ Americas 4% GDP
- ▶ Middle EAST 5% GDP



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Direct + indirect (projected 2030):

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Environment-related costs

- ▶ Food: 34% of GHG emissions
- ▶ Obesity: 1.4% extra
- ▶ 14% more transport emissions
- ▶ 140Mt excess consumption



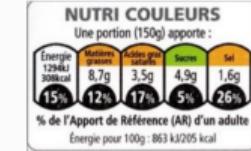
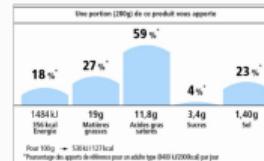
The spectrum of policies

- ▶ Information
- ▶ Fiscal interventions
- ▶ Nudges



The spectrum of policies

- ▶ Information
- ▶ Fiscal interventions
- ▶ Nudges



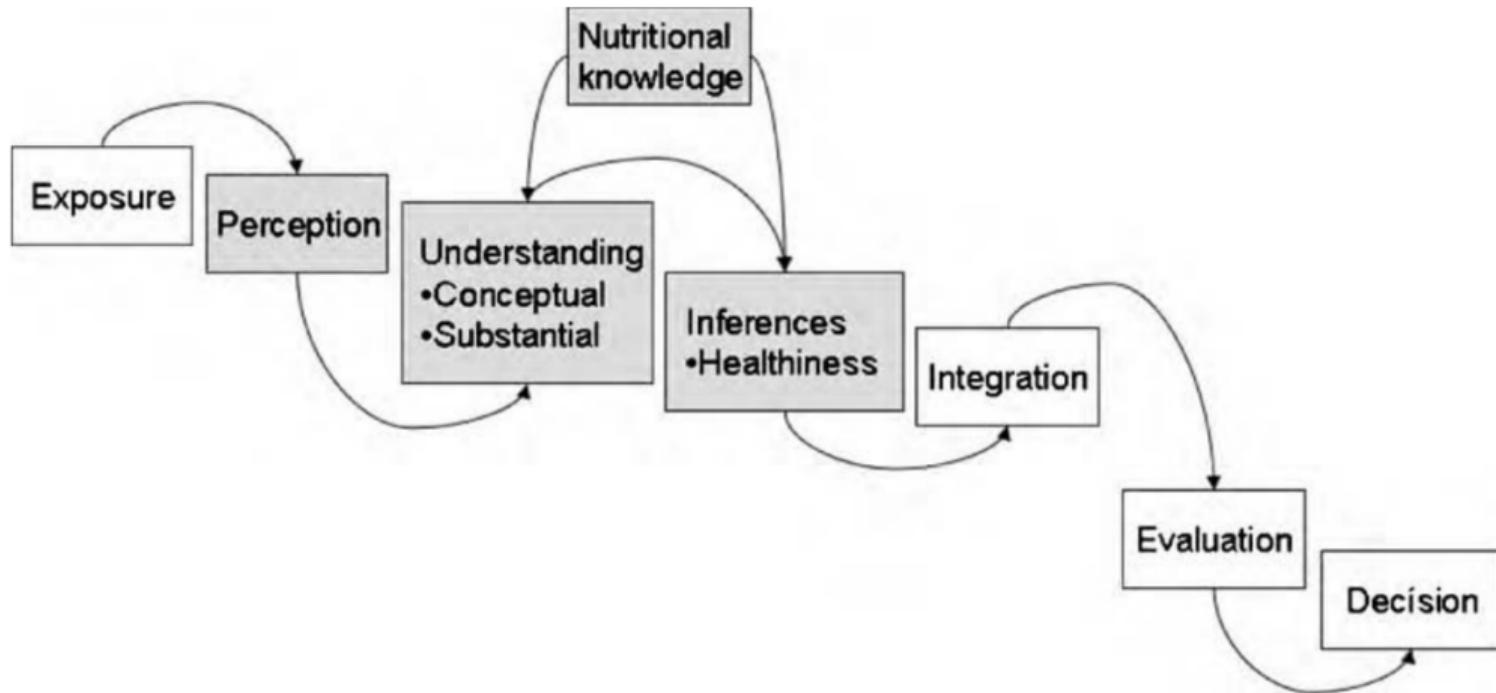


A series of key policy questions

- ▶ Do labels **work**?
- ▶ Why and **how** do they work?
- ▶ Do people **use** them? and why?
- ▶ Which label design is the **best** to **impact** choice?
- ▶ **How much** of an impact labels have?
- ▶ ...

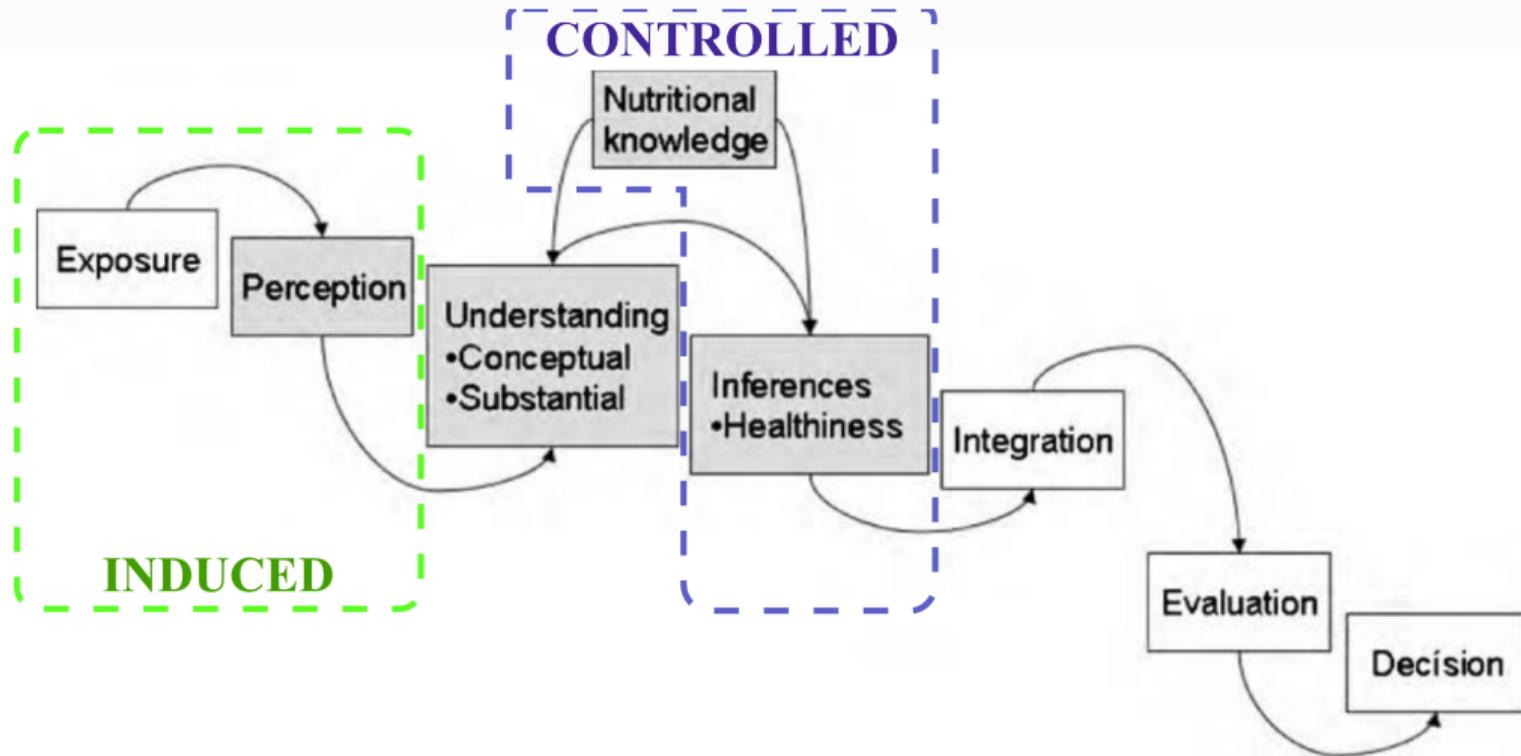


A conceptual framework (Grunert)





A conceptual framework (Grunert)

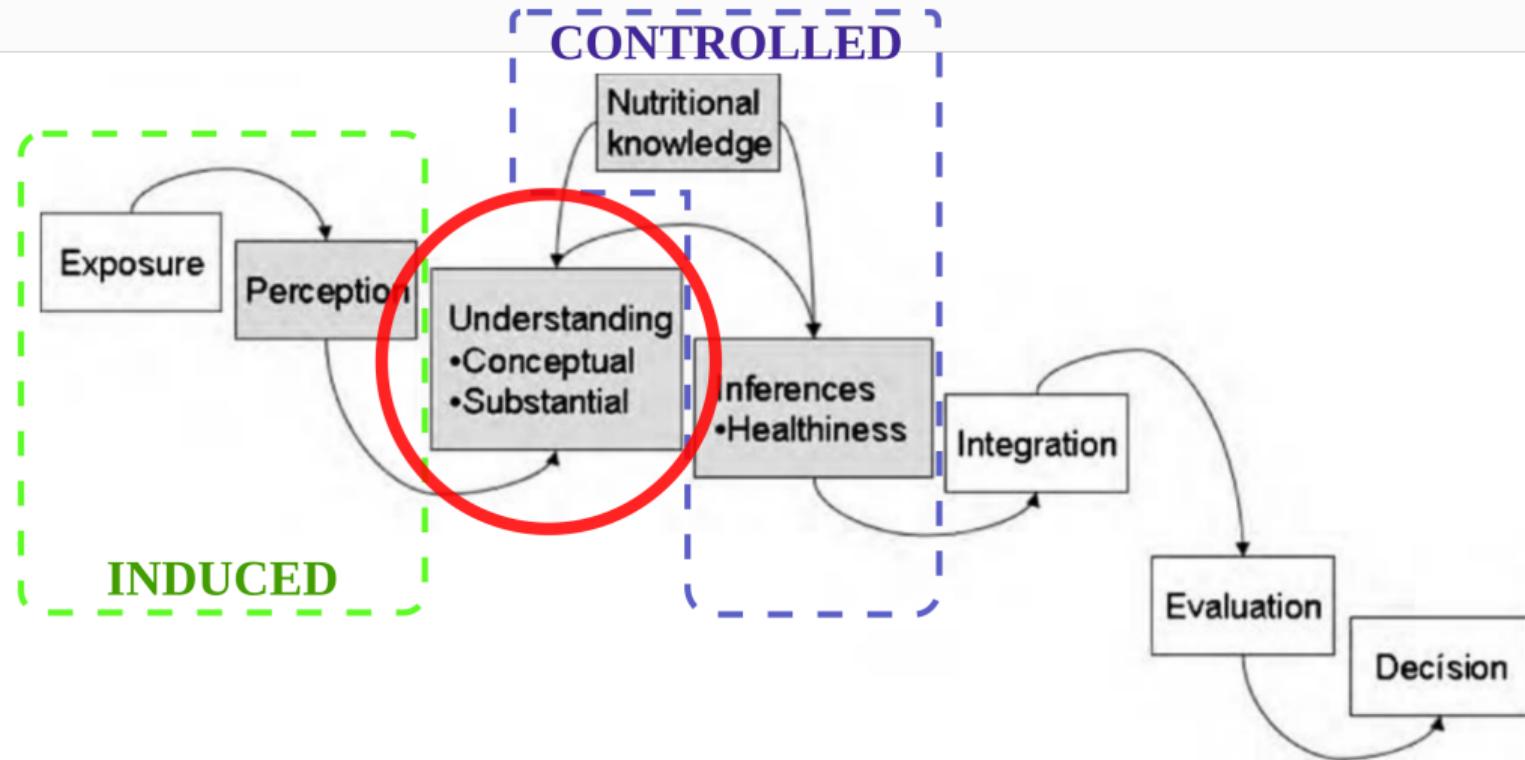


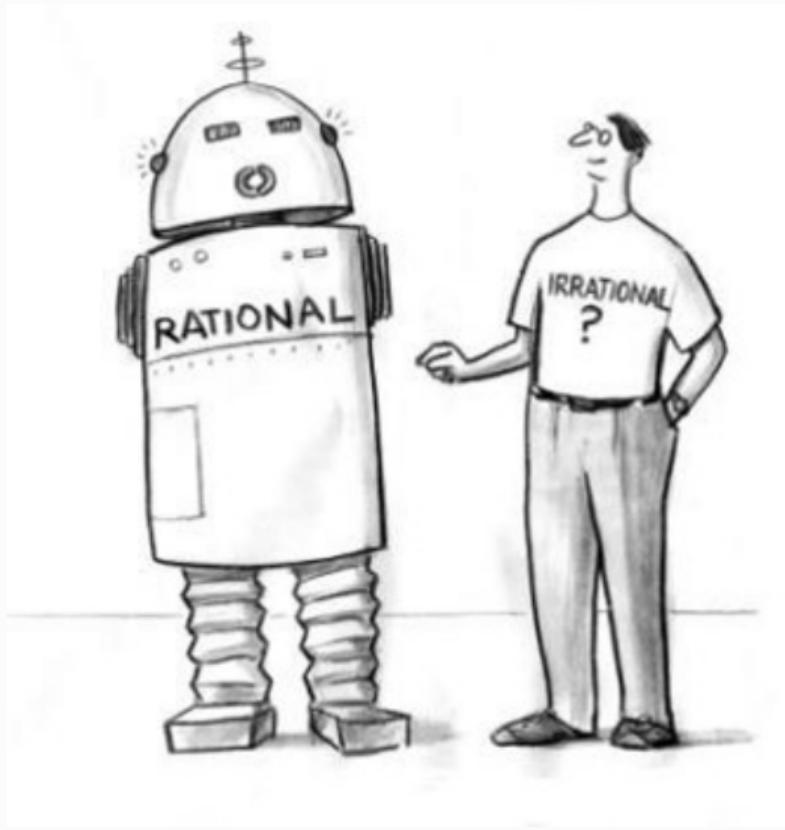
Part 1:

into the mind of subjects



Getting into the **mind** of subjects







How to induce healthier choices?

Homo Oeconomicus

- ▶ full attention
- ▶ no bias
- ▶ time-consistent
- ▶ goal: full information



How to induce healthier choices?

Homo Oeconomicus

- ▶ full attention
- ▶ no bias
- ▶ time-consistent
- ▶ goal: full information

Homo Sapiens

- ▶ limited attention
- ▶ biases
- ▶ time-inconsistent
- ▶ goal: salient cues

Nutrition Facts

Serving Size 2 CUPS (30g)

Servings per Container VARIED

Amount per Serving

Calories 150 Calories from Fat 70

% Daily Value*

Total Fat 7g 11%

 Saturated Fat 1.5g 6%

Cholesterol 0mg 0%

Sodium 120mg 5%

Total Carbohydrate 20g 7%

 Dietary Fiber 4g 15%

 Sugars 9g

Protein 1g

Vitamin A 0% • Vitamin C 0%

Calcium 0% • Iron 2%

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:

Fat 9 • Carbohydrate 4 • Protein 4

Nutrition Facts

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Servings per Container VARIED

Amount per Serving

Calories 150 **Calories from Fat** 70

% Daily Value*

Total Fat 7g **11%**

Saturated Fat 1.5g **6%**

Cholesterol 0mg **0%**

Sodium 120mg **5%**

Total Carbohydrate 20g **7%**

Dietary Fiber 4g **15%**

Sugars 9g

Protein 1g

Vitamin A 0% • **Vitamin C** 0%

Calcium 0% • **Iron** 2%

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

Calories 2,000 2,500

Total Fat Less than 65g 80g

Sat Fat Less than 20g 25g

Cholesterol Less than 300mg 300mg

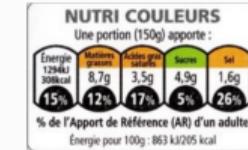
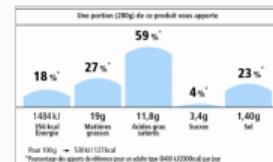
Sodium Less than 2,400mg 2,400mg

Total Carbohydrate 300g 375g

Dietary Fiber 25g 30g

Calories per gram:

Fat 9 • Carbohydrate 4 • Protein 4





The lab can shed very precise light on...

Cognitive underpinnings of label use

- ▶ Are colors more intuitive than numbers?
- ▶ Do numbers result in more accuracy?
- ▶ How much time is needed to use the information?
- ▶ Is there a time-accuracy trade off?

Study 1:

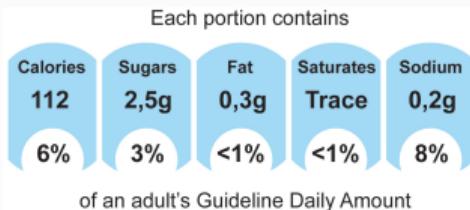
diet building under constraints

(with Laurent Muller, Bernard Ruffieux – Jo Eco Psy (2015))



GDA, TL, GDA+TL

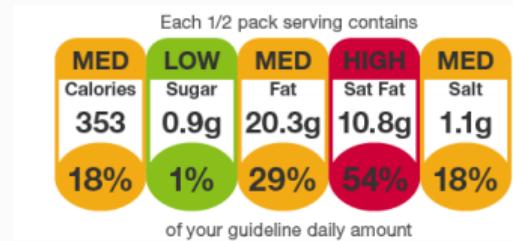
Guideline Daily Amount (GDA)



Traffic Lights (TL)



GDA+TL





The usual design





The usual design





What label is better to build a healthy diet?

Diets

- ▶ a diet is a complex object, akin to a portfolio
- ▶ you won't die for one bad item, but if the overall balance is wrong

Task

- ▶ subject "hired as a nutritionist for a canteen"
- ▶ must compose daily menu that satisfies nutritional constraints
- ▶ subject guided by labels: **numbers, colors, or both.**



What label is better to build a healthy diet?

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Incentives

- ▶ If the daily diet built satisfies nutritional constraints ⇒ flat fee (2 euro)
- ▶ Several daily diets to build



Daily diet

A daily **diet** is composed of *twelve* food items over *four* meals:

Daily base	120g bread, 10g butter, 20g oil	
Breakfast	<i>Drink</i>	The, coffee, milk, hot chocolate, juice...
	<i>Main course</i>	Bread, sweets, viennoiseries...
	<i>Fruit</i>	Fruit, jam...
Lunch	<i>Entrée</i>	Light dishes, ham, paté...
	<i>Main course</i>	Sandwich, pizza, pasta...
	<i>Seasoning</i>	Oil, butter, spices & herbs
	<i>Dessert</i>	Fruit, sweets...
Afternoon snack	-	Sweets
Dinner	<i>Entrée</i>	Light dishes, ham, paté...
	<i>Main course</i>	Meat or fish
	<i>Side</i>	Vegetables, rice...
	<i>Dessert</i>	Fruit, sweets...



Our design: diet-building

Petit déjeuner	Lait frais entier 	Nectar de fruits exotiques 	Eau gazeuse 	Lait aromatisé
	Céréale type All Bran 	Pain de mie 	Orange 	Pain croustillant
Déjeuner	Salade froide 	Pomme de terre à l'ail 	Viande des Grisons 	Pâté de foie de volaille
	Sandwich crudité fromage 	Sandwich crudité roti 	Pot au feu 	Sandwich type libanais (taflet)
	Pamplemousse frais 	Fraise 	Mousse de fruit 	Salade de fruits
Collation	Gâteau de Savoie 	Pettisuisse 	Meringue 	Kiel
	Avocat vinaigrette 	Laitue 	Aasperge grasse 	Röti avec hareng
	Fagioli 	Pâtes complètes 	Quinoa 	Châtaigne
Dîner	Haricot rouge 	Pâtes fraîches 	Pâtes rouge grillé 	Carotte



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	Céréale type All Bran	Pain de mie	Orange	Pain croustillant
Déjeuner	Salade fraîche	Pomme de terre à l'ail	Viande des Grisons	Pâté de foie de volaille
	Sandwich crudité fromage	Sandwich crudité rosbif	Pot au feu	Sandwich type ibérique (jambon)
Collation	Fromage et biscuits	Fraise	Mousse de fruit	Salade de fruits
	Gâteau de Savoie	Petit-suisse	Meringue	Kiwi
Dîner	Avocat vinaigrette	Laitue	Asperge grasse	Rötsops de hareng
	Fagioli	Pâtes complètes	Quinoa	Châtaigne
	Haricot rouge	Pâtes fraîches	Poivrons rouge grillé	Carotte

Characteristics:

- ▶ no preferences
- ▶ incentivized
- ▶ "realistic"

We add:

- ▶ labels
- ▶ constraints



Dimensions

Nutrition is multidimensional. We consider three cases:

1-dimension Kcal only are displayed.

4-dimension Kcal + 'bad' nutrients: salt, sugar, fat.

7-dimension 4d + 'good' nutrients: vitamin C, fiber, calcium.



Dimensions

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1-dimension Kcal only are displayed.

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Labels can have numbers, or colors, or both:

Numbers modeled on Guideline Daily Amounts / Reference Intakes

Colors modeled on Traffic Lights

Num+col both of the above combined



Numbers

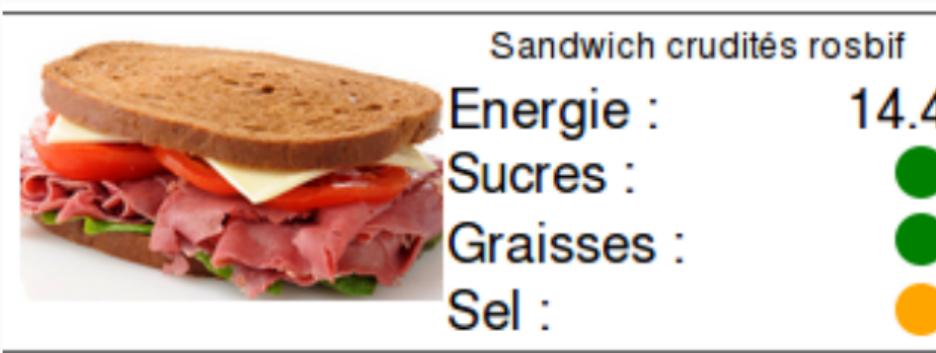


Tarte aux poireaux

Energie :	12.3
Sucres :	1.7
Graisses :	46.4
Sel :	19.1



Colors





Numbers + colors



Pêche

Energie :	3	
Sucres :	14	●
Graisses :	0	●
Sel :	0	●
Vitamines :	11	●
Fibres :	12	●
Calcium :	2	●



Part 1: Study 1 – diet building

A number + colors screen, 7 constraints

		Lait frais entier	Nectar de fruits exotiques	Eau gazeuse	Lait aromatisé
Petit déjeuner	Lait frais entier	Energie : 6.3 Sucres : 10.2 Graisses : 21 Sel : 3.8 Vitamines : 8.4 Fibres : 0	Energie : 5.5 Sucres : 29.3 Graisses : 0 Sel : 0.3 Vitamines : 7.8 Fibres : 0.8	Energie : 0 Sucres : 0 Graisses : 0 Sel : 2.9 Vitamines : 0 Fibres : 0	Energie : 6.3 Sucres : 23.3 Graisses : 7.7 Sel : 3.8 Vitamines : 8.9 Fibres : 0
	Céréale type All Bran	Energie : 4.2 Sucres : 5.3 Graisses : 1.1 Sel : 10.6 Vitamines : 22.8 Fibres : 32.4	Energie : 6.7 Sucres : 1.1 Graisses : 2.4 Sel : 12.5 Vitamines : 42 Fibres : 6.6	Energie : 2.6 Sucres : 12.5 Graisses : 0.2 Sel : 0.1 Vitamines : 6.4 Fibres : 8.1	Energie : 9.5 Sucres : 9.5 Graisses : 3.5 Sel : 7.3 Vitamines : 3.6 Fibres : 15
	Salade fraîche	Energie : 0.2 Sucres : 0.5 Graisses : 0.1 Sel : 0.2 Vitamines : 3.1 Fibres : 1.9	Energie : 6.8 Sucres : 3.9 Graisses : 4.9 Sel : 17.3 Vitamines : 8.6 Fibres : 6.8	Energie : 2.6 Sucres : 0.1 Graisses : 3.2 Sel : 25.9 Vitamines : 13.3 Fibres : 0	Energie : 3.5 Sucres : 0 Graisses : 7 Sel : 5.6 Vitamines : 29.7 Fibres : 0
	Sandwich crudité fromage	Energie : 19 Sucres : 2.8 Graisses : 31.9 Sel : 25.3 Vitamines : 12.7 Fibres : 11.6	Energie : 14.4 Sucres : 2.8 Graisses : 4.7 Sel : 23.7 Vitamines : 20.5 Fibres : 11.2	Energie : 13.9 Sucres : 11.3 Graisses : 24.6 Sel : 52.3 Vitamines : 28.6 Fibres : 21.4	Energie : 18.8 Sucres : 1.4 Graisses : 13.5 Sel : 33.5 Vitamines : 17.8 Fibres : 19
	Pamplemousse frais	Energie : 3.2 Sucres : 18 Graisses : 0.1 Sel : 0 Vitamines : 12.4	Energie : 2.2 Sucres : 10.1 Graisses : 0.1 Sel : 0.1 Vitamines : 16.4	Energie : 5.9 Sucres : 2.5 Graisses : 21.4 Sel : 2 Vitamines : 11.9	Energie : 4.2 Sucres : 21.3 Graisses : 0.3 Sel : 0.1 Vitamines : 6.8
	Pain de mie		Orange	Pain suédois	
	Vande des Grisons			Pate de foie de volaille	
	Sandwich crudité rosbif			Pot au feu	
	Sandwich type libanais				
Dejeuner					

Your turn!

<https://gaelexperience.fr>

"Diet Building Turin Showcase 2024"



Instructions

Screen 1: no info just select what you think is the overall healthiest (but nutritionally enough) menu

Screen 2: numbers, 1D you need to create a menu that has between 90% and 110% of the daily recommended calories.

Screen 3: colors, 4D you need to do as in Screen 1, plus you have to **minimize** salt, sugar and fat.

Screen 4: numbers + colors, 7D you need to do as in Screen 4, plus you have to **maximize** vitamin, calcium and fiber.

Results from the real experiment

2014, Grenoble



Two populations, three conditions

To investigate the role of

- ▶ **cognitive resources** and
- ▶ **time**

we run three conditions:

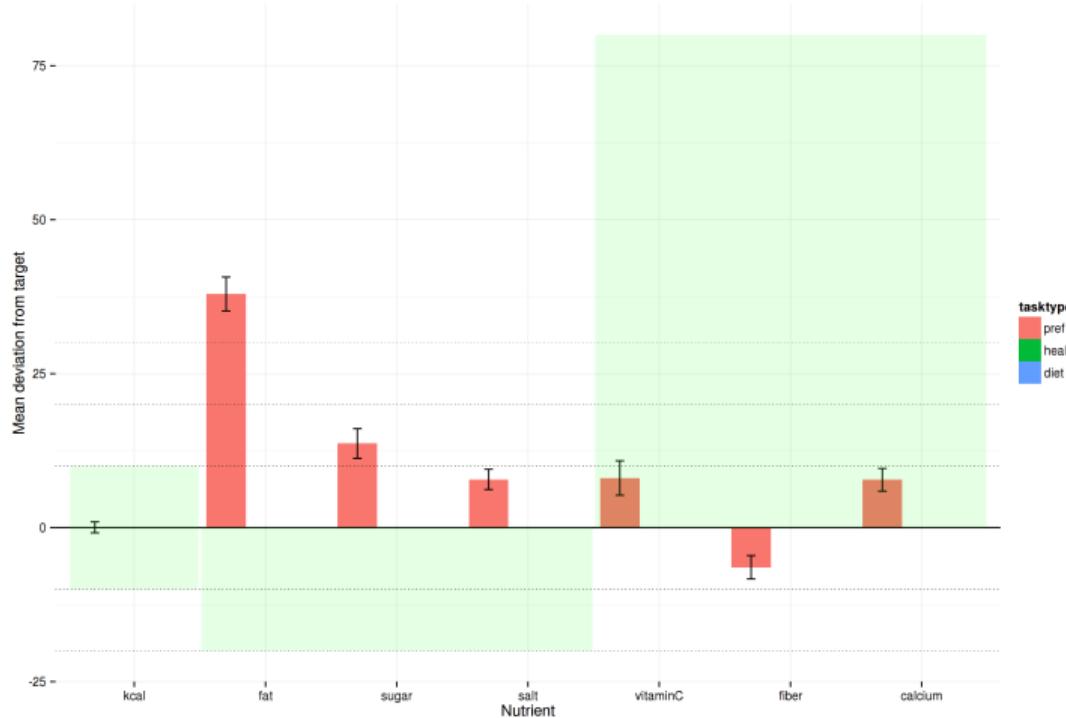
Students Highly skilled engineering students, no time limit, paper and pencil

Population Population at large, no time limit, paper and pencil

120 seconds Population at large, 120 seconds, NO paper and pencil



Average results – no labels – plain preferences



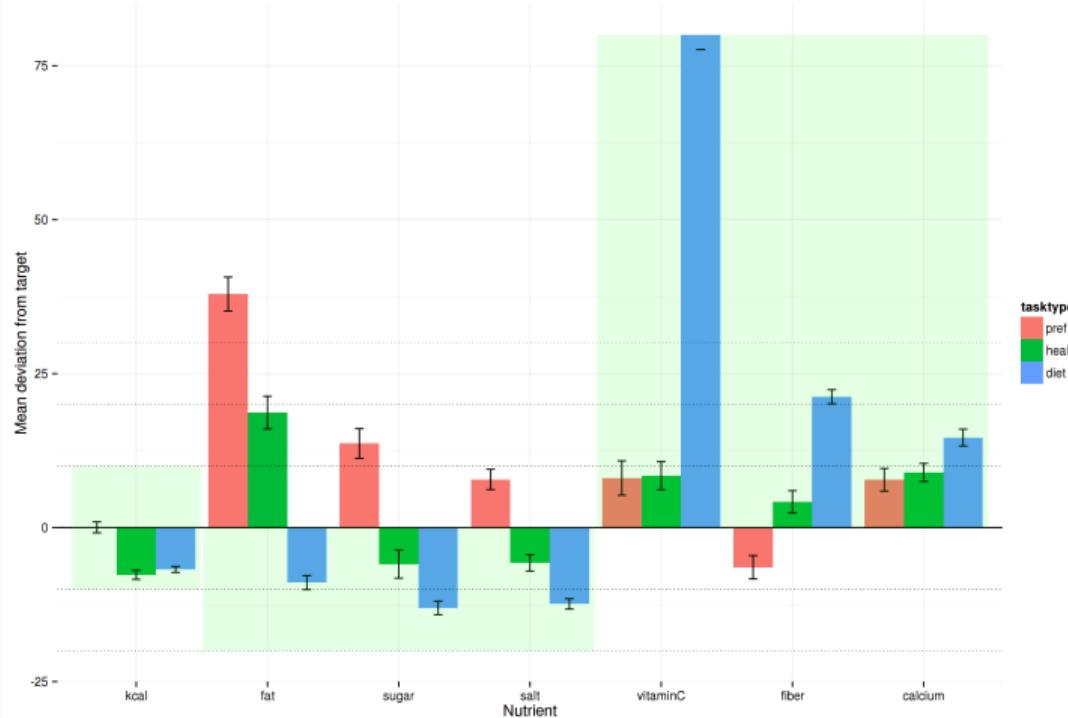


Average results – no labels – Healthiness

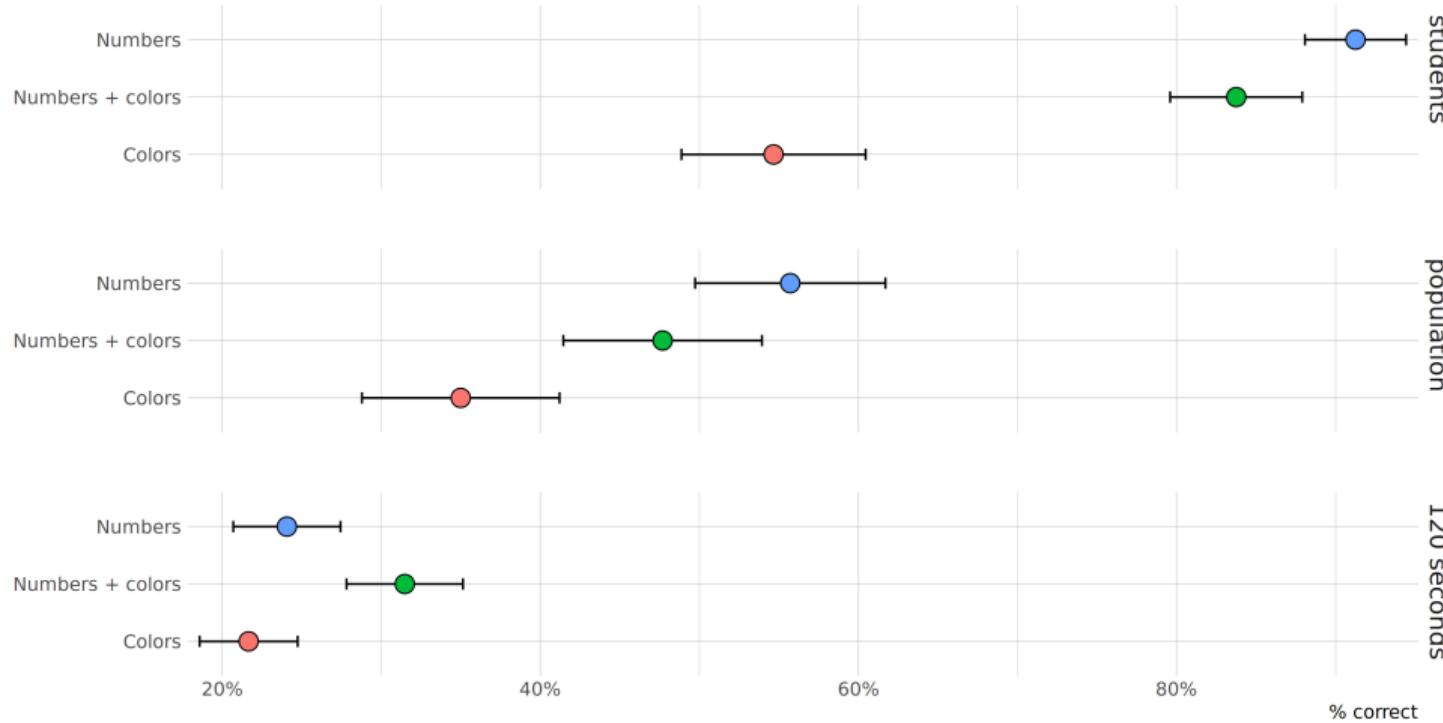




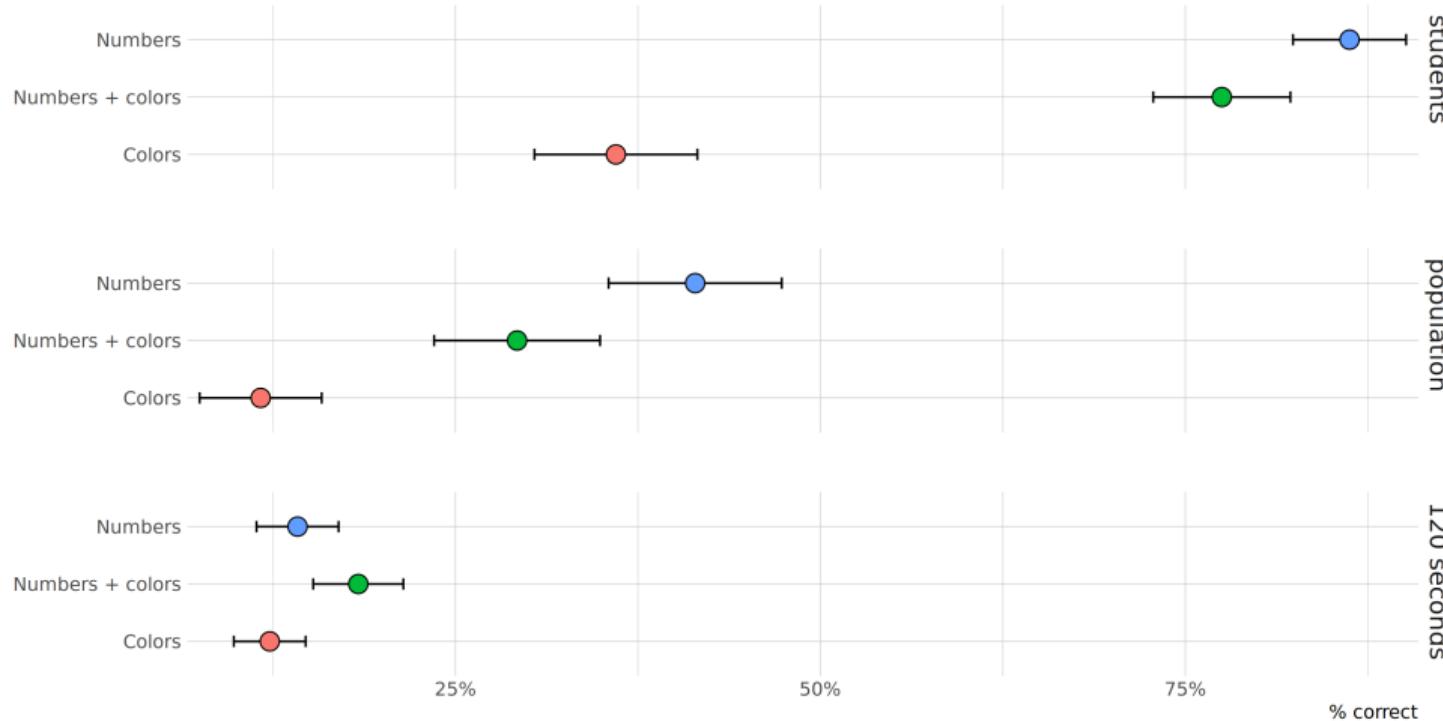
Average results – labels – All



Performance in the task - 4 constraints



Performance in the task - 7 constraints





Take-home message

If time is **unlimited**:

- ▶ Numbers win
- ▶ Especially so for highly skilled
- ▶ But also for general population



Take-home message

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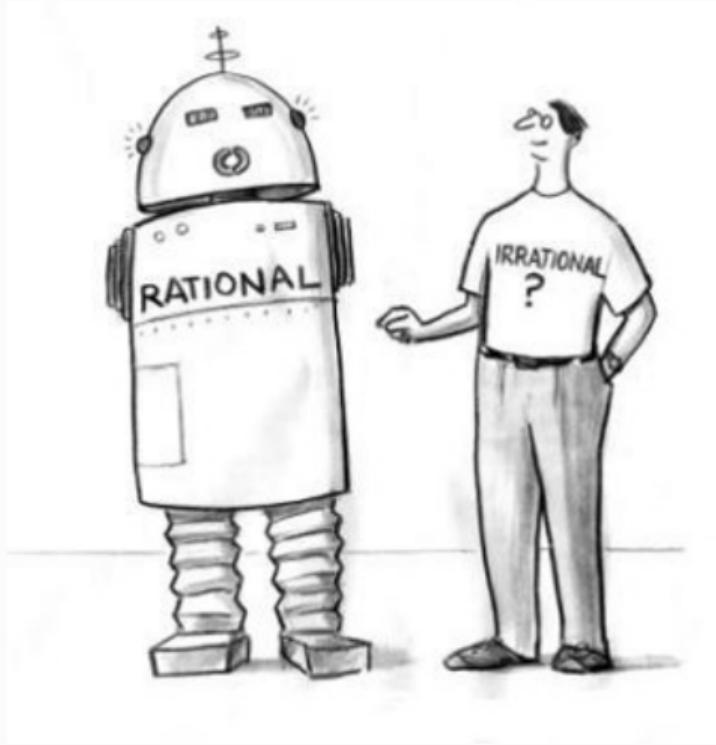
If time is **limited**:

- ▶ Numbers and colors equal
- ▶ Number + colors overall better
- ▶ Dismal performance in all cases

Study 2:

fast & slow reactions to labels

(with Laurent Muller)

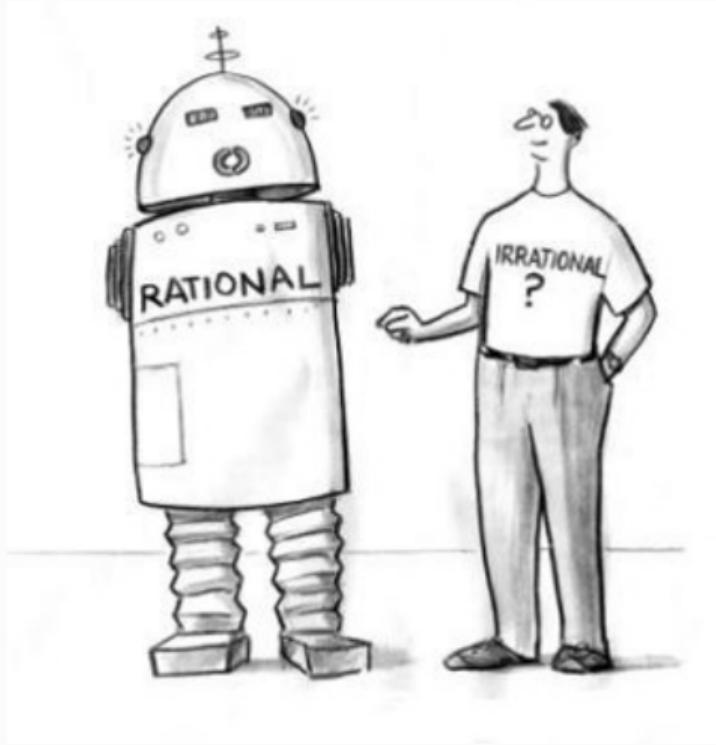




Food choice is both fast & slow

Food choice : fast

Health goals : slow



Food choice is both fast & slow

Food choice : fast

Health goals : slow

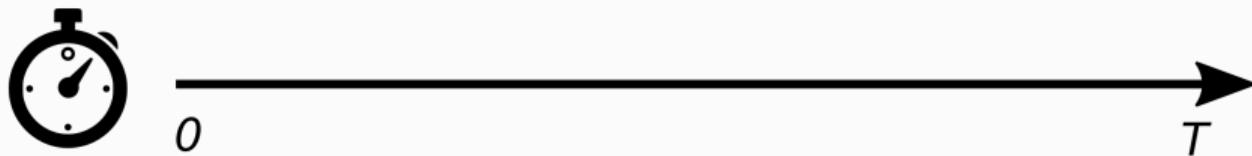
Labels are both fast & slow

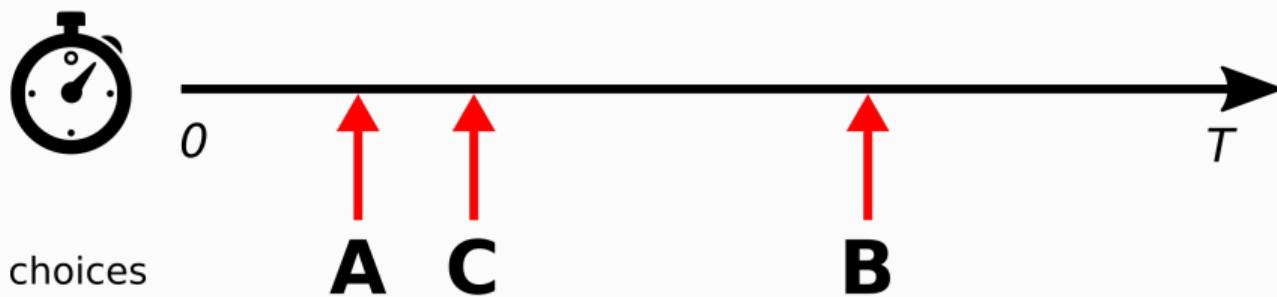
numbers : slow

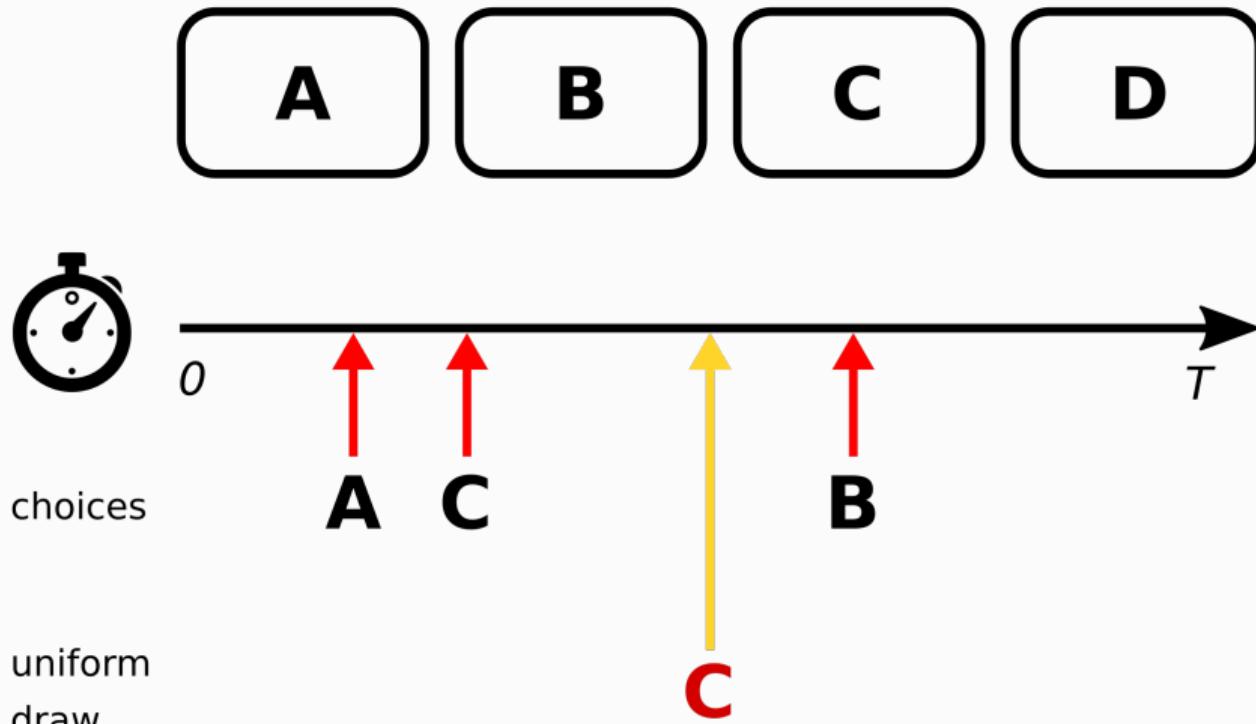
analytic : slow

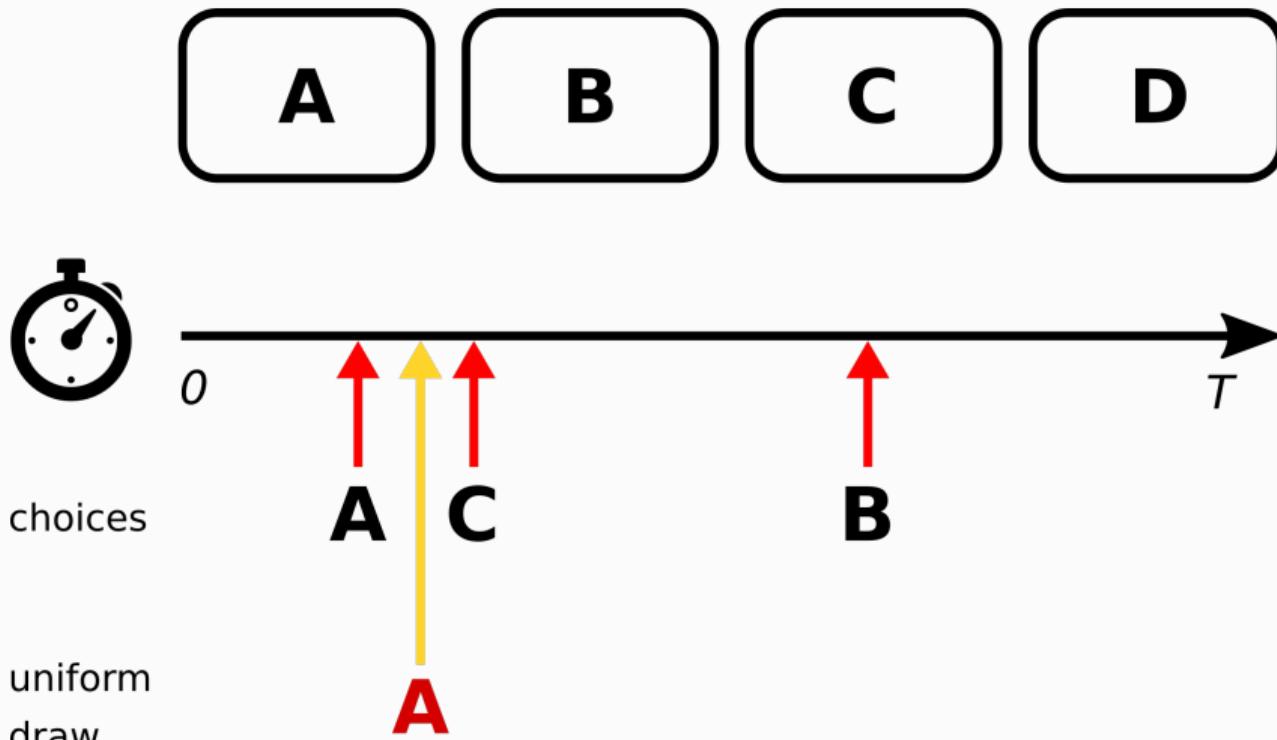
colors : fast

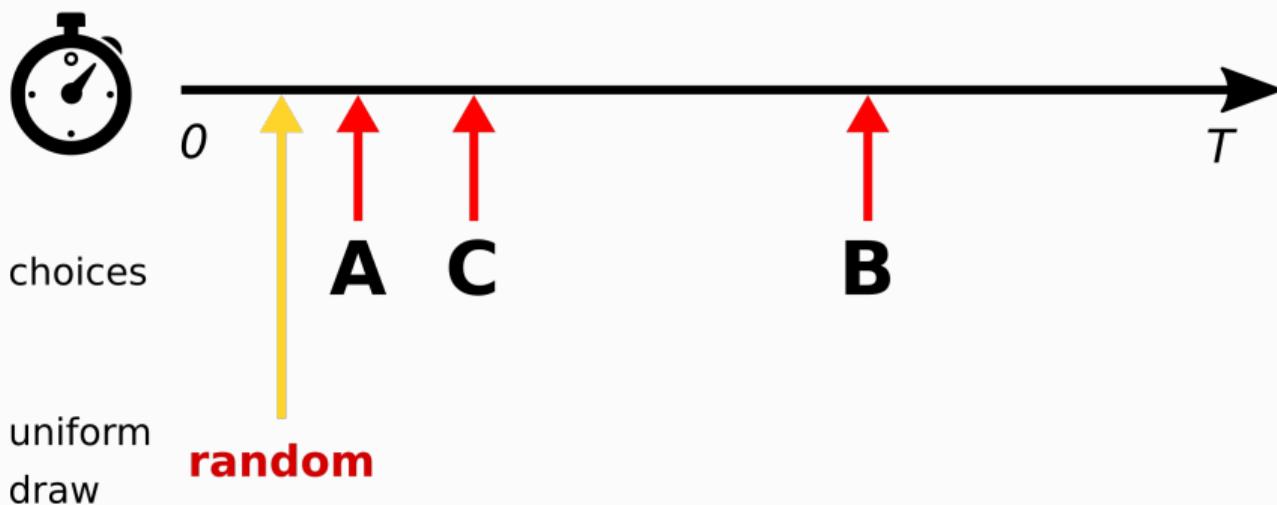
aggregate : fast













Our design

Thanks to the design:

- ▶ No choice \Rightarrow random choice: incentive to *fast* reply
- ▶ Time is ticking: incentive to *change* first decision upon reflection



Our design

Thanks to the design:

- ▶ No choice \Rightarrow random choice: incentive to *fast* reply
- ▶ Time is ticking: incentive to *change* first decision upon reflection
- ▶ *fast* to *slow endogenous* (usually: exogenous)
- ▶ Data reveal choice *process* (usually: outcome)



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Thanks to the design:

- ▶ No choice \Rightarrow random choice: incentive to *fast* reply
- ▶ Time is ticking: incentive to *change* first decision upon reflection
- ▶ *fast* to *slow endogenous* (usually: exogenous)
- ▶ Data reveal choice *process* (usually: outcome)

This allows us to:

- ▶ tell apart how different labels tap on different heuristics
- ▶ measure how much *faster* colors are
- ▶ assess if numbers do a better job, and when



Labels

global
quality



fat sugar salt



3% 13% 7%

fat sugar salt



fat sugar salt

3% 13% 7%

Barres au chocolat au lait
et aux céréales



Choisir

Barres chocolatées
fourrées au lait et aux noisettes



Choisir

Barres chocolatées
au caramel



Choisir

Barres de céréales
raisins et chocolat au lait



Choisir



Barres au chocolat au lait
et aux céréales

Sucre AGS Sel



Choisir

Barres chocolatées
fourrées au lait et aux noisettes

Sucre AGS Sel



Choisir

Barres chocolatées
au caramel

Sucre AGS Sel



Choisir

Barres de céréales
raisins et chocolat au lait

Sucre AGS Sel



Choisir



Barres au chocolat au lait
et aux céréales

Sucres	AGS	Sel
55%	110%	5%

Choisir

Barres chocolatées
fourrées au lait et aux noisettes

Sucres	AGS	Sel
46%	87%	5%

Choisir

Barres chocolatées
au caramel

Sucres	AGS	Sel
69%	42%	7%

Choisir

Barres de céréales
raisins et chocolat au lait

Sucres	AGS	Sel
34%	27%	9%

Choisir



Your turn!

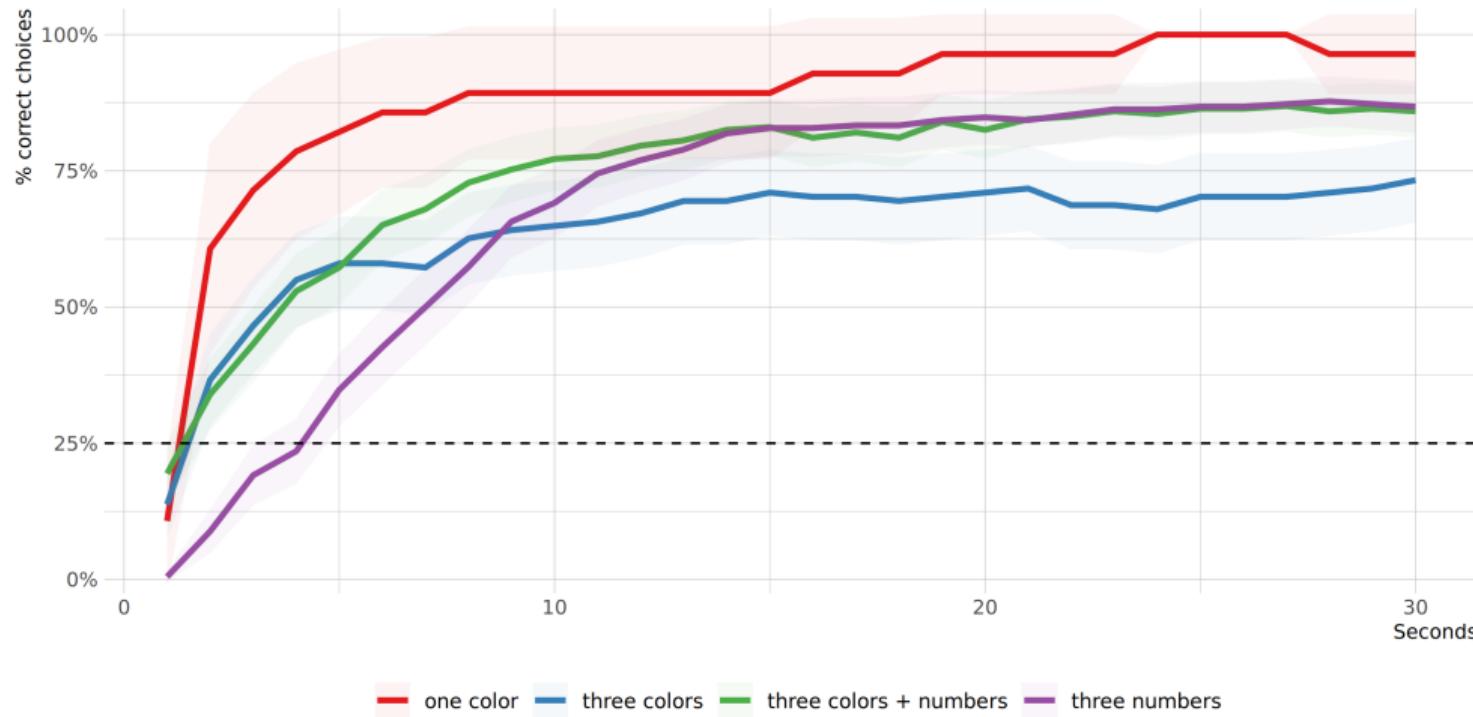
<https://gaelexperience.fr>

Blue button "*Experience en salle*"

Results from the real experiment

2016, Grenoble

Share of correct choices in time, by labeling scheme



from Fast&Slow labels, wip



What do we learn?

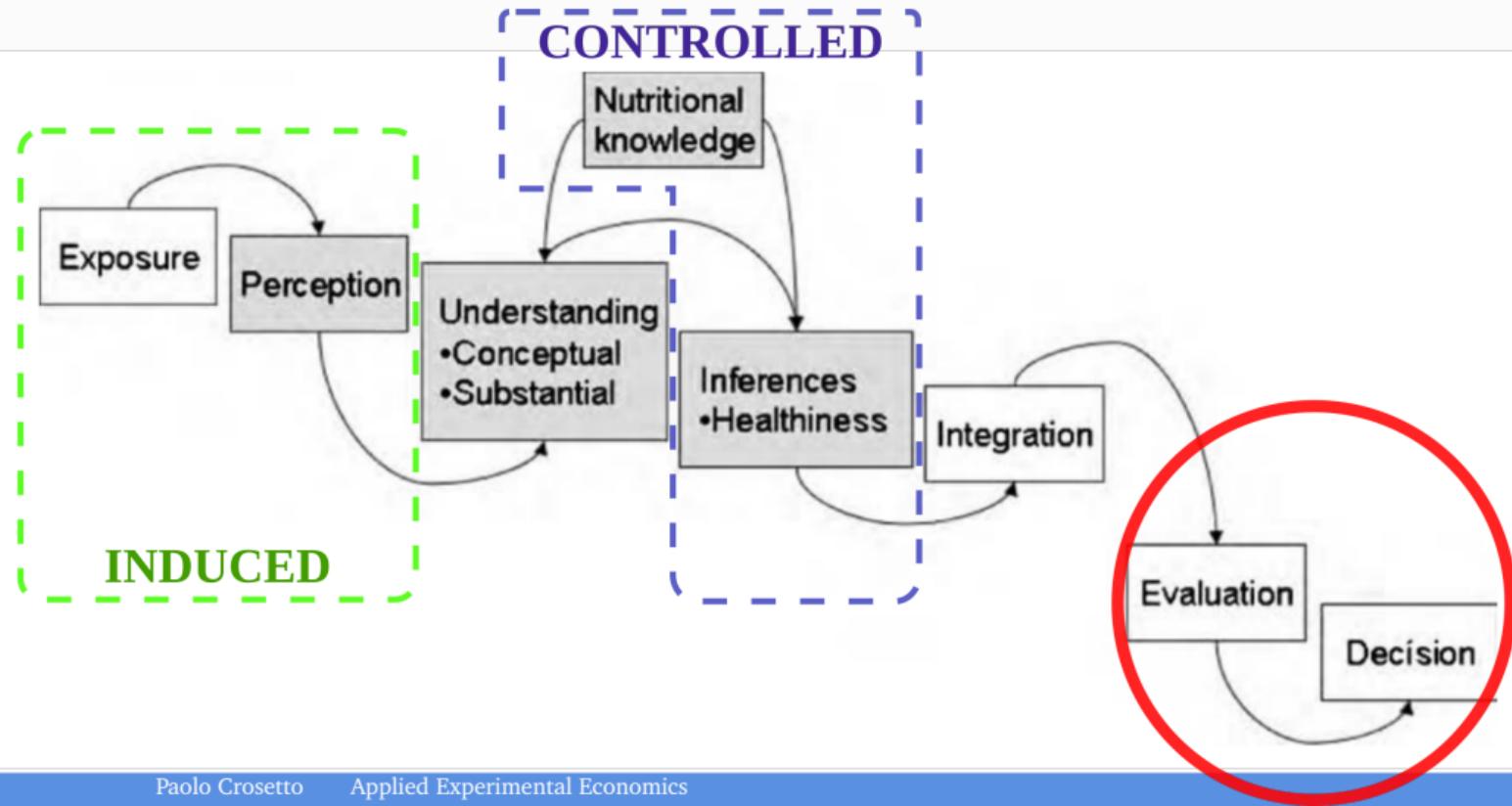
- ▶ Trade off time/accuracy
- ▶ Heuristics give way to computation in time
- ▶ Indirect evidence of different cognitive processes
- ▶ We explicitly measure 'how more intuitive' colors are

Part 2:

building counterfactuals



Building counterfactuals







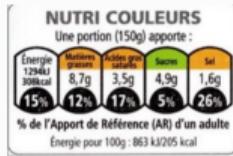
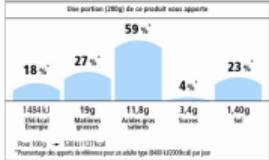
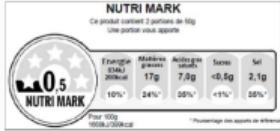
Some context



Fédération du Commerce
et de la Distribution

Testing a labeling policy in the field can be **costly** and **ineffective**

- ▶ Labeling all products is costly
- ▶ Large samples required
- ▶ Lots of noise – special offers, discounts, availabilities. . .
- ▶ No control on population switching shops
- ▶ Little control on implementation
- ▶ Which reference period?



French Ministry of Health

- ▶ Which FoPL to choose?
- ▶ How large is the effect?
- ▶ A RCT in 60 French supermarket
- ▶ A large lab experiment (**us!**)

Study 3:

ex-ante evaluation of labels: lab shopping

(with Anne Lacroix, Laurent Muller, Bernard Ruffieux – ERAE (2019))

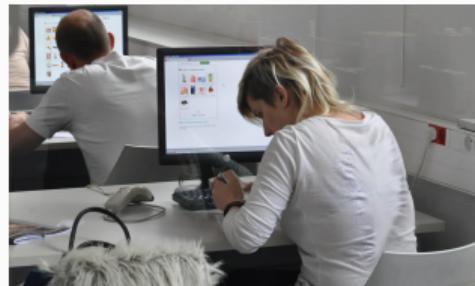


Our setup

Paper catalog



Computer interface



Real products



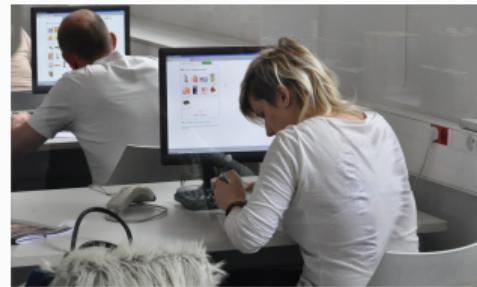


Our setup

Paper catalog



Computer interface



Real products



- ▶ Preferences are back!
- ▶ Subjects shop for real in the lab

- ▶ $\sim \frac{1}{4}$ of product supply available
- ▶ chosen + we have it \Rightarrow buy



A large and representative catalog

- ▶ 290 products
- ▶ 37 food categories
- ▶ custom e-shopping interface
- ▶ barcode scanners on the desk
- ▶ price, quantity, picture (label) up front
- ▶ nutritional table and ingredient list available upon clicking

1138

Chercher

Votre caddie actuel :

Aucun produit dans ce panier.

Terminer

4,25 €
260 g
16,35 €/Kg



1



Ajouter au caddie

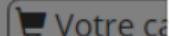
2 Steaks hachés pur boeuf 15% mg



Ingrediénts

Valeurs nutritionnelles

Scannez un produit



Votre caisse
Aucun produit dans la caisse

Terminer

2 Steaks hachés pur boeuf 15% mg

Ingrédients

100% Viande bovine.

Les ingrédients en majuscules sont susceptibles d'entrainer des intolérances ou des allergies

Valeurs nutritionnelles

Fermer



Ingrédients

Valeurs nutritionnelles

Scannez un produit

Votre ca

Aucun produit da

Terminer

2 Steaks hachés pur boeuf 15% mg

Valeurs nutritionnelles

Pour 100g de produit :

Energie :	129 Kcal
Lipides :	5,00 g
donc Acides Gras Saturés :	2,30 g
Glucides :	0,00 g
dont sucres :	0,00 g
Protéines :	21,00 g
Sel :	0,23 mg

Ingédients

Fermer

Ingédients

Valeurs nutritionnelles

Scannez un produit Chercher

Votre caddie actuel :



x 1 = 4.25 €

1 Articles

Total = 4.25 €

Terminer



1



Modifier la quantité

Enlever du caddie

2 Steaks hachés pur boeuf 15% mg



Ingrediénts

Valeurs nutritionnelles

1814

 Chercher

1814

Votre caddie actuel :



x 1 = 4.25 €



x 1 = 3.95 €



x 1 = 1.17 €



x 1 = 2.83 €



x 3 = 1.83 €

5 Articles

Total = 14.03 € - 1 + Ajouter au caddie

Frites surgelées pour micro-ondes

 Ingrédients Valeurs nutritionnelles Terminer



Experimental design: difference-in-difference

Shopping 1



Shopping 2



double difference

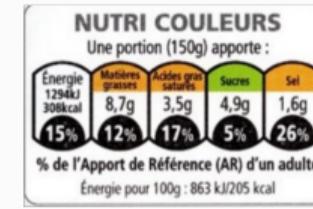
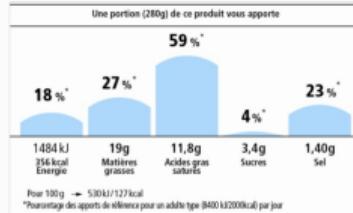
simple difference

Snacks

Cacahuètes grillées très pauvres en sel 1,09€ 200g 5,05€/Kg  2872	Cacahuètes délicatement salées 1,09€ 220g 4,05€/Kg  2849
Chips de maïs nature 2,49€ 230g 10,83€/Kg  2859	Chips paysannes nature 2,48€ 300g 8,27€/Kg  2898
Soufflés de maïs goût cacahuète 2,29€ 250g 9,00€/Kg  2851	Biscuits apéritif à l'emmental 0,52€ 50g 10,40€/Kg  2810



Then, we apply (no or) one of five labels



- ▶ plus a Neutral (benchmark) treatment (no labels)

Snacks

Cacahuètes grillées très pauvres en sel	Cacahuètes délicatement salées
1,09€ 200g 5,05€/Kg  2872	1,09€ 220g 4,05€/Kg  2849
NUTRI-SCORE     	NUTRI-SCORE     
Chips de maïs nature	Chips paysannes nature
2,49€ 230g 10,83€/Kg  2859	2,48€ 300g 8,27€/Kg  2898
NUTRI-SCORE     	NUTRI-SCORE     
Soufflés de maïs goût cacahuète	Biscuits apéritif à l'emmental
2,29€ 250g 9,09€/Kg  2851	0,52€ 50g 10,40€/Kg  2810
NUTRI-SCORE     	NUTRI-SCORE     



Treatments





Metrics: nutrition

We use the **scoreFSA** normalized by **caloric content**.

For each shopping cart i , for each subject j , for each product p :

$$scoreFSA_{ij} = \frac{\sum_p Kcal_{pij} \cdot FSA_{pij}}{\sum_p Kcal_{pij}},$$

We focus on ΔFSA , the *difference* between carts 1 and 2.



A large and representative subject pool

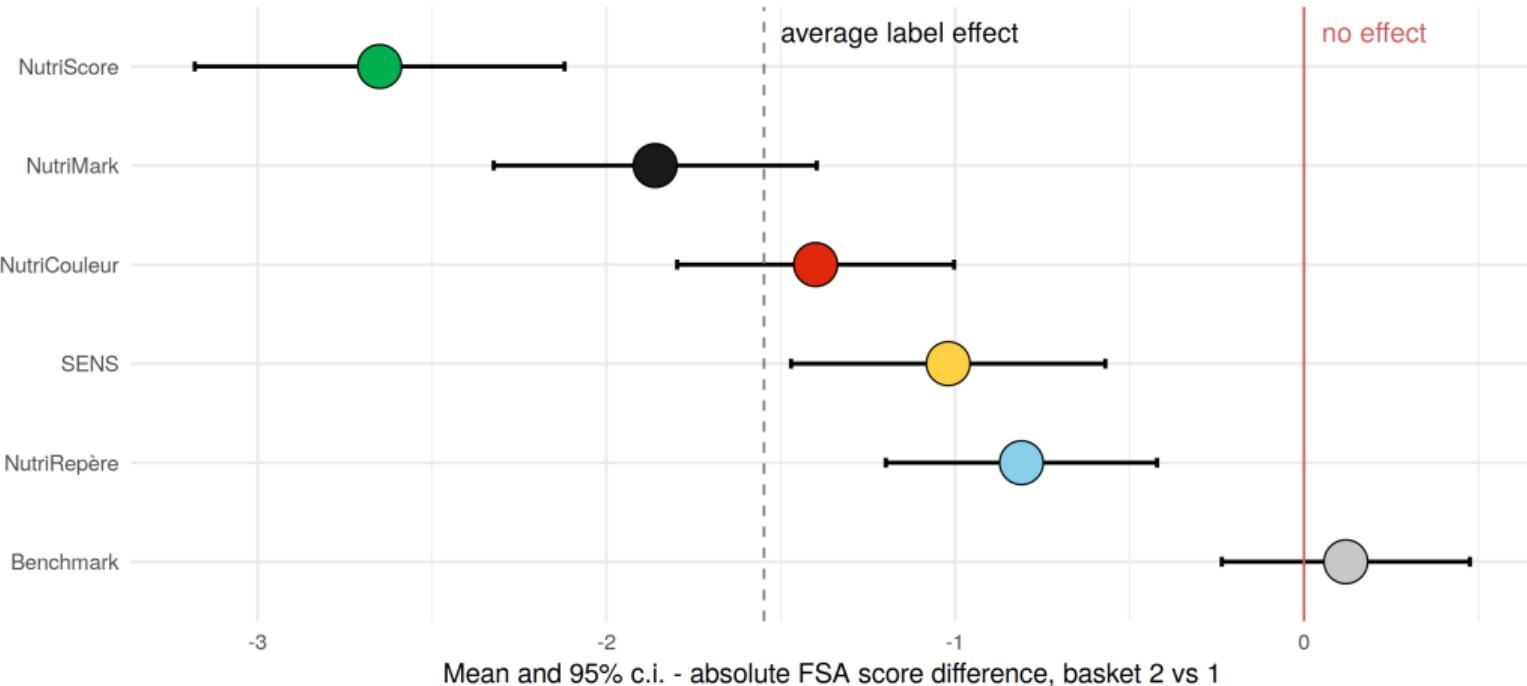
- ▶ 691 subjects
- ▶ ~ 110 for each of 6 treatments
- ▶ sample issued from the general population
- ▶ (recruiting agency boosted our reach into all socio-economic statuses)
- ▶ roughly representative

Results from the real experiment

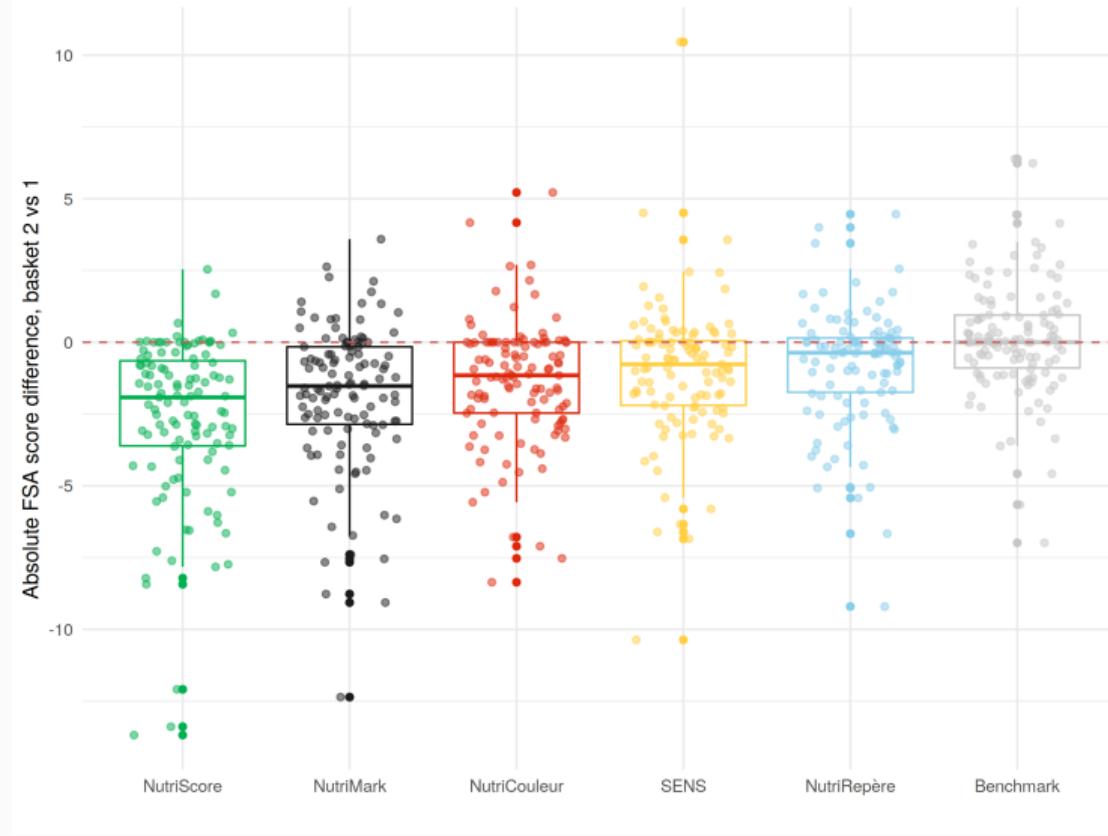
2019, Grenoble

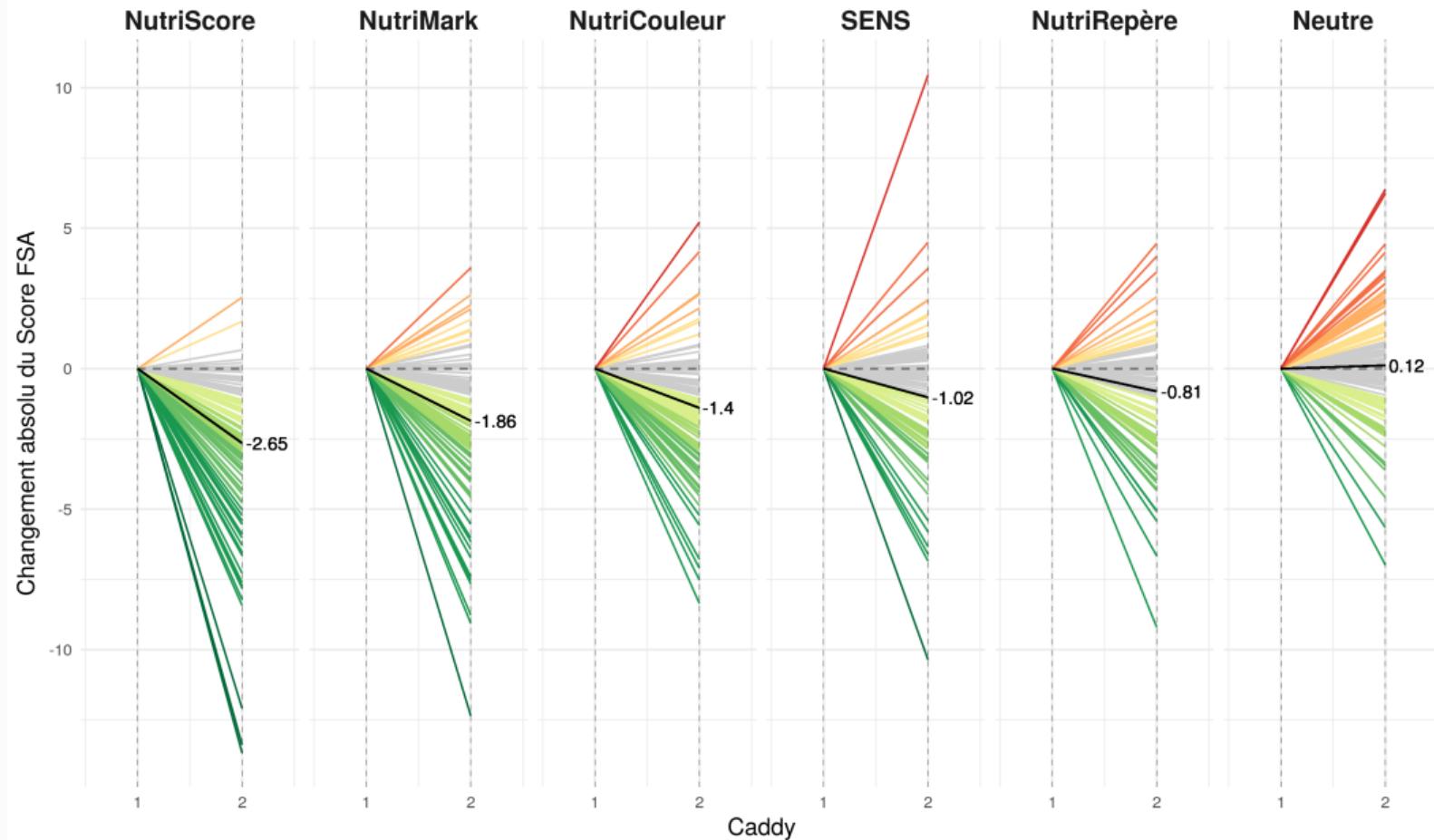


NutriScore leads, by far



But there is heterogeneity







What do we learn?

- ▶ Color-coded, summary labels perform best
- ▶ (but only if they directly relate to quality – not SENS)
- ▶ Number-based, analytic labels perform worse



Policy implications

- ▶ NutriScore officially selected in FR (and ES, BE, DE...)
- ▶ Adopted by Auchan, Fleury Michon, Leclerc, Casino, Nestlé...
- ▶ The very idea of FOP labels validated
- ▶ NutriScore is being proposed by France as EU standard
- ▶ Even though *some countries* really do **not** like it

PRESENTI 311
VOTANTI 299
ASTENUTI 12
MAGIORANZA . . . 150
FAVOREVOLI . . . 299
CONTRARI 0

APPROVATO

MARTEDÌ

10

OTTOBRE

Study 4:

Lab vs. Field RCTs

(Dubois et al., Jo. Ac. Mark. Sci. 2020,)



The two studies at a glance

	Lab	Field
Location Supermarkets	Grenoble "1"	Paris couronne, Nord, Lyon 60
Task Real purchases	shop for two days' worth "yes"	shop yes
Measure	FSA score for 2000Kcal	FSA score for 2000Kcal
Design	Diff-in-diff	Diff-in-diff
Time frame	2x, same session	5 weeks, 1 year apart
Participants	691	171.827
Products (of which labeled)	290 (all)	3586 (1266)
Food categories	37	4
Purchases	27.882	1.668.301
Manpower needed	8	~ 100
Cost	~100k	~4 million



Field study: "instructions"





Part 2: Study 4 – lab or field?

Field study: product display





Field study: alerting the subject





Results: the lab as a magnifying glass

Label	Δ score FSA Field	Δ score FSA Lab	Corr	Zoom
	-0.142*	-2.766***		19x
	-0.115	-1.513*	0.88	13x
	-0.062	-1.140		18x
	-0.024	-0.924		38x



Which one is the *correct* estimate?

Demand effect	similar in both experiments
Strategic behavior	
Social desirability bias	
Game form misconception & complexity	mostly same simple everyday task
Incentive compatibility	same in both experiments
Subject pool differences	not really
Self-selection	not much, but our lab sample <i>is</i> selected
Focality and attention	stark difference
Time contraction	stark difference and generates focality

Study 5:

ex-ante evaluation: labels or prices?

(with Laurent Muller, Bernard Ruffieux)



A bit of context

- ▶ World Bank: strongly tax unhealthy foods (Shekar and Popkin 2020)
- ▶ WHO: introduce dietary taxes on unhealthy food of minimum 20%
- ▶ India and Mexico tax unhealthy food & beverages (India : tax of 28%).

Existing evidence suggests that taxes are likely to shift consumption in the desired direction, although policy makers need to be wary of changes in other important nutrients. However, the tax would need to be at least 20% to have a significant effect on population health.' (Mytton, Clarke, and Rayner 2012)



Question and design

- ▶ Suppose we want to couple a **label** with an **incentive** scheme
- ▶ e.g. tax unhealthy (soda tax) and subsidize healthy food.
- ▶ Does it work? How?
- ▶ Will the intervention be (sub/super)additive?
- ▶ i.e. label **or** price \geqslant label **plus** price?



Question and design

- ▶ Suppose we want to couple a **label** with an **incentive** scheme
- ▶ e.g. tax unhealthy (soda tax) and subsidize healthy food.
- ▶ Does it work? How?
- ▶ Will the intervention be (sub/super)additive?
- ▶ i.e. label **or** price \geqslant label **plus** price?

Exact same design as Study 3

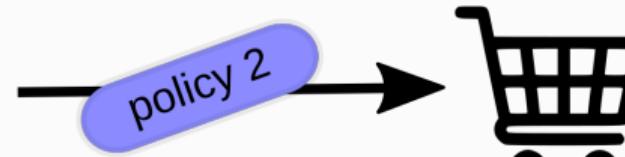


Experimental design: difference-in-difference

Shopping 1



Shopping 2



double difference



simple difference





Metrics: expenditure

We use the **expenditure** on a basket, normalized by 2000Kcal.

For each shopping cart i , for each subject j , for each product p :

$$\text{expenditure}_{ij} = 2000 * \frac{\sum_p \text{Price}_{pij}}{\sum_p \text{Kcal}_{pij}},$$

We focus on $\Delta\text{Expenditure}$, the *difference* between carts 1 and 2.



Metrics: state investment

We use the total amount of subsidies minus the total amount of tax revenue, per consumer.

Since consumers had to buy for 2 days, we divide by 2 to get a daily cost.

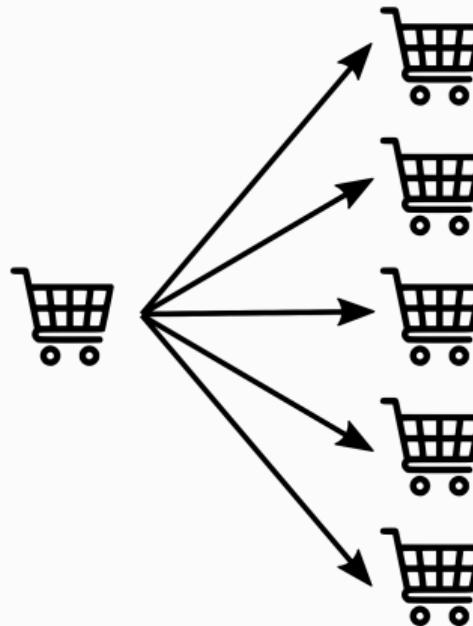
for each subject j , for each product p :

$$stateaid_j = \frac{\sum_p (tax_{pj} - subsidy_{pj})}{2},$$



Treatments

Shopping 1
no policy



Shopping 2
different policies



$\pm 20\%$

$\pm 2\text{cts}$

$\pm 20\%$

$\pm 20\%$



Part 2: Study 5 – labels or prices?

A large price change: $\pm 10\%$ or 20%





Part 2: Study 5 – labels or prices?

A small price change: ± 1 or 2 cents





Part 2: Study 5 – labels or prices?

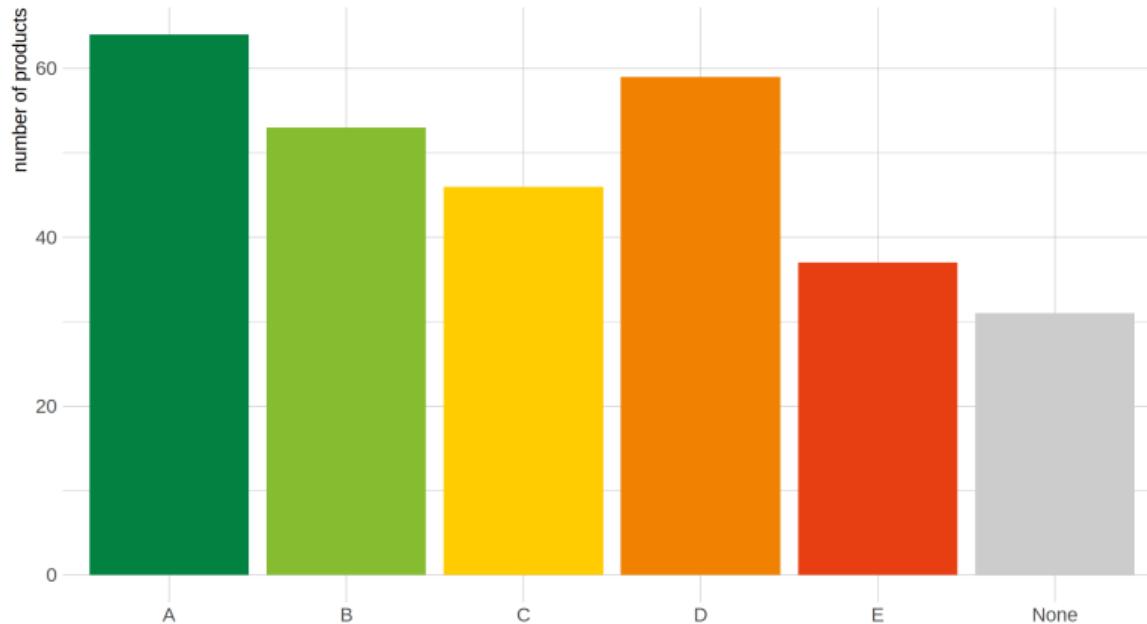
Stimuli

Référence Sans Nutri-Score sans Bonus-Malus	Traitement 1 Nutri-Score sans Bonus-Malus	Traitement 2 Nutri-Score avec Bonus-Malus explicite <i>ad valorem</i> de niveau élevé
Cacahuètes grillées très pauvres en sel 2872	Cacahuètes grillées très pauvres en sel 2872	Cacahuètes grillées très pauvres en sel 2872
200g 5,00€/kg 1,00€	200g 5,00€/kg 1,00€	200g 4,00€/kg 1,00€ 0,80€
Traitement 3 Nutri-Score avec Bonus-Malus explicite par unité de niveau symbolique	Traitement 4 Bonus-Malus implicite <i>ad valorem</i> de niveau élevé	Traitement 5 Bonus-Malus explicite <i>ad valorem</i> de niveau élevé
Cacahuètes grillées très pauvres en sel 2872	Bonus-Malus implicite <i>ad valorem</i> de niveau élevé Cacahuètes grillées très pauvres en sel 2872	Cacahuètes grillées très pauvres en sel 2872
200g 4,50€/kg 0,98€	200g 4,00€/kg 0,80€	200g 4,00€/kg 1,00€ 0,80€



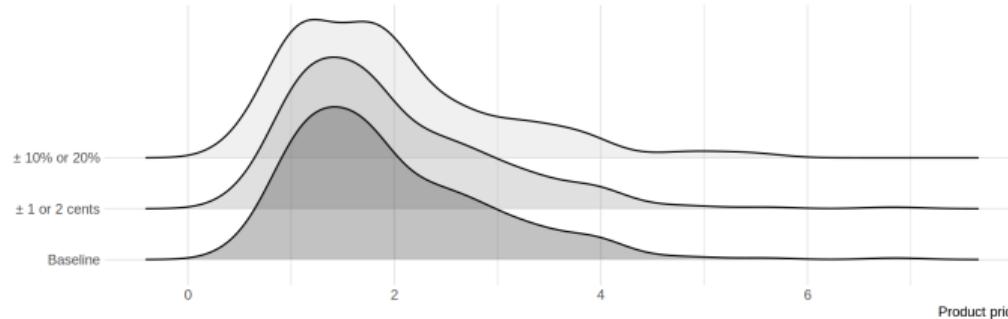
Part 2: Study 5 – labels or prices?

Catalog: NutriScore





Catalog: Price distribution

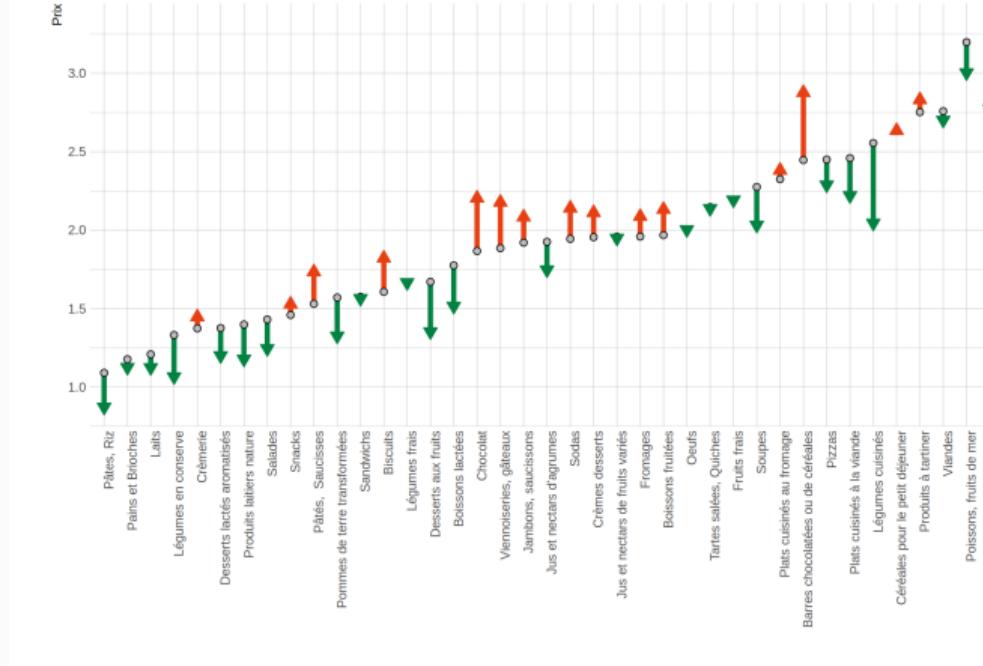


	price	p-value
baseline	1.96 (0.96)	
cents	1.96 (0.96)	0.841
percent	1.94 (1)	



Part 2: Study 5 – labels or prices?

Catalog: price changes by microcategory





A large(ish) and representative subject pool

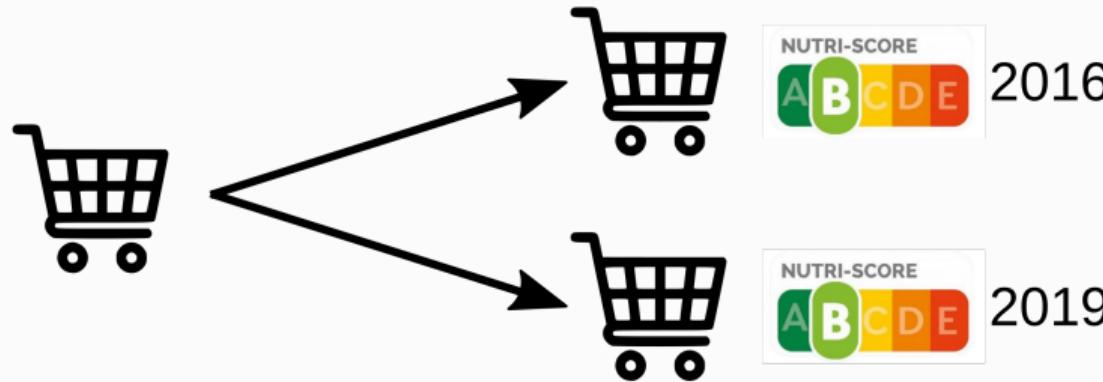
- ▶ 386 subjects
- ▶ ~ 75 for each of the 5 treatments
- ▶ sample issued from the general population
- ▶ roughly representative (+ + women, + + educated)



Replication

Shopping 1
no policy

Shopping 2
different policies



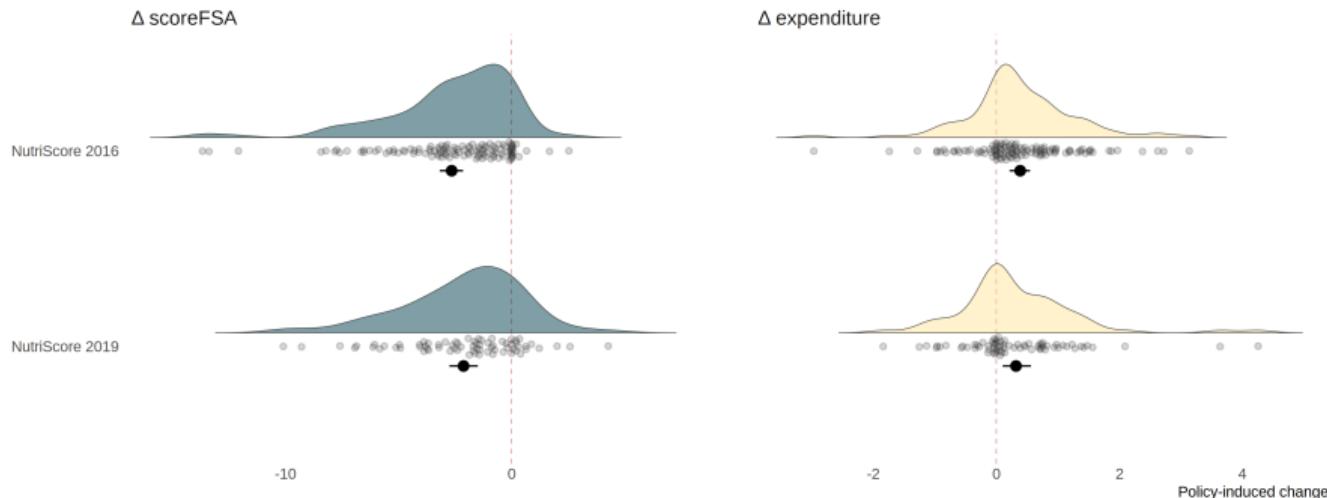
H_p: we will *replicate* the 2016 findings re. NutriScore



Part 2: Study 5 – labels or prices?

Results: replication

	ScoreFSA				Expenditure			
	cart 1	cart 2	difference	p-value	cart 1	cart 2	difference	p-value
NutriScore 2019	3.1 (2.95)	0.97 (3.07)	-2.13 (2.67)	0.205	5.85 (1.64)	6.17 (1.97)	0.32 (0.95)	0.621
NutriScore 2016	4.74 (3.43)	2.09 (3.47)	-2.65 (2.84)		5.24 (1.6)	5.63 (1.65)	0.39 (0.86)	

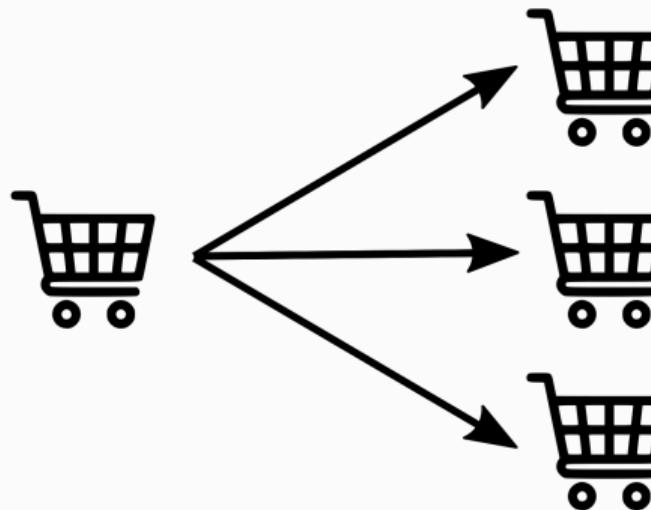




Policy mix additivity

Shopping 1

no policy



Shopping 2

different policies

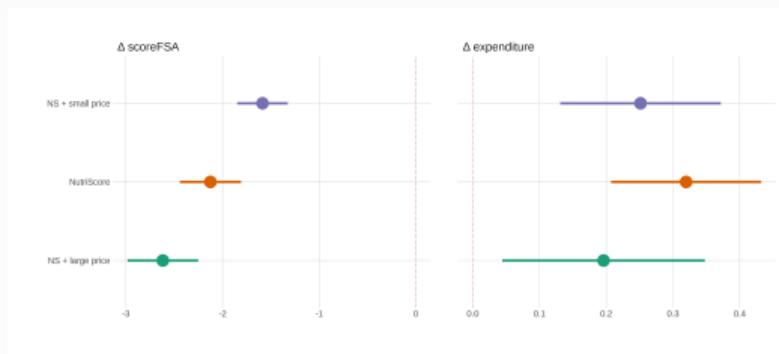


H_p: policies are subadditive: $A \mid B \leq f(A, B) \leq A + B$



Part 2: Study 5 – labels or prices?

Additivity: results





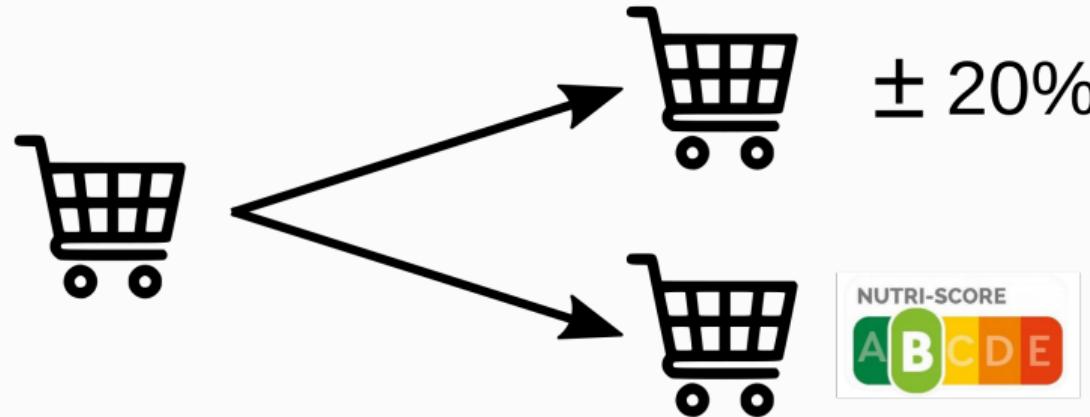
Information vs. incentives

Shopping 1

no policy

Shopping 2

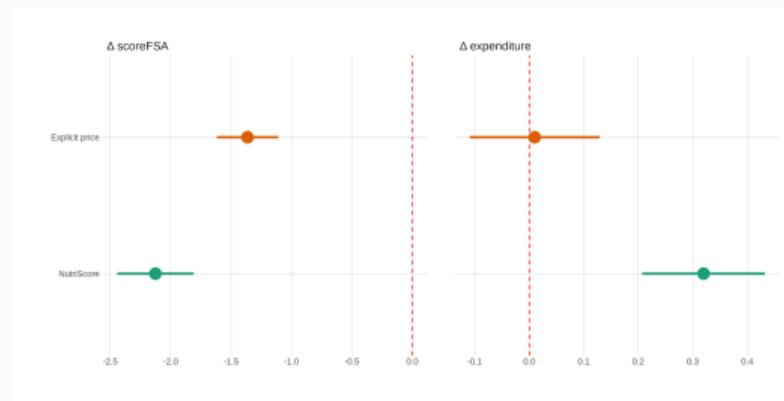
different policies



H_p: Labels have a higher impact than prices



Information vs. incentives: results





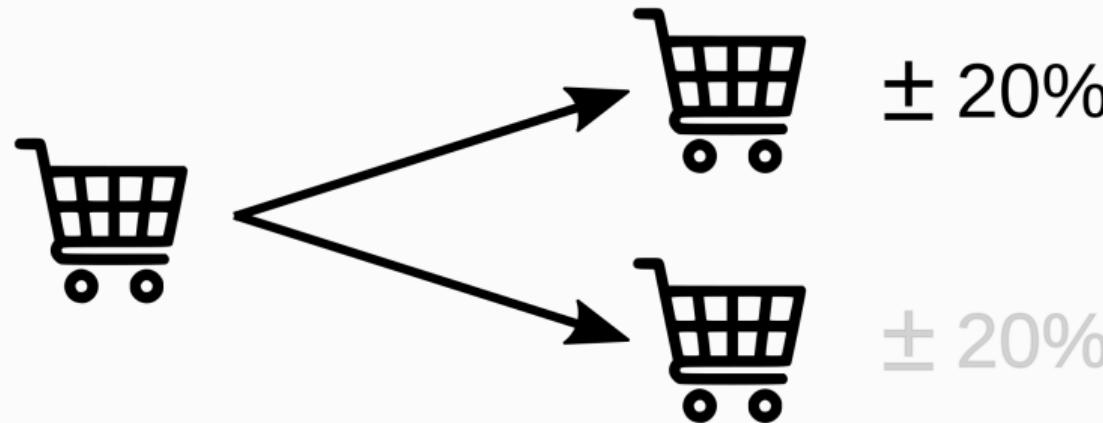
Price salience

Shopping 1

no policy

Shopping 2

different policies

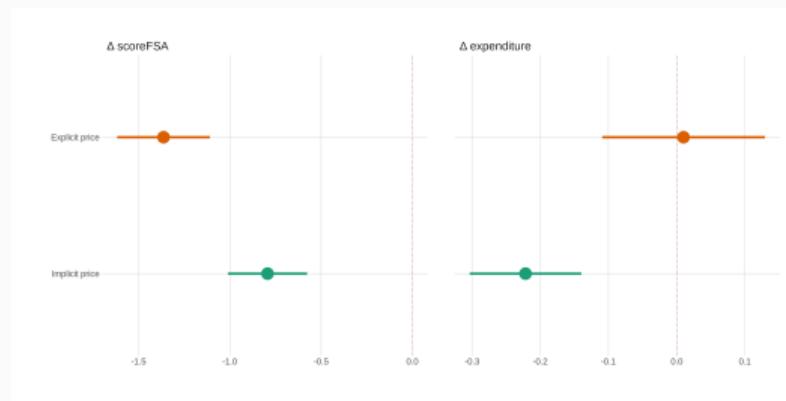


H_p: *salient* price changes have a larger impact



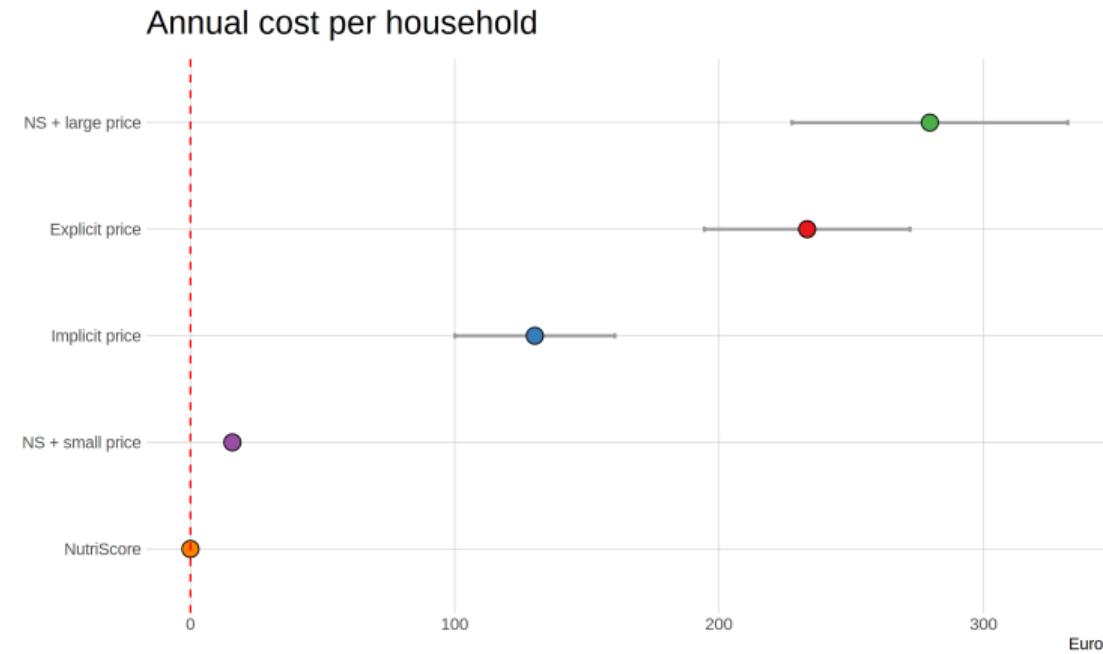
Part 2: Study 5 – labels or prices?

Price salience: results



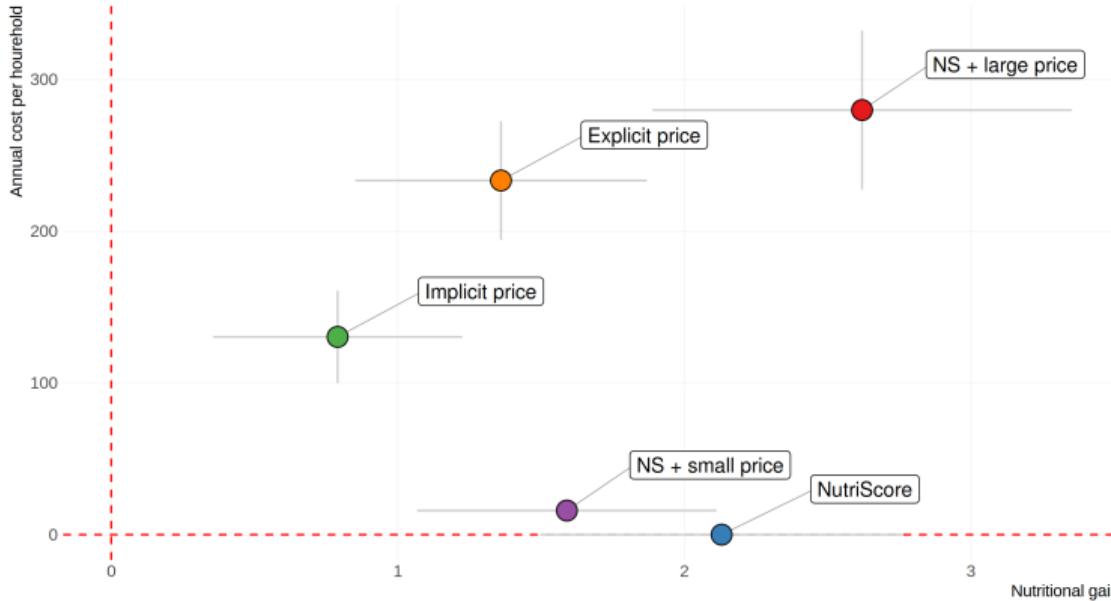


Welfare analysis: cost for the state





Welfare analysis: trade-offs





What do we learn?

- ▶ Nutritional policies are subadditive
- ▶ *Too small* an incentive reduces the effect (Gneezy & Rustichini)
- ▶ Price policies have better be explicit (Chetty et al.)
- ▶ Labeling appears as more cost-effective than the policy mix
- ▶ ...still, it's just the lab!

Part 3:

does it matter?

Study 6:

epidemiological consequences of labels

(with Egnell, d'Almeida, Kesse-Guyot, Muller, Ruffieux, Hercberg, Julia)



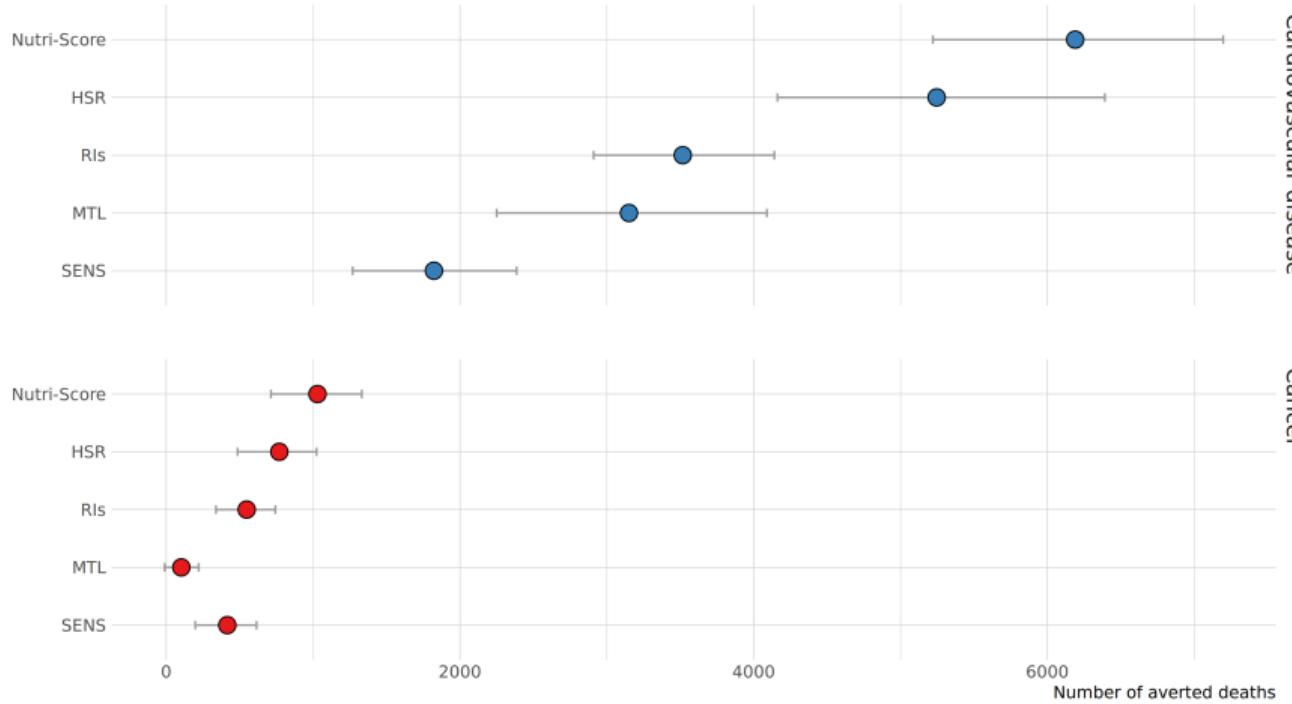
From micro to macro





Part 3: does it matter?

Estimated number of averted deaths, France





What do we learn?

- ▶ Labels have non-negligible impacts on mortality
- ▶ Results from the lab can be used to feed macro models
- ▶ Better, intuitive labels are used and save lives.

What next

for behavioral label research?



Asking an AI: 2022 vs 2024

"Nutritional labeling for human beings"



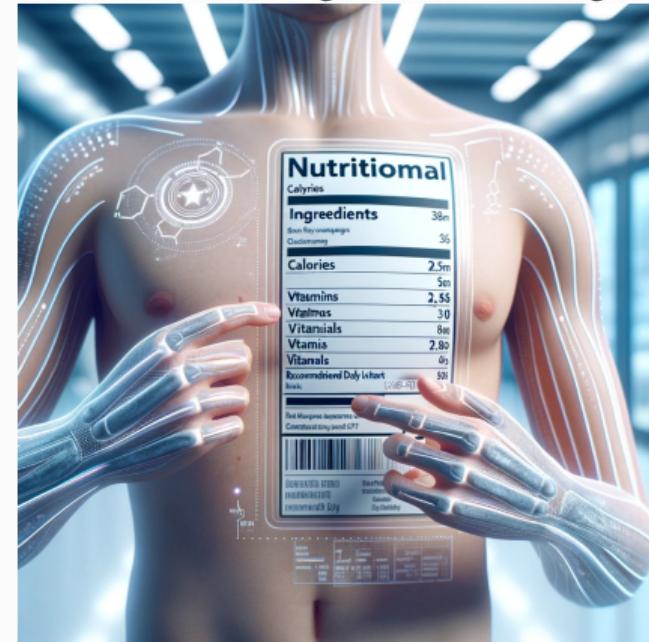


Asking an AI: 2022 vs 2024

"Nutritional labeling for human beings"



"Nutritional labeling for human beings"





Some open questions: consumers

How externally valid are our results?

- ▶ Integration: can all the effects just be summed up?
- ▶ Label proliferation
- ▶ Information overload



Some open questions: consumers

How externally valid are our results?

- ▶ Integration: can all the effects just be summed up?
- ▶ Label proliferation
- ▶ Information overload

What other forces are at play?

- ▶ Cultural arena: the battle for label perception
- ▶ Nutrition vs tradition
- ▶ A contrarian view from Italy



Some open questions: firms

Firms react strategically

- ▶ Price discrimination
- ▶ Multiple labeling
- ▶ Labels as anti-competitive devices



Some open questions: firms

Firms react strategically

- ▶ Price discrimination
- ▶ Multiple labeling
- ▶ Labels as anti-competitive devices

Interaction firm/consumers

- ▶ Labels working for the *wrong* reasons
- ▶ Normative messages
- ▶ "*Bisogna che tutto cambi, affinché tutto resti uguale*"

Summing up – what do we learn?

*mechanisms, counterfactuals, and the
back-and-forth*



The role of behavioral public policy

Getting into the mind of subjects



The role of behavioral public policy

Getting into the mind of subjects

Building counterfactuals

- ▶ focus on cognitive aspects
- ▶ clearly identify mechanisms
- ▶ (if needed) sidestep preferences
- ▶ heuristics, choice processes



The role of behavioral public policy

Getting into the mind of subjects

- ▶ focus on cognitive aspects
- ▶ clearly identify mechanisms
- ▶ (if needed) sidestep preferences
- ▶ heuristics, choice processes

Building counterfactuals

- ▶ explore different scenarios
- ▶ integrate preferences with control
- ▶ track macro consequences
- ▶ cheaply explore solutions



Your exam- getting back and forth

Take-home 4-pages report a paper

The article report is made up of **three parts**:

1. 1-page summary of the paper and main results;
2. 1-page critique of experiment: what are the weak points? Does it lack in external/internal validity?
3. 2-page alternative design proposal: transition from *mechanism* to *counterfactual*
 - ▶ if the paper studies a *mechanism*, propose a **counterfactual** study (lab or field)
 - ▶ if the paper studies a *counterfactual*, propose a **mechanism** study (lab or field)
 - ▶ the design includes a data analysis plan, that roughly describes what data and what analyses you'll carry out on the paper.

More details in the Exam Rules pdf on github