Nutritional policy design

Behavioral insights from the lab to the field

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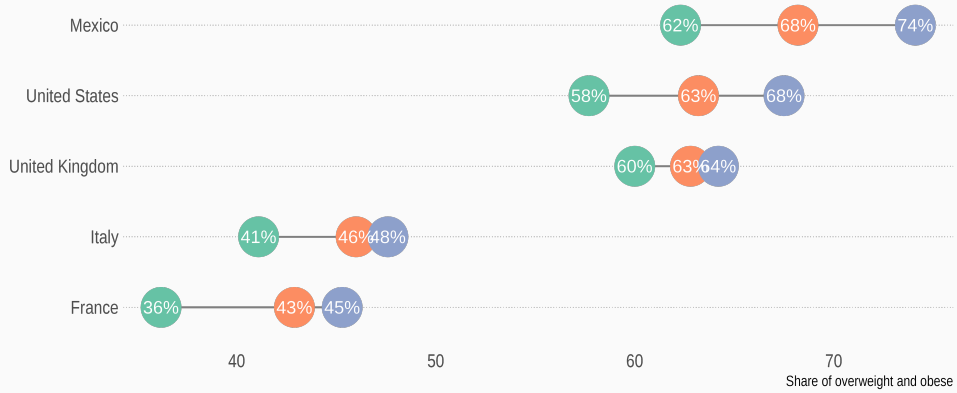
The problem

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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- Middle EAST 5% GDP

Environment-related costs

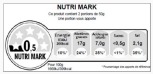
- Food: 34% of GHG emissions
- Obesity: 1.4% extra
- 14% more transport emissions
- 140Mt excess consumption

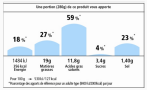
What tools do we have?

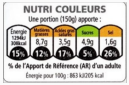
- Regulation
- Information
- Labeling
- Price policies
- Nudges
- ...

This talk

- Regulation
- Information
- **Labeling**
- **Price policies**
- Nudges
- …







+

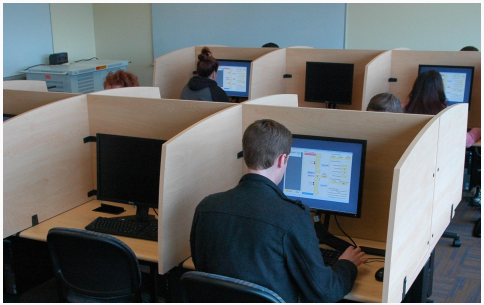
Fat **tax** & thin **subsidy**

A series of key policy questions

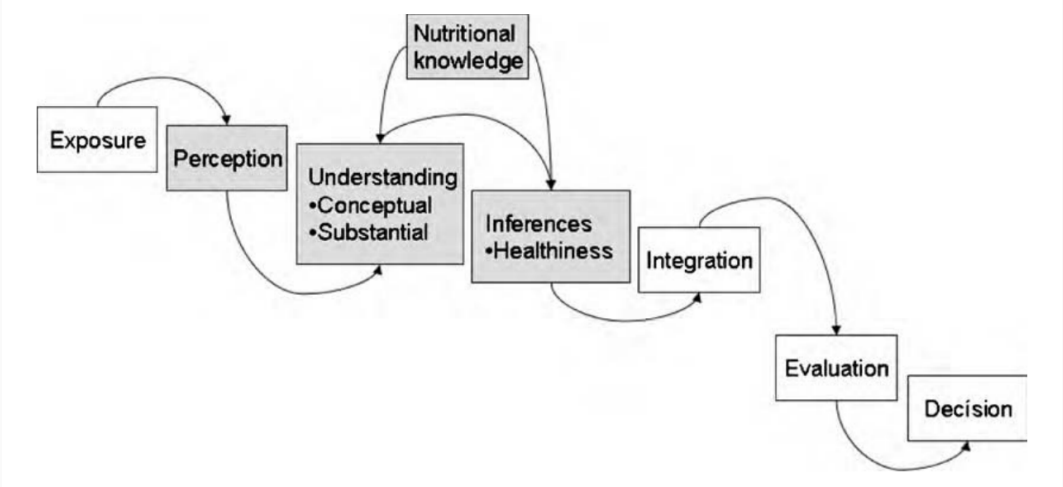
- Do **labels** work?
- Which label design is the **best** to **impact** choice?
- **How much** of an impact labels have?
- Do **price** interventions work?
- Do they work **better** or **worse** than labels?
- How do the two policies **interact**?

Which role for the lab?

What can we learn from the lab?



A conceptual framework (Grunert)



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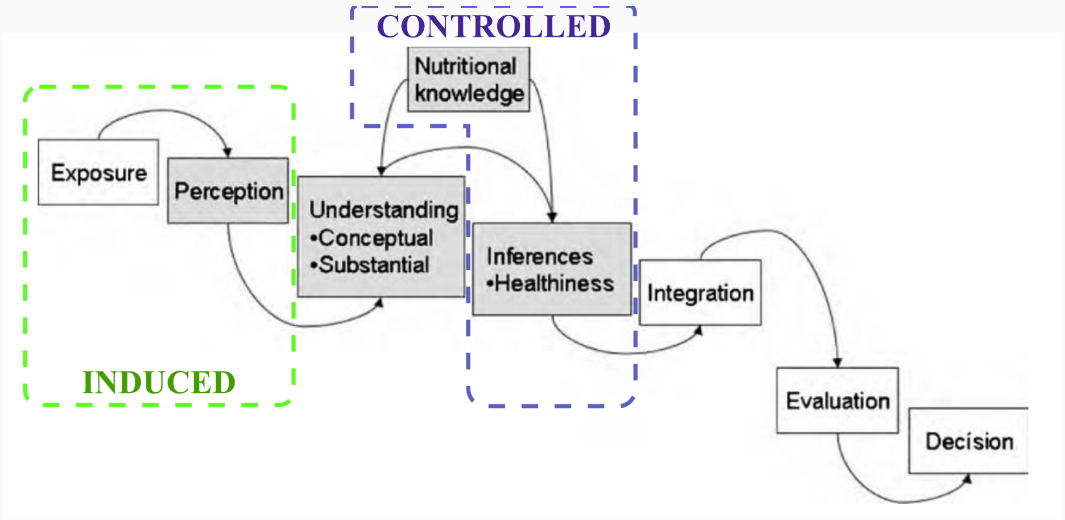


Two main roles of the lab in an applied policy context

Getting into the mind of subjects

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

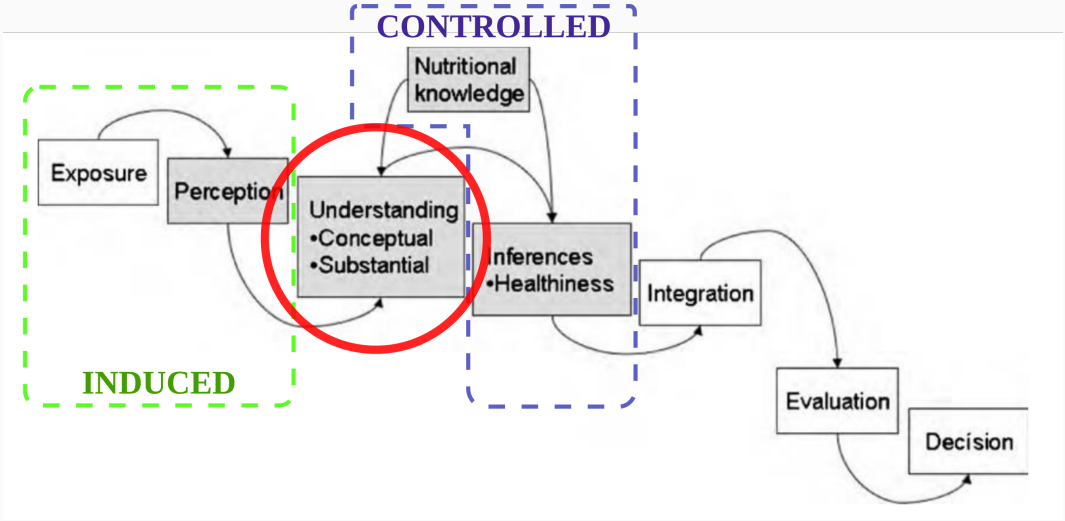
Two main roles of the lab in an applied policy context

Building counterfactuals

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

Part 1: into the mind of subjects

Getting into the mind of subjects



The usual design

The usual design

Study 1: building *diets*
[JoEP 2015 – L. Muller, B. Ruffieux]

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** & satisfy nutritional constraints
- subject guided by labels: **numbers**, **colors**, or **both**.

Incentives

- If diet satisfies nutritional constraints $\Rightarrow$ flat fee (2 euro)
- Several daily diets to build

Our design: diet-building

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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Labels can have numbers, or colors, or **both**:

Numbers modeled on Reference Intakes

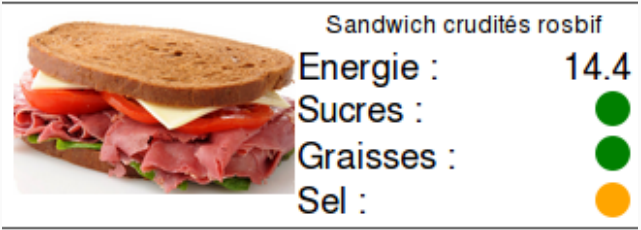
Colors modeled on Traffic Lights

Num+col both of the above combined

Numbers

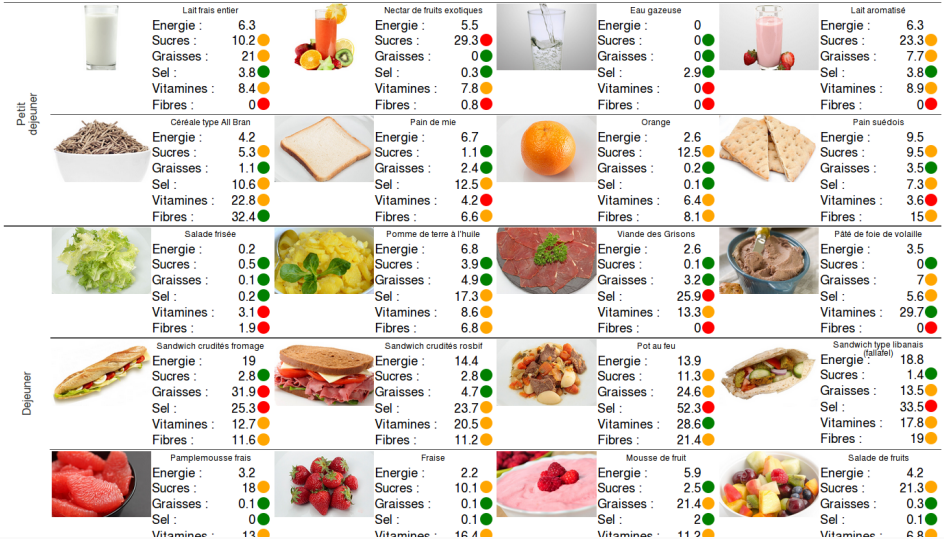
Tarte aux poireaux	
Energie :	12.3
Sucres :	1.7
Graisses :	46.4
Sel :	19.1

Colors



Numbers + colors

A number + colors screen, 7 constraints



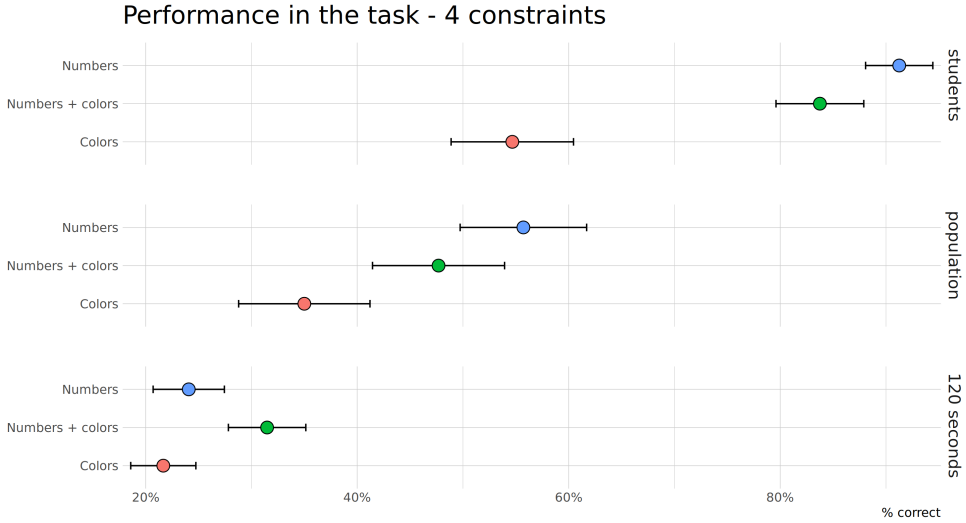
Two populations, three conditions

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


Performance in the task - 4 constraints
Numbers
Numbers + colors
Colors
students
Numbers
Numbers + colors
Colors
population
Numbers
Numbers + colors
Colors
120 seconds
20%
40%
60%
80%
% correct

What do we learn?

Numeric lables **win**, *in a task that was tilted int heir favor*, **only**:

- among a *very* high skilled population
- with plenty of time and computational aid (paper and pencil)

But if *time* and *cognitive resources* are **limited**

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

Study 2: *fast* vs. *slow* decisions [WIP – L. Muller]

Food choice: fast or slow?

Food choice: fast or 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

Nutrition Facts

Serving Size 2 CUPS (30g)
Servings per Container VARIED

Amount per Serving

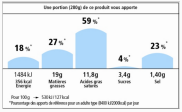
Calories 150	Calories from Fat 70
	% Daily Value*
Total Fat 7g	**11%**
Saturated Fat 1.5g	**6%**
Cholesterol 0mg	**0%**
Sodium 120mg	**5%**
Total Carbohydrate 20g	**7%**
Dietary Fiber 4g	**15%**
Sugars 9g	
Protein 1g	

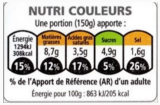
Vitamin A 0% •	Vitamin C 0%
Calcium 0% •	Iron 2%

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

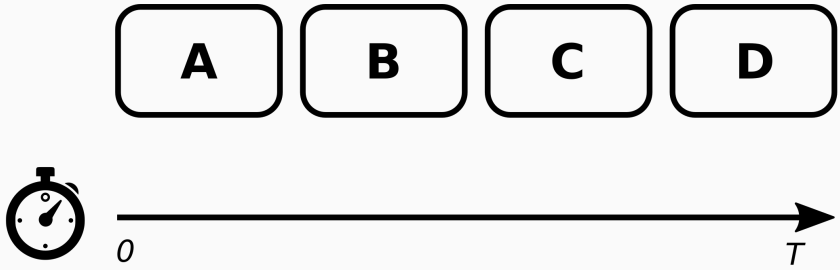
	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4





A special input mechanism: don't take your time!



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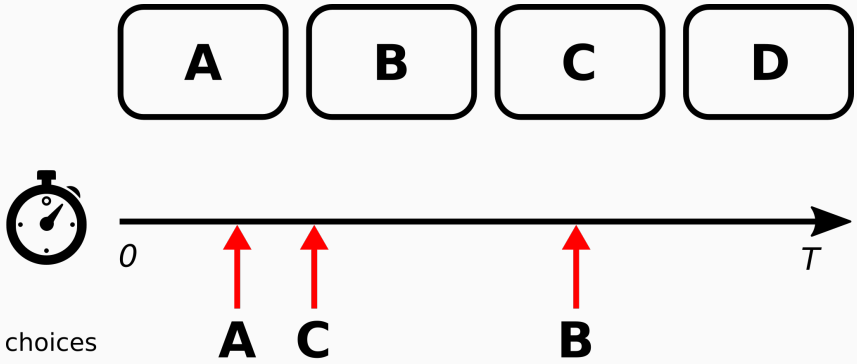

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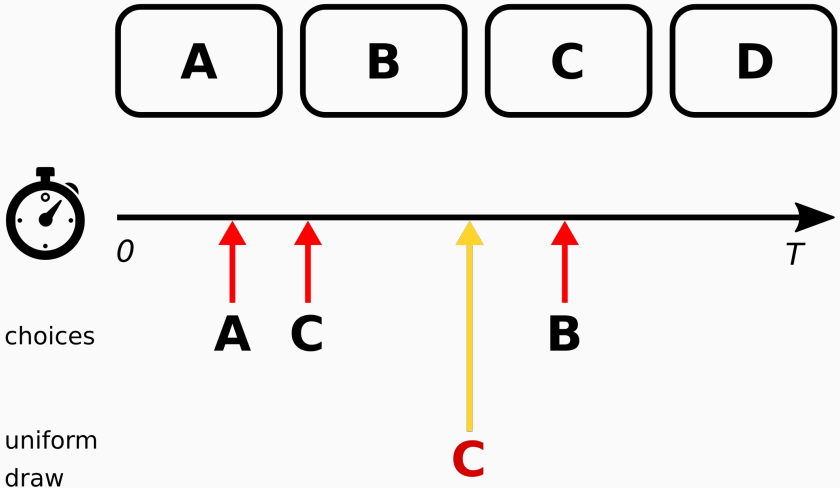

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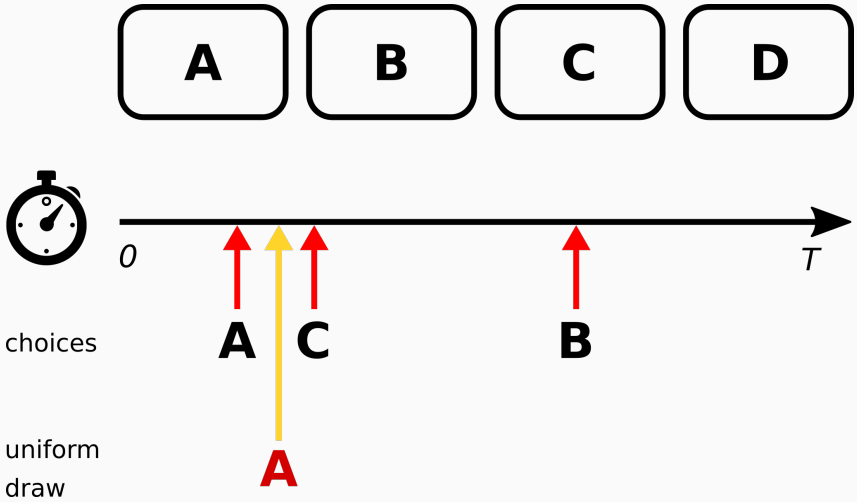

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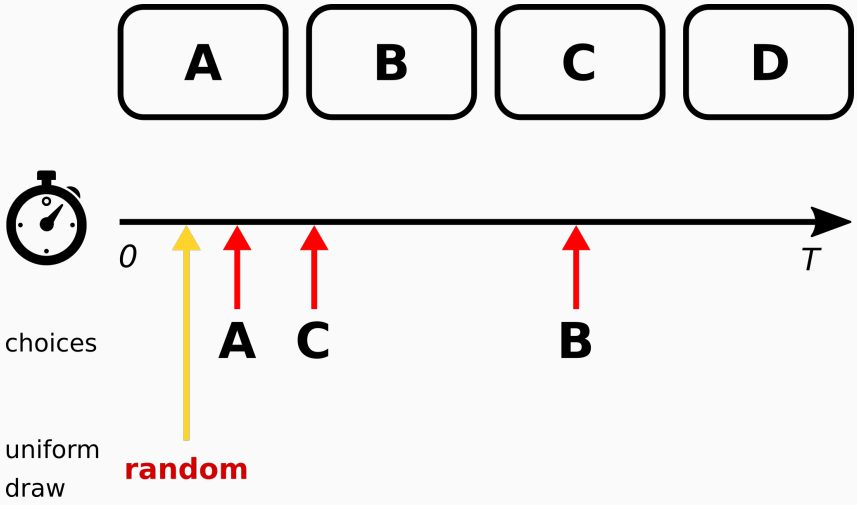


Our design

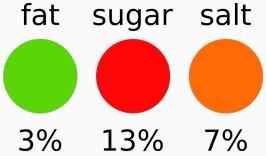
- No choice $\Rightarrow$ random choice: incentive to *fast* reply
- Time is ticking: incentive to *change* first decision upon reflection

- 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



fat sugar salt

3% 13% 7%

Barres au chocolat au lait et aux céréales

Choisir

Barres chocolatées fourrées au lait et aux noisettes

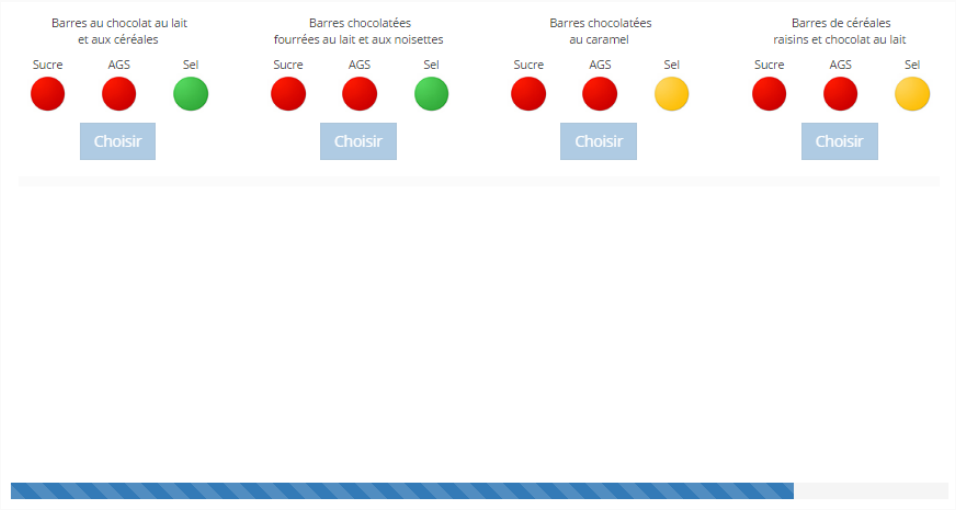
Choisir

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

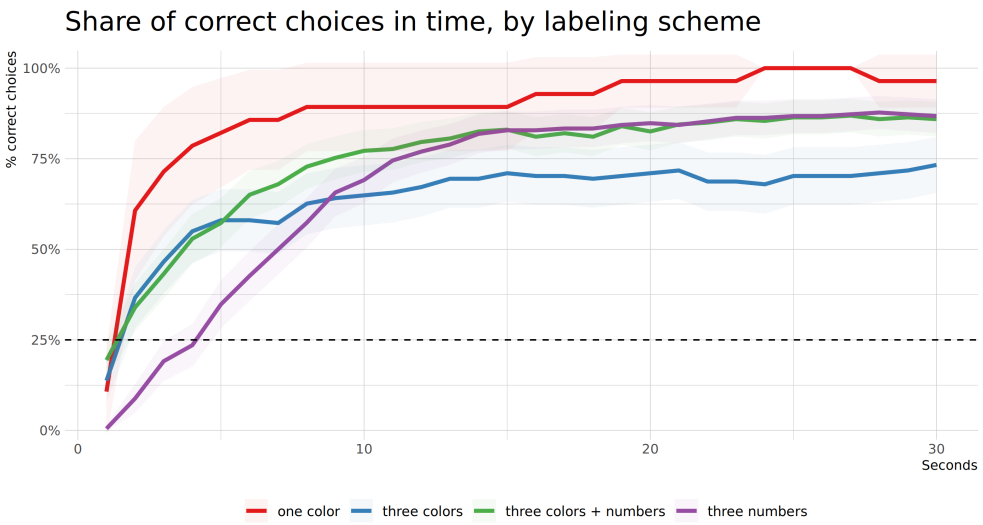
Sucres	AGS	Sel
69%	42%	7%

Choisir

Barres de céréales raisins et chocolat au lait

Sucres	AGS	Sel
34%	27%	9%

Choisir

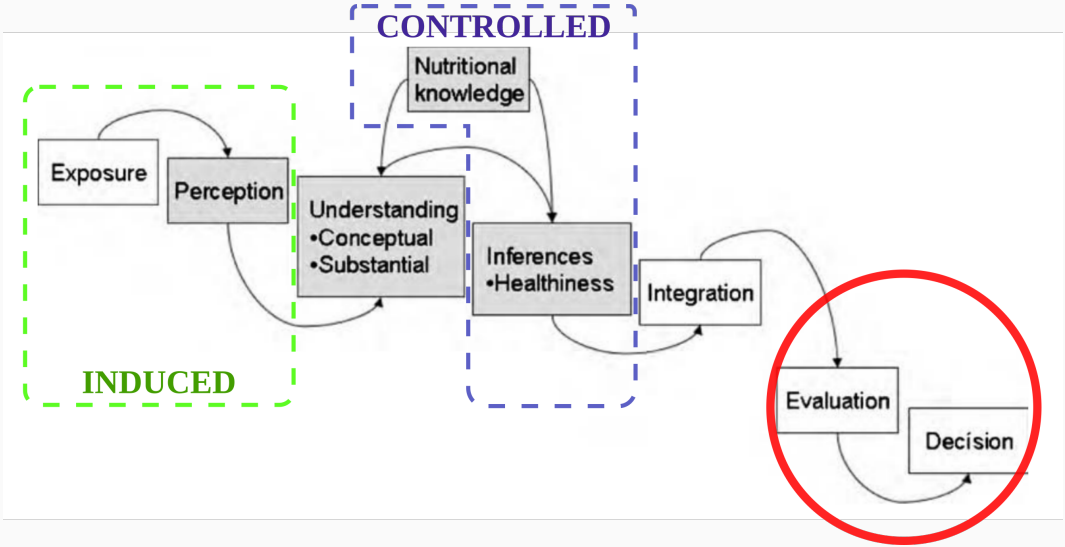

Share of correct choices in time, by labeling scheme
% correct choices
100%
75%
50%
25%
0%
0
10
20
30
Seconds
one color
three colors
three colors + numbers
three numbers
from Fast&Slow labels, wip

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



Study 3: shopping with labels [ERAE 2019 – L. Muller, B. Ruffieux, A. Lacroix]

Some French context

NUTRI-SCORE

A B C D E

Inserm

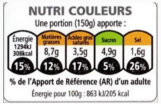
La science pour la santé
From science to health

ania

Association Nationale des Industries Alimentaires

fcd Fédération du Commerce et de la Distribution

Ex-ante policy evaluations, 2016-17



French Ministry of Health – 2016

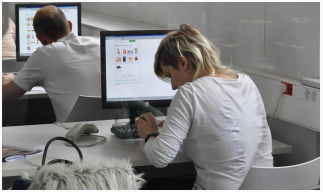
- Which FoPL to choose?
- How large is the effect?

- A RCT in 60 French supermarket
- A large lab experiment (**us!**)

Our setup

Paper catalog

Computer interface

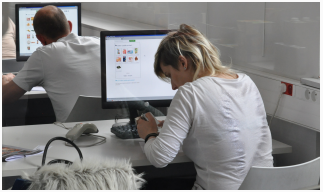


Real products

Our setup

Paper catalog

Computer interface



Real products

- Subjects shop for real in the lab
- For two days for their household

- $\sim \frac{1}{4}$ 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

Ingrédients 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 €

Terminer

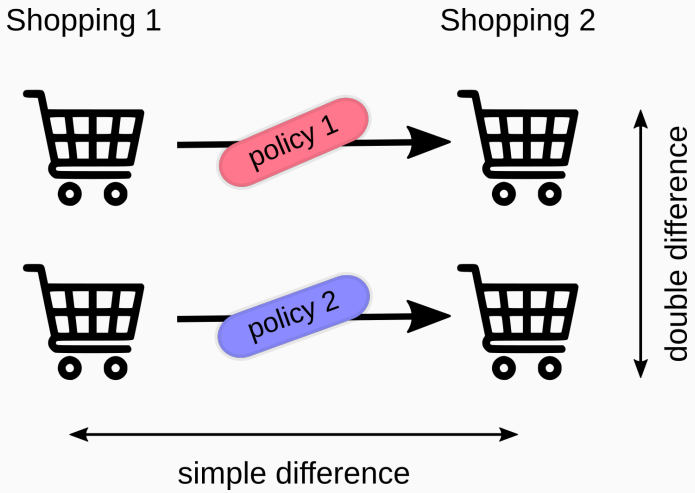
1,62 €
180 g
9,00 €/Kg

1 Ajouter au caddie

Frites surgelées pour micro-ondes

Ingrédients | Valeurs nutritionnelles

Experimental design: difference-in-difference



Treatments

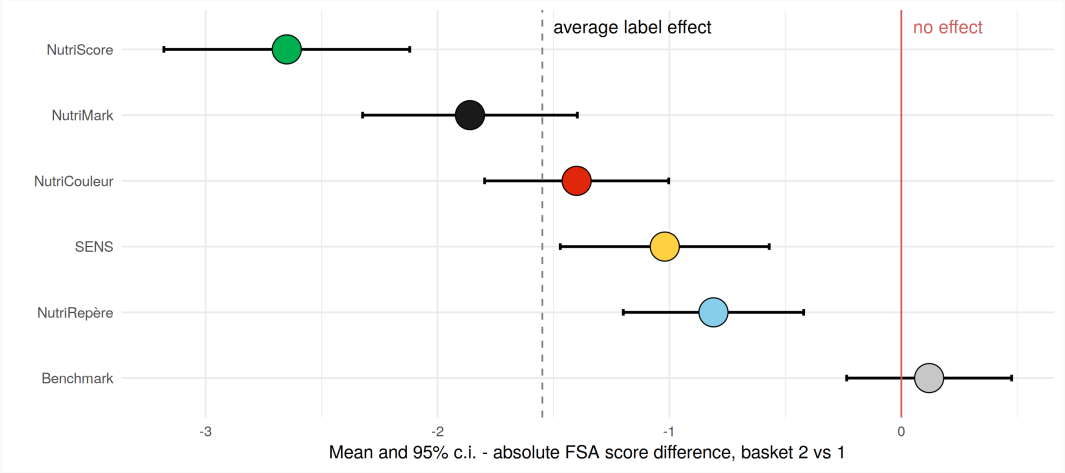
Shopping 1
no label

Shopping 2
different labels

A large and representative subject pool

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

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
MAGGIORANZA..150
FAVOREVOLI...299
CONTRARI.....0
APPROVATO
MARTEDI'
10
OTTOBRE

Study 4: Lab vs. Field [with L. Muller]

Lab vs Field at a glance

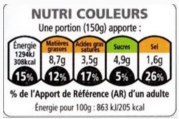
	Lab	Field
Location	Grenoble	Paris couronne, Nord, Lyon
Supermarkets	"1"	60
Task	shop for two days' worth	shop
Real purchases	"yes"	yes
Measure	FSA score for 2000Kcal	FSA score for 2000Kcal
Design	Diff-in-diff	Diff-in-diff
Time frame	2x, same session	5 weeks, 1 year apart
Participants	691	171.827
Products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

Field study: "instructions"

Field study: product display

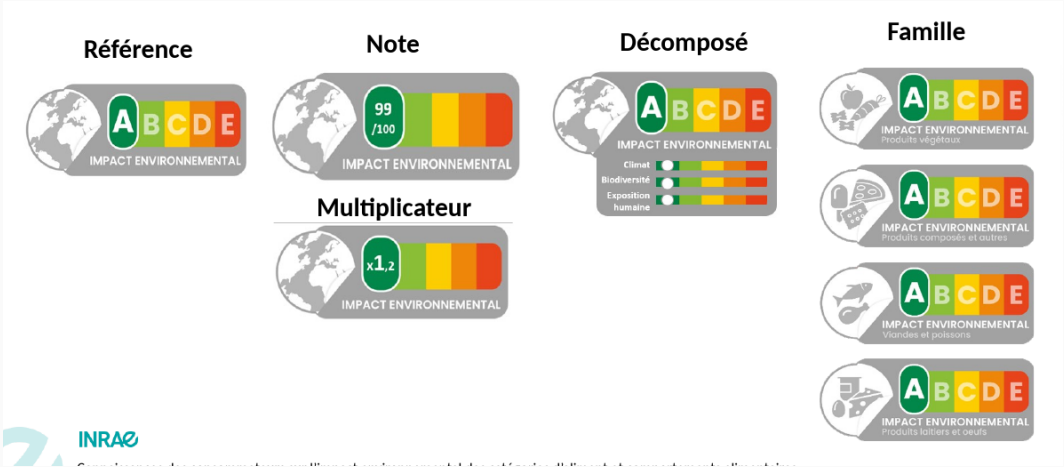
Field study: alerting the subject to the experimentation

Results: the lab as a magnifying glass

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

Study 5: environmental labels? [WIP – P. De Lattre, L. Muller]

The design can be used for environmental labels too



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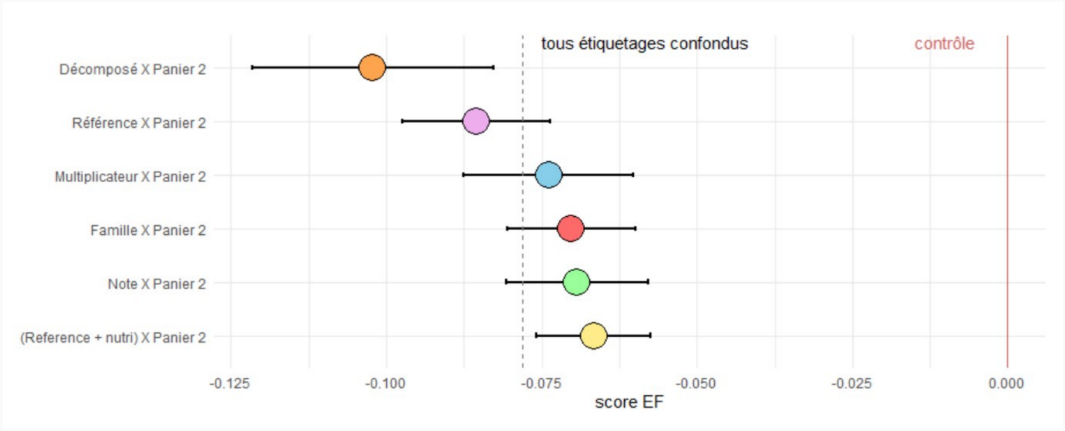
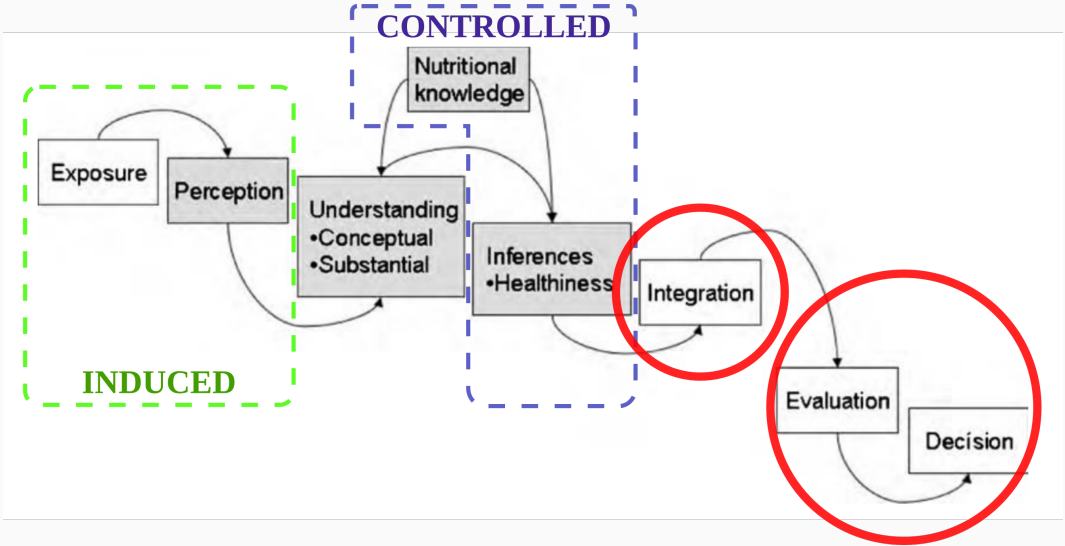


What do we learn?

- Consumer seem to take environmental labels into account
- Small effects
- Different formats do not make different impacts

Study 6: labels or prices?
[JEBO 2023 – L. Muller, B. Ruffieux]

Integrating different policies



A bit of context

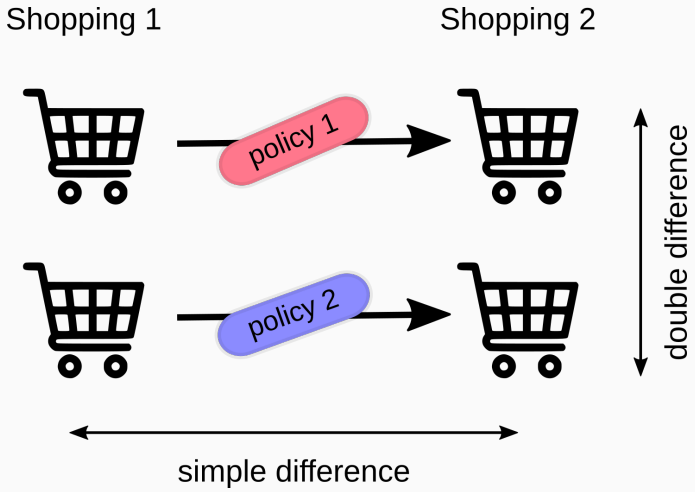
- World Bank: strongly tax unhealthy foods (Shekar and Popkin 2020)
- WHO: introduce dietary taxes on unhealthy food of minimum 20%
- India and Mexico tax unhealthy food & beverages (India : tax of 28%).

Question and design

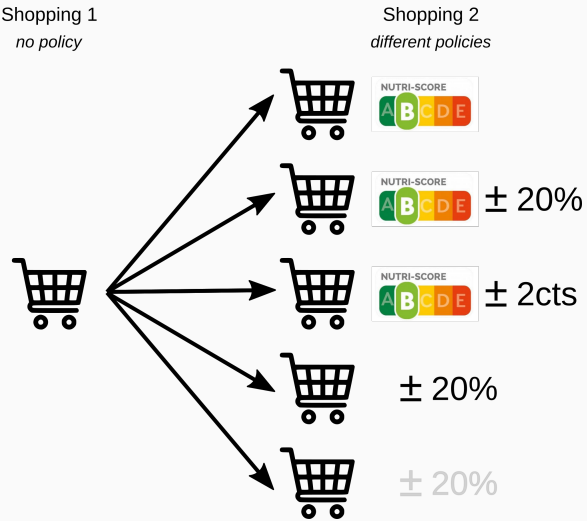
- Suppose we want to couple a **label** with an **incentive** scheme
- e.g. tax unhealthy (soda tax) and subsidize healthy food.
- Does it work? How?
- Will the intervention be (sub/super)additive?
- i.e. label **or** price $\gtrless$ label **plus** price?

Exact same design as Study 2

Experimental design: difference-in-difference



Treatments


Shopping 1
no policy
Shopping 2
different policies
NUTRI-SCORE
A B C D E
± 20%
NUTRI-SCORE
A B C D E
± 2cts
NUTRI-SCORE
A B C D E
± 20%
± 20%

A large price change: ±10% or 20%

A small price change: ± 1 or 2cents

Stimuli

Référence
Sans Nutri-Score
sans Bonus-Malus

Traitement 1
Nutri-Score
sans Bonus-Malus

Traitement 2
Nutri-Score
avec Bonus-Malus explicite
ad valorem
de niveau élevé

Traitement 3
Nutri-Score
avec Bonus-Malus explicite
par unité de
niveau symbolique

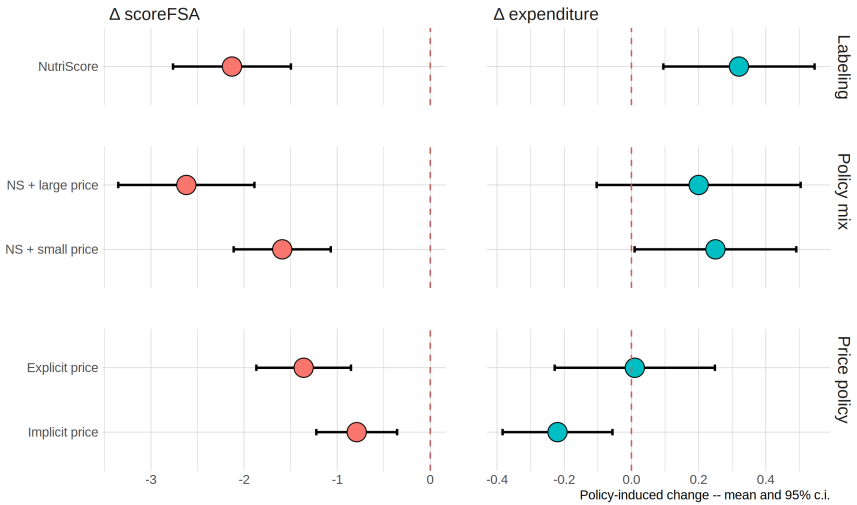
Traitement 4
Bonus-Malus implicite
ad valorem
de niveau élevé

Traitement 5
Bonus-Malus explicite
ad valorem
de niveau élevé

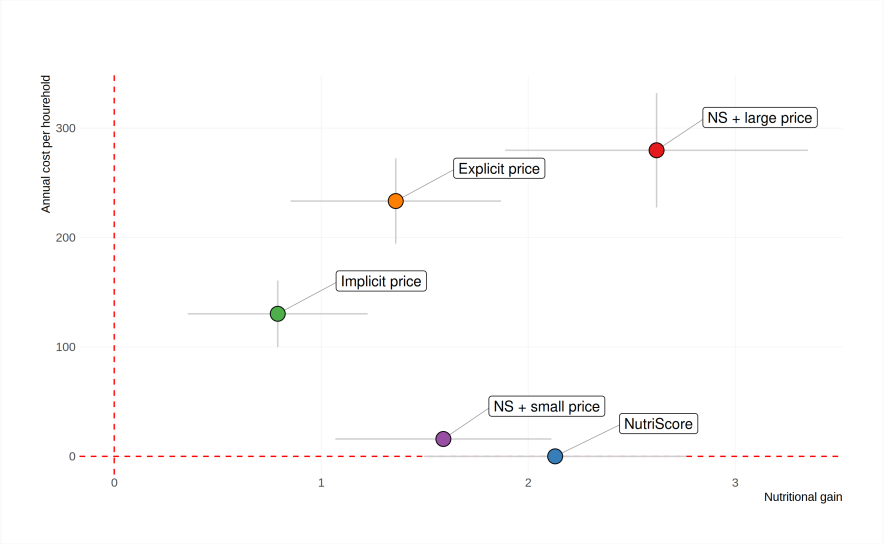
A large(ish) and representative subject pool

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

Results


Δ scoreFSA
Δ expenditure
NutriScore
NS + large price
NS + small price
Explicit price
Implicit price
Labeling
Policy mix
Price policy
-3
-2
-1
0
-0.4
-0.2
0.0
0.2
0.4
Policy-induced change -- mean and 95% c.i.

Welfare analysis: trade-offs



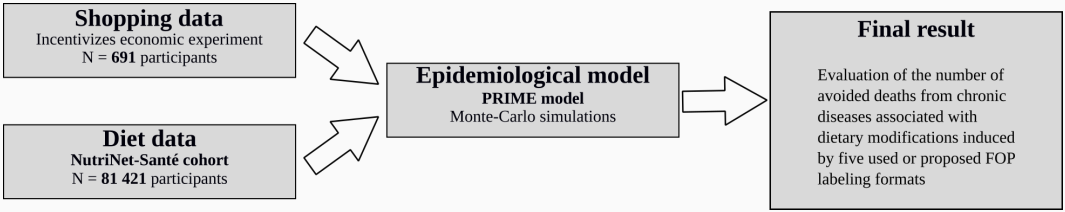
What do we learn?

- 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!

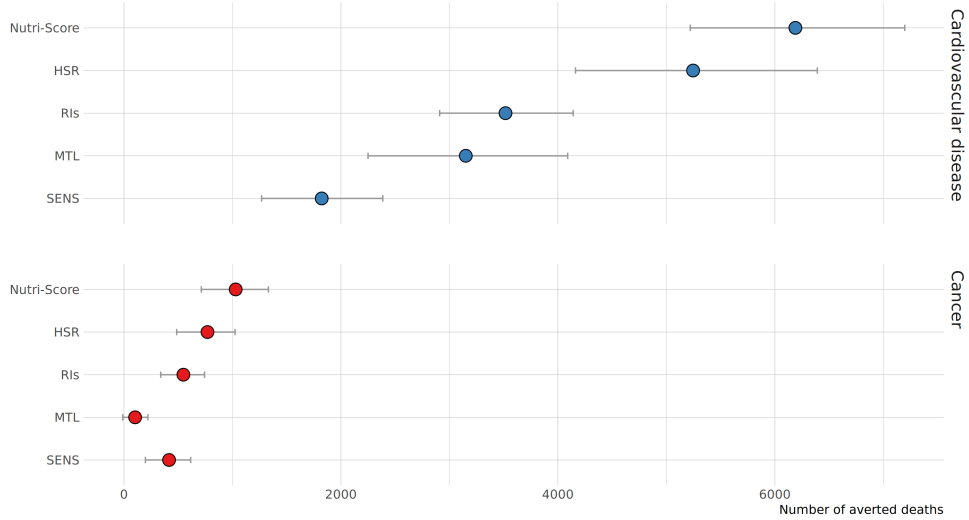
Part 3: does it matter?

Study 7: epidemiology
[IJBNPA 2019 – S. Hercberg et al]

From micro to macro



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.

Open questions

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*"

Thank you

References

Links to papers

Study 1 J Eco Psy 2015 – Numbers or Colors?

Study 3 Er Rev Ag Econ 2019 – 5 labels comparison

Study 6 JEBO 2023 – Labels or prices?

Study 7 IJBNPA 2019 – Tracking macro health consequences