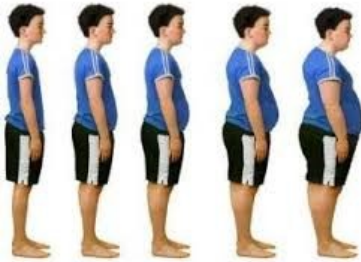




Context

Changing consumers behavior toward sustainable consumption



- **Obesity epidemic** rates have more than doubled since the 1970's (National Center for Health Statistics, 2009)
- More than one-third of U.S. adults are obese (Flegal et al., 2016)
- Obesity is a leading public health problem in the U.S. (Ogden et al., 2016)
- Annual health care costs in the United States stemming from obesity approaches **\$240 billion** (Schlosser, 2012)

• **Global warming :**
0.8° rise in
mean



Context

Changing consumers behavior toward sustainable consumption

What are the tools at the disposal of the public deciders?

Improving social welfare by :

- solving market failures...
 - Fixing externalities through taxes and subsidies (eg. fat tax)
 - Providing the consumer with all the useful information (eg. Nutrition Labeling and Education Act)
- Helping consumers to avoid self-destructing decisions
 - Rating food items (eg. Traffic lights)
 - Nudging - also called *asymetric paternalism* (Camerer et al, 2003) or *libertarian paternalism* (Thaler & Sunstein, 2003)



Context

Changing consumers behavior toward sustainable consumption

Use of framed-field experiments to evaluate policies

- **Study based on real purchase** rather than stated intentions or demand estimates
Self-reported studies can generate socially desirable answers
- **Observation of the whole food baskets** rather than one specific items or one product family
Global evaluation is not possible when all possible substitutions are not considered
- ***Ceteris paribus* conditions** rather than natural environment
Causality relationship can be unclear due to many explicative variables

Also : **Real consumers** for representativeness and **reproducibility** for robustness

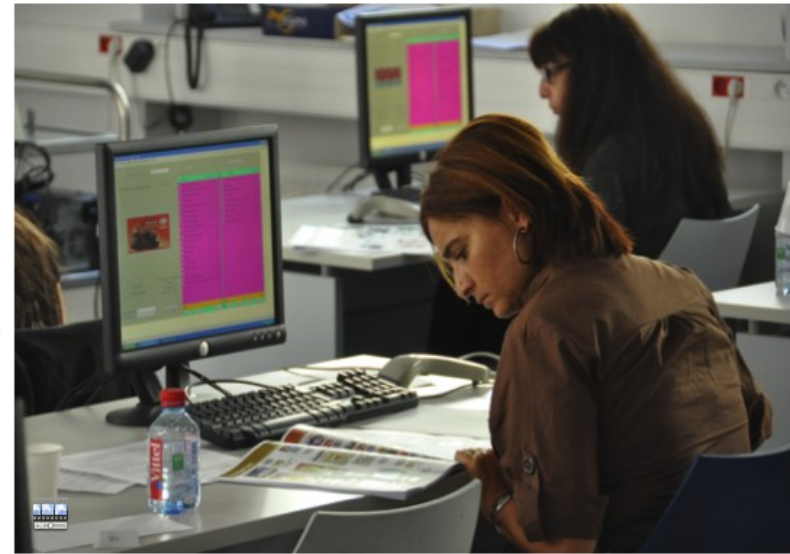


Context

Changing consumers behavior toward sustainable consumption

Use of framed-field experiments to evaluate policies

- Consumers are invited to do their food shopping in our laboratory store.
- We observe them *before* and *after* the implementation of a policy

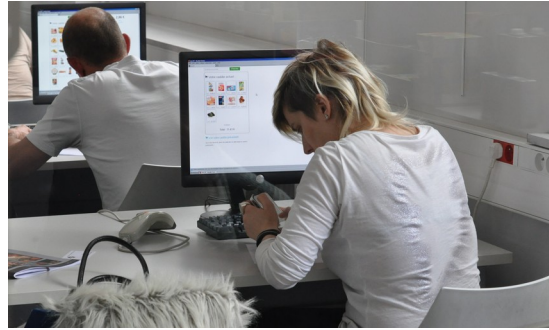


The laboratory store

Paper catalogue



Computer interface



Real products



- The food catalogue lists 290 food items distributed in 37 food categories
- Items pop up on the computer screen when they are scanned with a barcode reader
- On screen, subjects have access to more information about the selected item and can, if they are willing to, place it in their shopping basket
- For each item, we have price (as observed in supermarkets), weight, ingredients, nutrient composition, environmental impact (CO_2 , SO_2 , PO_3)
- A subset (1/4) of the food supply is hidden from the subjects in a back office. If items from the food basket are actually available, subjects purchase them at the end of the experiment at the posted price

Food Catalogue

Viandes

2 STEAKS HACHÉS PUR BŒUF 15 % MG

4,25 €

280 g

16,35 €/kg



2 STEAKS HACHÉS DE VIANDE CHAROLAISE
FAÇON BOUCHÈRE 5%MG

3,80 €

250 g

15,20 €/kg



CÔTE PREMIÈRE DE PORC

1,52 €

200 g

7,60 €/kg



2 TRANCHES DE RÔTI DE PORC

1,26 €

100 g

12,60 €/kg



2 FILETS DE POULET

3,84 €

320 g

12,00 €/kg



4

Viandes

TRANCHE DE GIGOT D'AGNEAU

1,69 €

100 g

16,90 €/kg



ENTRECÔTE DE BŒUF

4,57 €

200 g

22,85 €/kg



8 CORDONS BLEUS DE VOLAILLE

2,82 €

800 g

3,53 €/kg



AIGUILLETTES DE POULET PANÉ

2,35 €

200 g

11,75 €/kg



5

7

Computer interface



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](#)

Computer interface



Computer interface

The screenshot displays a web application interface. On the left, a sidebar contains a search bar labeled 'Scannez un produit', a shopping cart icon with the text 'Votre ca', and a status message 'Aucun produit da'. Below this is a blue button labeled 'Terminer'. The main content area features a modal window titled '2 Steaks hachés pur boeuf 15% mg'. Inside the modal, the heading 'Valeurs nutritionnelles' is followed by the text 'Pour 100g de produit :'. A table lists the following nutritional values: Energie : 129 Kcal, Lipides : 5,00 g (with a sub-entry 'donc Acides Gras Saturés : 2,30 g'), Glucides : 0,00 g (with a sub-entry 'dont sucres : 0,00 g'), Protéines : 21,00 g, and Sel : 0,23 mg. At the bottom of the modal are two buttons: 'Ingrédients' and 'Fermer'. Below the modal, two tabs are visible: 'Ingrédients' and 'Valeurs nutritionnelles', with the latter being the active tab.

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


Ingrédients Fermer

Ingrédients Valeurs nutritionnelles

Computer interface

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

4,25 €
260 g
16,35 €/Kg



[Ingrédients](#) [Valeurs nutritionnelles](#)

Computer interface

1814

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 +

Frites surgelées pour micro-ondes

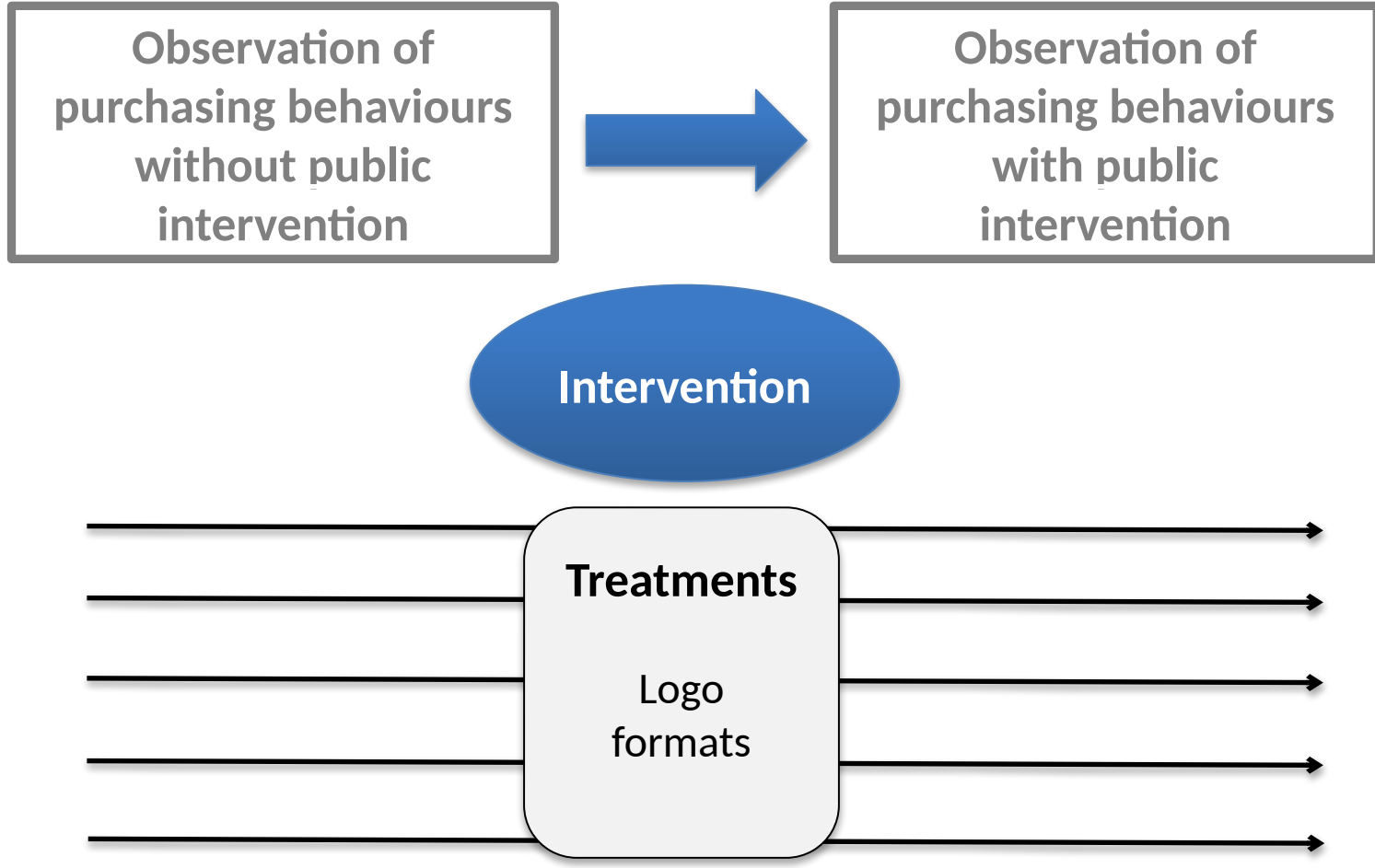


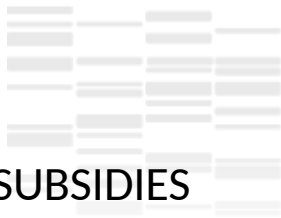
Ingrédients

Valeurs nutritionnelles

Experimental Protocol

Task: Composition of a food shopping cart for 2 days for the household





Some policies already tested...

TAXES AND SUBSIDIES

- Muller, Lacroix, Lusk & Ruffieux « Distributional Impacts of Fat Taxes and Thin Subsidies » *The Economic Journal*, 2016
- Darmon, Lacroix, Muller & Ruffieux « Food price policies improve diet quality while increasing socioeconomic inequalities in nutrition », *International Journal of Behavioral Nutrition and Physical Activity*, 2014

INFORMATION AND POLICY MIX

- Jo, Muller, Ruffieux & Lusk « Value of parsimonious nutritional information in a framed field experiment », *Food Policy*, 2016

LOGO FORMATS

- Muller & Ruffieux « Shopper's behavioural responses to 'front-of-pack' nutrition logo formats: GDA Diet-Logo vs. 6 alternative Choice-Logos » Muller and Ruffieux, under revision in *Food Quality and Preference*
- Crosetto, Muller & Ruffieux « Consumers' response to two front-of-pack labels: *Reference Intake vs. Multiple Traffic Lights* » Working paper

ENVIRONMENTAL LOGOS

- Lacroix, Muller & Ruffieux « Environmental labeling and consumption changes: A food choice experiment » Working paper



Today's example: RI vs. TL

Reference Intake

Each portion contains

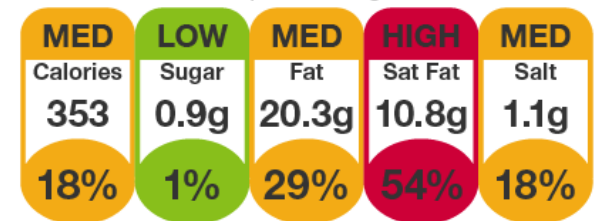


of an adult's Guideline Daily Amount

- Indicates the proportion of each nutrient according to recommended daily values
- Origin: UK, adopted in the UE (2009, standard industriel), Australia (2006, *Daily Intake Guide*) et US (2012, *Facts up fronts*)

Multiple Traffic Lights

Each 1/2 pack serving contains



of your guideline daily amount

Source: Food Standards Agency

- Ranks sugars, fat, saturated acids and salt by assigning colours
- Recommended by British Food Agency Standard. Litigation proceedings opened by the European Commission in 2014.

Viandes

2 STEAKS HACHÉS PUR BŒUF 15 % MG

4,25 €

260 g

16,35 €/kg



	Energie	Sucre	Lipides	AGS	Sel
Information Nutritionnelle pour 130 g	168 kcal 8 %	0,0 g 0 %	6,5 g 9 %	3,0 g 15 %	0,12 mg 2 %

CÔTE PREMIÈRE DE PORC

1,52 €

200 g

7,60 €/kg



	Energie	Sucre	Lipides	AGS	Sel
Information Nutritionnelle pour 125 g	339 kcal 17 %	0,0 g 0 %	29,4 g 42 %	13,1 g 66 %	0 mg 0 %

2 STEAKS HACHÉS DE VIANDE CHAROLAISE FAÇON BOUCHÈRE 5% MG

3,80 €

250 g

15,20 €/kg



	Energie	Sucre	Lipides	AGS	Sel
Information Nutritionnelle pour 125 g	151 kcal 8 %	0,0 g 0 %	5,9 g 8 %	2,1 g 10 %	0,07 mg 1 %

2 TRANCHES DE RÔTI DE PORC

1,26 €

100 g

12,60 €/kg



	Energie	Sucre	Lipides	AGS	Sel
Information Nutritionnelle pour 80 g	95 kcal 5 %	0,7 g 1 %	2,4 g 3 %	0,9 g 4 %	0,57 mg 9 %

2 FILETS DE POULET

3,84 €

320 g

12,00 €/kg



	Energie	Sucre	Lipides	AGS	Sel
Information Nutritionnelle pour 160 g	173 kcal 9 %	0,0 g 0 %	1,1 g 2 %	0,0 g 0 %	0 mg 0 %

4

Viandes

2 STEAKS HACHÉS PUR BŒUF 15 % MG

4,25 €

260 g

16,35 €/kg



	Energie	Sucre	Lipides	AGS	Sel
Information Nutritionnelle pour 100 g	129 kcal 0 %	0 g 0 %	5 g 8 %	2,3 g 10 %	0,23 mg 1 %

CÔTE PREMIÈRE DE PORC

1,52 €

200 g

7,60 €/kg



	Energie	Sucre	Lipides	AGS	Sel
Information Nutritionnelle pour 100 g	271 kcal 0 %	0 g 0 %	23,5 g 33 %	10,5 g 54 %	0 mg 0 %

2 STEAKS HACHÉS DE VIANDE CHAROLAISE FAÇON BOUCHÈRE 5% MG

3,80 €

250 g

15,20 €/kg



	Energie	Sucre	Lipides	AGS	Sel
Information Nutritionnelle pour 100 g	121 kcal 0 %	0 g 0 %	4,69 g 8 %	1,64 g 10 %	0,14 mg 1 %

2 TRANCHES DE RÔTI DE PORC

1,26 €

100 g

12,60 €/kg



	Energie	Sucre	Lipides	AGS	Sel
Information Nutritionnelle pour 100 g	119 kcal 0 %	0,9 g 0 %	3 g 3 %	1,18 g 4 %	1,8 mg 1 %

2 FILETS DE POULET

3,84 €

320 g

12,00 €/kg



	Energie	Sucre	Lipides	AGS	Sel
Information Nutritionnelle pour 100 g	108 kcal 0 %	0 g 0 %	0,7 g 0 %	0 g 0 %	0 mg 0 %

4

1138

Chercher

1138

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

Energie

Sucre

Lipides

AGS

Sel

pour 100 g

129
kcal

0
g

500
g

230
g

23
mg



Results

- For each individual, we measure the distance between the two phases (*within*)

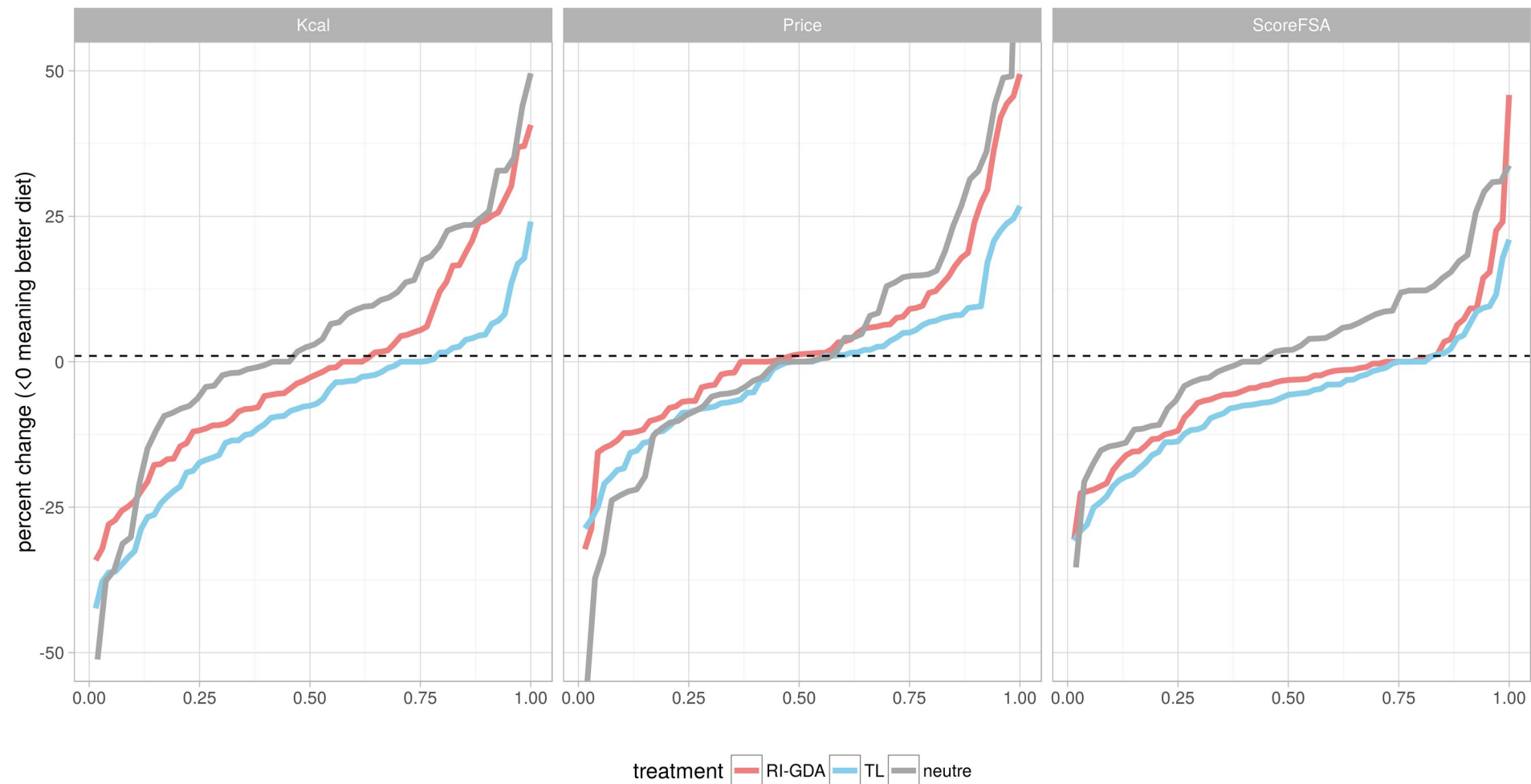
$$\Delta_i = \frac{X_i^{t-2} - X_i^{t-1}}{X_i^{t-1}} \times 100$$

- We then compares these distances between samples/treatments (*between*)

	TL	RI	Neutral
FSA Score per 100g	-6.6% ^a	-3.7% ^a	+2.8% ^b
Energy (kCal per 100g)	-8.9% ^a	-1.1% ^b	+4.2% ^c
Price (€ per 100g)	-1.5% ^a	+3.7% ^b	+3.8% ^b
Sugar (g per 100g)	-8.1% ^a	-1.7% ^b	+11.2% ^c
SFA (g per 100g)	-23.2% ^a	-12.8% ^b	+12.2% ^c
Salt (mg per 100g)	-2.0% ^a	-1.3% ^a	+4.7% ^a

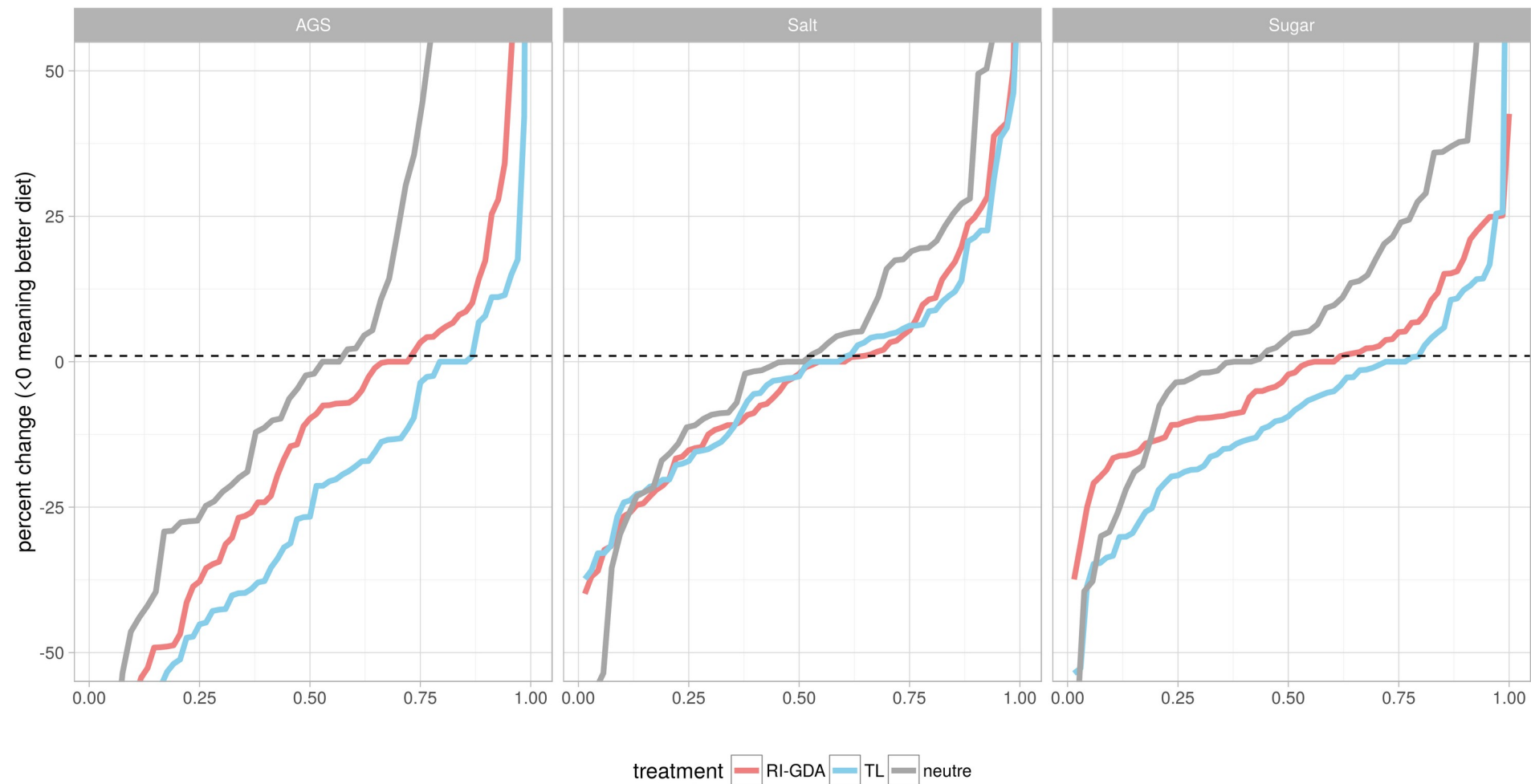


Distribution of subjects according to indicator, /100g





Distribution of subjects according to indicator, /100g





Discussion

Framed field experiment allows strong internal validity :

- Global evaluation of policies based real purchase
- Great control ensuring causality effects Individual analysis allowing test on population
- Reproducibility
- Test of policies that have not yet been implemented

BUT... SOME LIMITATIONS that may hinder external validity

- Great saliency and possible social desirability bias despite monetary incentive
- Environment favorable to reasoned decisions