Additional forms of presentation of the nutrition information

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Nutrition basics

- Risk
- Benefit

- Assessment
- Management
- Communication

take
two
carrots
and call me
in the morning

Hazard (the train)

Harm (death from trauma injuries)

Risk (stepping over the yellow line)

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What does nutritional risk mean?

- Nutritional risk is multifaceted;

- Both high and low nutrient intakes are inherently associated with risk of adverse health effects (risk-risk scenario);

- Energy and nutrients (micro- and macro-), as well as food non-nutrients, can also positively or negatively affect the occurrence/progression of chronic diseases (risk-benefit scenario).

When nutritional risk assessment is needed?

- Setting DRVs related to nutrient requirements;
- Setting FBDG related to dietary guidance for the population at large;
- Setting guidelines for diet-therapy or life-style intervention for specific diseases;
- Informing food policies (e.g. related to reduction of health-care expenditure);
- Supporting legal rules:
  - Nutrition and Health Claims made on foods;
  - Food fortification;
  - Novel foods;
- Orienting the innovation in the food industry…

What does nutritional risk mean?
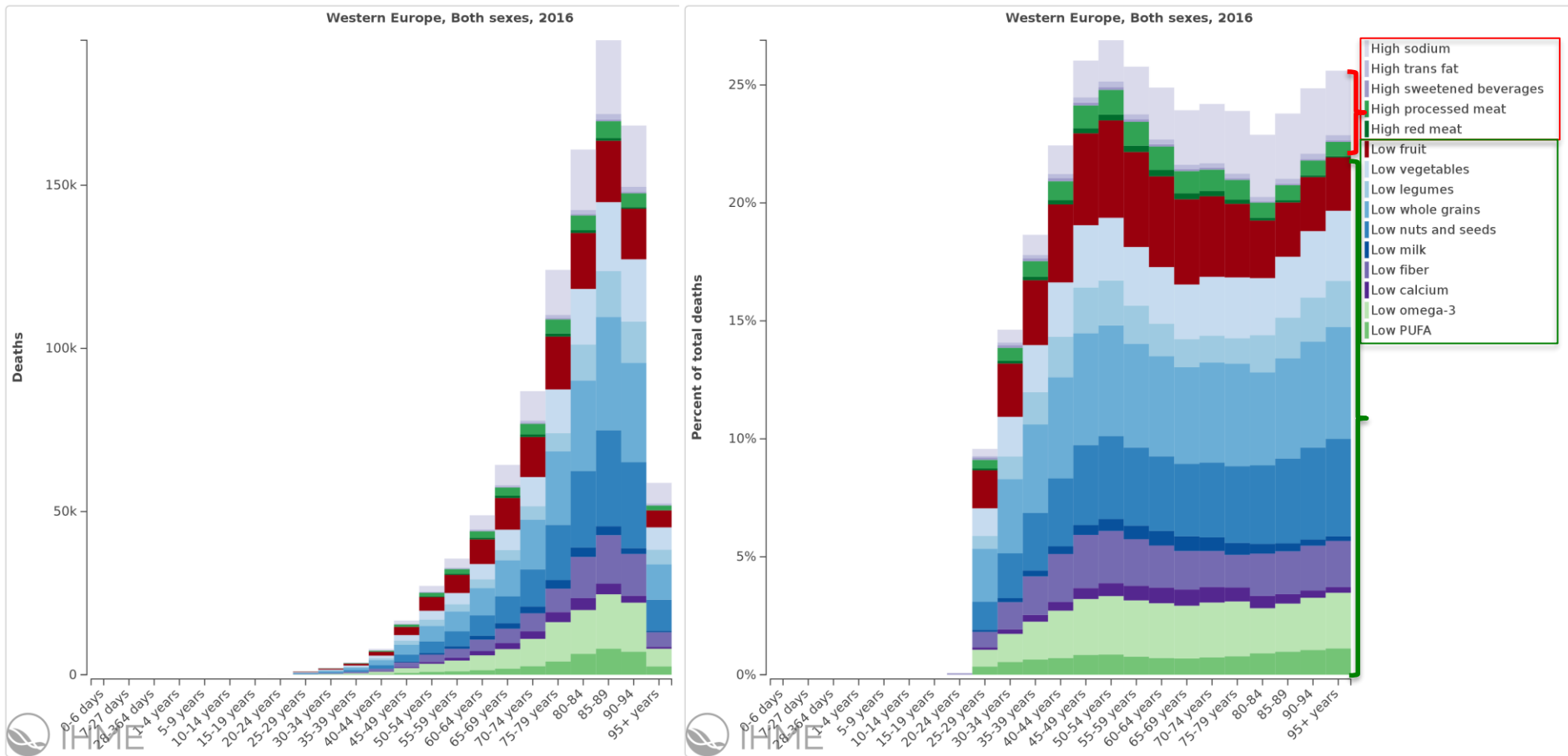# Global burden of disease 2016

- http://vizhub.healthdata.org/gbd-compare/

IHME
Institute for Health Metrics and Evaluation

GBD dietary risk, 2016, Death

Western Europe, Both sexes, 2016

Legend (right chart):
- High sodium
- High trans fat
- High sweetened beverages
- High processed meat
- High red meat
- Low fruit
- Low vegetables
- Low legumes
- Low whole grains
- Low nuts and seeds
- Low milk
- Low fiber
- Low calcium
- Low omega-3
- Low PUFA

i.e. risk for Diets LOW in… >>> than for Diets HIGH in…

Informing the consumer about healthier choices (i.e. decreasing the risk)

- Guidance & Education: role of labelling

  - Ingredient list (often underestimated as an guidance/education tool)
  - Nutrition declaration

Guidance: the regulatory frame

- EU regulation 1924/2006
  - Nutrition & Health claims
- EU regulation 1925/2006
  - Addition of vitamins and minerals
- EU regulation 1169/2011 (FIR)
  - General food labelling provisions
- EU regulation 609/2013 (FSG)
  - Infant and follow-up formulas, processed cereal-based foods, food for special medical purposes, total diet replacements for weight control

Mandatory nutrition label (1169/2011)

- Information required on energy value (in both kJ and kcal)

- Amounts (in g) of fat, saturates, carbohydrates, sugars, protein and salt - to be given per 100g and/or 100ml

  - This is a change from previous requirements on nutrition information, adding saturates and sugars, removing fibre and sodium which is no longer permitted, although statement can be added explaining salt is due to naturally occurring sodium

- With exemptions..(e.g. waters, spices, salt, additives, alcoholic drinks..)

Voluntary nutrition label (1169/2011)

- In addition to the mandatory elements of nutrition labelling supplementary information may be given on a voluntary basis.

- Supplementary information can be given for:
  - mono-unsaturates, polyunsaturates (under total fats)
  - polyols, starch (under carbohydrates)
  - fibre and
  - any of the permitted vitamins & minerals listed in Annex XIII

- When making a nutrition or health claim or fortifying a food, if the claim is about any of these supplementary elements, they must be declared as part of the nutrition declaration.

Voluntary nutrition label (1169/2011)

- All nutrition labelling information must be given on a per 100g/100ml basis;

- In addition, information can be given per portion and/or per consumption unit (number in package must be stated)

- %RI information may be provided voluntarily per 100g/ml only or per 100g/ml **plus** per portion and/or consumption unit or per portion and/or per consumption unit only

Voluntary nutrition label (1169/2011)

- % reference intakes for the 7 mandatory may be given voluntarily;

- if provided per 100g/ml only or per 100g/ml and per portion and/or per consumption unit, this statement must appear in close proximity to the information on reference intakes

"Reference intake of an average adult (8400kJ / 2000 kcal)"

- %RI cannot be given for the supplementary elements except vitamins and minerals when it is mandatory

Ingredient & Nutrition label:
a nutrition grammar

- Provides "clear" and "neutral" <u>information</u> on the composition of food

- Not to be confused with other forms of labelling, whose intention is to provide <u>indication</u> about dietary choices supposedly better for you.
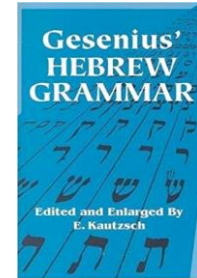
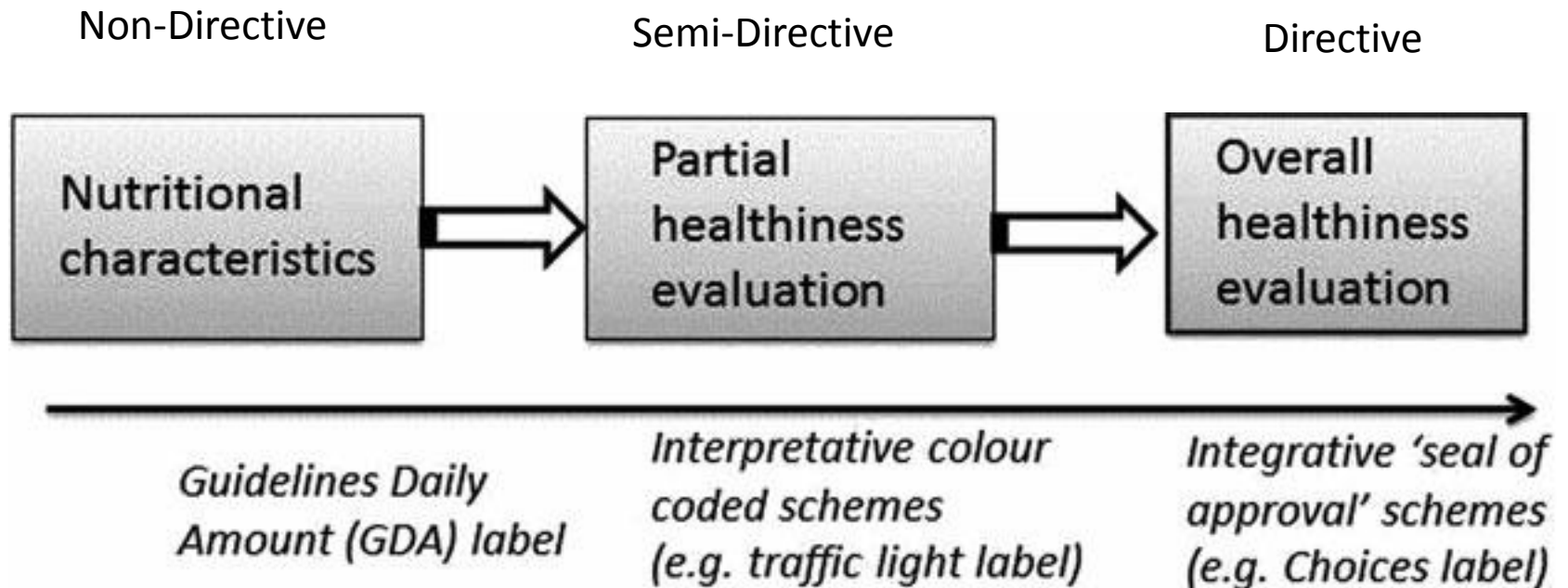*11 : "Thou will not dink carbonated beverages..!"*

Additional Forms of Expression - FoP

GENERAL RULES:

- The Regulation No. 1169/2011 (EU FIC) provides two options for front-of-pack nutrition labelling:

    Option 1 - **energy only**

    Option 2 - **energy, fat, saturates, sugars and salt**

- FIC Regulation, Article 33(2), allows FoP information on "energy + 4" to be expressed per portion only (with the exception of the absolute value for energy, which must be expressed both per 100g/100ml and per portion), even when the back of pack information is expressed per 100g/100ml only.

- The name and order of the nutrients is set out in the EU FIC and will be presented on the front of pack: **Energy / Fat / Saturates / Sugars / Salt**

- In addition, percentage reference intakes (%Ris, as for Part B of Annex XIII of the EU FIC) can be given on a per 100g/ml and/or per portion basis .

- The percentage reference intake should be provided for each nutrient and should be rounded to the nearest whole number.

- Where % RI information is provided on a per 100g/ml basis, the statement 'Reference intake of an average adult (8400kJ/2000kcal)' is required.

Additional Forms of Expression - FoP

DIMENSIONS ON WHICH FOP LABELS DIFFER:

Non-Directive   Semi-Directive   Directive

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Additional Forms of Expression - FOP

DIMENSIONS ON WHICH FOP LABELS DIFFER:

A. Non Directive   B. Semi Directive   C. Directive

Bix L, Sundar RP, Bello NM, Peltier C, Weatherspoon LJ, Becker MW (2015) *To See or Not to See: Do Front of Pack Nutrition Labels Affect Attention to Overall Nutrition Information?* PLoS ONE 10(10): e0139732. DOI:10.1371/journal.pone.0139732

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Additional Forms of Expression - FOP

USED IN EUROPE:

All over:	GDAs	non-directive
UK:	traffic lights	semi-directive
France:	nutri-score	directive

FoP non directive (e.g. GDA)

The system is none other than the simplest application of the EU FIC directive.
The choice of energy + 4 targets only nutrients whose **excess** is commonly supposed to be a dietary **risk**.

Each grilled burger (94g) contains

Energy	Fat	Saturates	Sugars	Salt
924 kJ 220 kcal	13g	5.9g	0.8g	0.7g

Typical values (as sold) per 100g: Energy 966kJ / 230kcal

OR

Each grilled burger (94g) contains

Energy	Fat	Saturates	Sugars	Salt
924 kJ 220 kcal	13g	5.9g	0.8g	0.7g
11%	19%	30%	<1%	12%

of an adult's reference intake
Typical values (as sold) per 100g: Energy 966kJ / 230kcal

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FoP – semi directive (i.e. traffic lights, UK)

The criteria originally used by the British Food Standards Agency (FSA) for its traffic light colour-coding were developed in order to provide better understanding to consumers about the nutrients to limit in their diet. Owing to new legal requirements from the EU, the colour-coding criteria for the British traffic light label have been changed repeatedly since 2007.
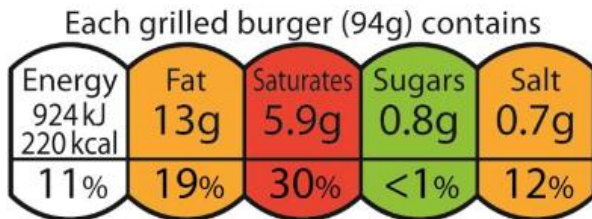
Table 3: Criteria for drinks (per 100ml)

Text	LOW[9]	MEDIUM	HIGH	
Colour code	Green	Amber	Red	
			>12.5% of RIs	>15% of RIs
Fat	≤ 1.5g/100ml	> 1.5g to ≤ 8.75g/100ml	> 8.75g/100ml	>10.5g/portion
Saturates	≤ 0.75g/100ml	> 0.75g to ≤ 2.5g/100ml	> 2.5g/100ml	> 3g/portion
(Total) Sugars	≤ 2.5g/100ml	> 2.5g to ≤ 11.25g/100ml	> 11.25g/100ml	> 13.5g/portion
Salt	≤ 0.3g/100ml	>0.3g to ≤0.75g/100ml	> 0.75g/100ml	> 0.9g/portion

Note: Portion size criteria apply to portions/serving sizes greater than 150ml

Table 2: Criteria for 100g of food (whether or not it is sold by volume)

Text	LOW[8]	MEDIUM	HIGH	
Colour code	Green	Amber	Red	
			>25% of RIs	>30% of RIs
Fat	≤ 3.0g/100g	> 3.0g to ≤ 17.5g/100g	> 17.5g/100g	> 21g/portion
Saturates	≤ 1.5g/100g	> 1.5g to ≤ 5.0g/100g	> 5.0g/100g	> 6.0g/portion
(Total) Sugars	≤ 5.0g/100g	> 5.0g to ≤ 22.5g /100g	> 22.5g/100g	> 27g/portion
Salt	≤ 0.3g/100g	> 0.3g to ≤ 1.5g/100g	>1.5g/100g	>1.8g/portion

Note: portion size criteria apply to portions/serving sizes greater than 100g

Each grilled burger (94g) contains

| Energy 924kJ 220 kcal	Fat 13g	Saturates 5.9g	Sugars 0.8g	Salt 0.7g
11%	19%	30%	<1%	12%

of an adult's reference intake
Typical values (as sold) per 100g: Energy 966kJ /230kcal

FoP – directive (i.e. Nutri-Score, France)

The system is a point-based score, where negative (N: nutrients to be limited) and positive (P: ingredients/nutrients to be promoted) scores are combined to reach an overall food score.

Nutritional score =
total N points - total P points
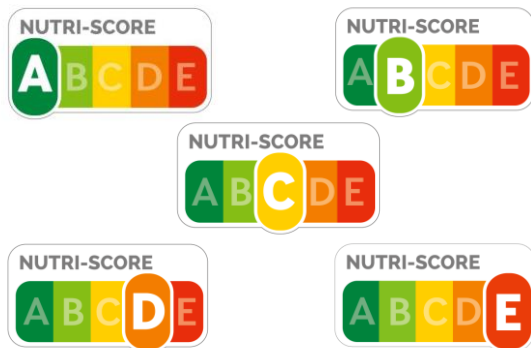
- The N component of the score takes into account nutritional elements that should be limited: caloric density (the calories in kJ per 100 g of the food), saturated fatty acid content, amount of simple sugars (in g per 100 g of the food) and salt content (in mg per 100 g of the food). It corresponds to the sum of the points it accumulates (from 1 to 10) based on the food product's nutritional composition. The grade for the N component can range **from 0 to 40.**

- The P component is calculated based on the amount of fruits, vegetables, legumes, and nuts in the food product by virtue of the vitamins, fibres, and proteins they contain (expressed as g per 100 g of the food product). For each of these elements, points from 1 to 5 are awarded based on the content of the food product. The P component of the nutritional score is the grade corresponding to the sum of the points defined for these three elements; the grade is therefore between **0 and 15.**

FoP – directive (i.e. Nutri-Score, France)

Food N and P points

Table 1: Points attributed to each of the elements of the negative N component

Points	Energy density (KJ/100g)	Saturated fats (g/100g)	Simple sugars (g/100g)	Sodium[1] (mg/100g)
0	≤ 335	≤ 1	≤ 4.5	≤ 90
1	> 335	> 1	> 4.5	> 90
2	> 670	> 2	> 9	> 180
3	> 1005	> 3	> 13.5	> 270
4	> 1340	> 4	> 18	> 360
5	> 1675	> 5	> 22.5	> 450
6	> 2010	> 6	> 27	> 540
7	> 2345	> 7	> 31	> 630
8	> 2680	> 8	> 36	> 720
9	> 3015	> 9	> 40	> 810
10	> 3350	> 10	> 45	> 900

[1]: the sodium content corresponds to the salt content mentioned in the mandatory statement divided by 2.5.

Table 2: Points attributed to each of the nutrients of the positive P component

Points	Fruits, vegetables, and nuts (g/100g)[1] (%)	Fibres (g/100g)		Proteins (g/100g)
		NSP method[2]	AOAC method[3]	
0	≤ 40	< 0.7	≤ 0.9	≤ 1.6
1	> 40	> 0.7	> 0.9	> 1.6
2	> 60	> 1.4	> 1.9	> 3.2
3	-	> 2.1	> 2.8	> 4.8
4	-	> 2.8	> 3.7	> 6.4
5	80	> 3.5	> 4.7	> 8.0

[1]: fruits, vegetables, legumes and nuts contain many vitamins (especially vitamins E, C, B1, B2, B3, B6, and B9 as well as provitamin A)

[2]: NSP: no details on method for obtaining it

[3]: AOAC: content obtained using the AOAC method

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FoP – directive (i.e. Nutri-Score, France)

Drink N and P points

Table 4: Table for attributing points to drinks

Points	Calories (kJ)	Total sugars (g)	Fruits and vegetables (%)
0	≤ 0	≤ 0	≤ 40
1	≤ 30	≤ 1.5	
2	≤ 60	≤ 3	> 40
3	≤ 90	≤ 4.5	
4	≤ 120	≤ 6	> 60
5	≤ 150	≤ 7.5	
6	≤ 180	≤ 9	
7	≤ 210	≤ 10.5	
8	≤ 240	≤ 12	
9	≤ 270	≤ 13.5	
10	> 270	> 13.5	> 80

FoP – directive (i.e. Nutri-Score, France)

Class	Score ranges	Colour
A	Min - 1	Dark green
B	0 - 2	Light green
C	3 - 10	Light orange
D	11 - 18	Orange
E	19 - max	Dark orange

Nutriscore for foods

Class	Score ranges	Colour
A	Mineral waters	Dark green
B	Min - 1	Light green
C	2 - 5	Light orange
D	6 - 9	Orange
E	10 - max	Dark orange

Nutriscore for drinks

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Open question(s)

- Do consumers want FoP labeling?

- How different FoP schemes are perceived by the consumer?

- Do different FoP schemes allow identification of healthier choices?

- Does the presence of FoP labeling improve the nutritional quality of purchased goods?

- Are there unintended consequences in the application of FoP labeling?

Do consumers want FOP labelling?

Yes. Consumer organisations' surveys revealed that most consumers say FoP labelling should be modelled in a way to raise awareness about the nutritional profile of food…

Consumer organizations' surveys also shows consumer want and prefer semi-directive or/and interpretative (i.e. color-coded) schemes

Etiquetage nutritionnel – Clair et complet s'il vous plait. Test Achats, October/November 2012

Ampel-Kennzeichnung bei Lebensmitteln hilft Verbrauchern - Ergebnisse eines Online-Quiz zur Nährwertkennzeichnung. VZBV, June 2013.

http://www.consumentenbond.nl/actueel/nieuws/nieuwsoverzicht-2013/Kleurcodering-verdubbelt- inzicht-in-vet-zout-en-suikergehalte/

Front of pack nutrition labelling. Which?, August 2012.

How different FoP schemes are perceived?

RESEARCH ARTICLE

Effectiveness of Front-Of-Pack Nutrition Labels in French Adults: Results from the NutriNet-Santé Cohort Study

N=13.578

1 country (France)

5 food categories (Pizzas, Dairy products, Fish dishes, Breakfast cereals, appetizers)

5 labelling alternatives

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How different FoP schemes are perceived?

//

No label (nutrition facts only)
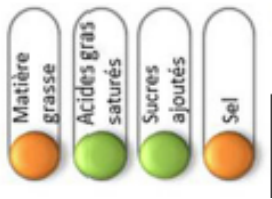
Traffic lights (TL)

Guideline daily Amounts (GDA)

5-colours nutrition label (5-CNL)

Health logo (Tick)

How are different FoP schemes perceived?
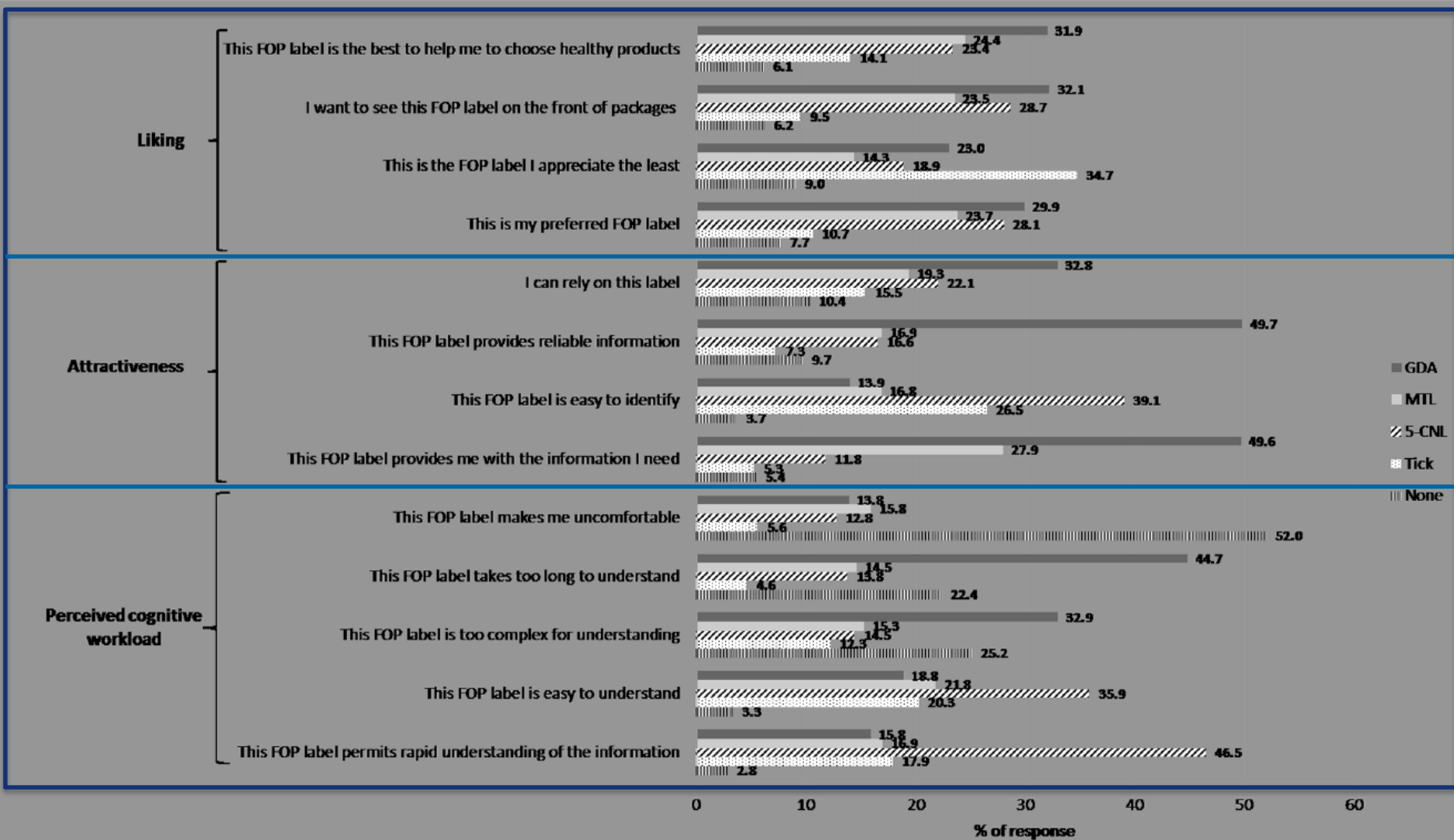
How are different FoP schemes perceived?

Conclusions:

"Our study supports the fact that nutritional FoP labelling systems could be effective instruments to guide consumers in their food choices. No system was identified as the most appropriate for all studied dimensions of acceptability."

Do different FoP schemes allow identification of healthier choices?

Guiding healthier food choice: systematic comparison of four front-of-pack labelling systems and their effect on judgements of product healthiness

N=2.068

4 countries (Germany, Poland, UK, Turkey)

3 food categories (Pizzas, Yogurt, Biscuits)

3 healthy variants (High, Medium, Low) for

a total of 9 foods (3 for each category)

5 labelling alternatives

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Schemes tested

Basic label (BL)

Traffic lights (TL)

Guideline daily Amounts (GDA)

Hybrid TL + GDA (HYB)

Health logo (HL)

Fig. 3. Front-of-pack × healthiness × system interaction utilising dependent variable 1 (DV1; mean healthiness ratings). $F^1(5\cdot9,3989\cdot5) = 7\cdot17$, $P \leq 0\cdot001$, $\eta_p^2 = 0\cdot010$. Within the different healthiness variant groups, the following statistically significant differences were observed. High health variant: basic label (BL) v. health logo (HL) ($P \leq 0\cdot001$), guideline daily amounts (GDA) v. HL ($P = 0\cdot014$). Medium health variant: BL v. traffic lights (TL) ($P = 0\cdot013$), BL v. HL ($P = 0\cdot005$), BL v. GDA + TL hybrid (HYB) ($P = 0\cdot023$), GDA v. TL ($P \leq 0\cdot001$), GDA v. HYB ($P = 0\cdot004$), TL v. HL ($P \leq 0\cdot001$), HL v. HYB ($P \leq 0\cdot001$). Low health variant: BL v. HYB ($P = 0\cdot013$).

NOTE: the SSAg/1 objective health score scale starts at 0 for the healthiest foods, and foods with higher scores are considered less healthy.

Do different FoP schemes allow identification of healthier choices?

Conclusions:

"Under experimental conditions, any structured and legible presentation of key nutrient and energy information on the front of the pack is sufficient to enable consumers to detect a healthier alternative within a food category when they are provided with foods that have distinctly different levels of healthiness."

Does the presence of FoP labeling improve the nutritional quality of purchased goods?

So far, the large majority of consumer research explored the understanding and the ability of consumers to identify healthier food choices.

However, revealed preference data analyses do not support that these tendencies translate into healthy behaviours at the point of sale. An analysis of scanner data from Sainsbury stores in the UK – (collected on a short period and for a limited number of items) when Sainsbury introduced TL labels on its private brand products – found no evidence that the new label shifted choices to more healthful products.

Sacks, Rayner, & Swinburn, (2009) Impact of front-of-pack 'traffic-light' nutrition labelling on consumer food purchases in the UK, health Pmot. Int., *24*:2 344-352
DOI: 10.1093/heapro/dap032

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Does the presence of FoP labeling improve the nutritional quality of purchased goods?

Effects of interpretive nutrition labels on consumer food purchases: the Starlight randomized controlled trial[1,2]

Cliona Ni Mhurchu,[3]* Ekaterina Volkova,[3] Yannan Jiang,[3] Helen Eyles,[3] Jo Michie,[3] Bruce Neal,[4,5] Tony Blakely,[6] Boyd Swinburn,[7] and Mike Rayner[8]
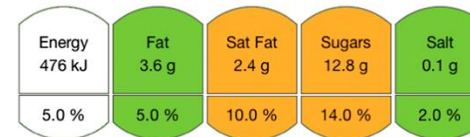
2 countries (Australia, New Zealand)

N=1.357 shoppers, randomized over three labelling alternatives (assisted by Phone App):

1) Star label (HSR), 2) traffic-light label (TLL) , 3) no FoP, nutrition label only (NIP);

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Does the presence of FoP labeling improve the nutritional quality of purchased goods?

Outcome: healthiness of food purchased at supermarket over 4 weeks, measured with the Aus. & New Zeal. Nutrient Profiling Scoring Criterion (NPSC).

TLL

HSR

NIP

Mhurchu CN. et al. Effects of interpretive nutrition labels on food purchases: the Starlight randomised controlled trial. Am J Clin Nutr, 105 (2017) 695-704

Does the presence of FoP labeling improve the nutritional quality of purchased goods?

Results: Overall difference in the mean transformed NPSC score for the TLL group compared with the NIP group was -0.20 (95% CI: -0.94, 0.54; P = 0.60). The corresponding difference for HSR compared with NIP was -0.60 (95% CI: -1.35, 0.15; P = 0.12).

Mhurchu CN. et al. Effects of interpretive nutrition labels on food purchases: the Starlight randomised controlled trial. Am J Clin Nutr, 105 (2017) 695-704

Does the presence of FoP labeling improve the nutritional quality of purchased goods?

Conclusions:

"At the relatively low level of use observed in this trial, interpretive nutrition labels had no significant effect on food purchases."

Mhurchu CN. et al. Effects of interpretive nutrition labels on food purchases: the Starlight randomised controlled trial. Am J Clin Nutr, 105 (2017) 695-704

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Are there unintended consequences in the application of FOP labeling?

From 27 June 2014 (the date that the Australia and New Zealand Ministerial Forum on Food Regulation endorsed the HSR System) to 30 June 2017;

12.108 new Australian and New Zealand food and beverage displaying a HSR;

Data Source: Mintel Global New Products Database (GNPD);

Rating of Food groups (FFG foods) (fruit; vegetables; grain foods; meat/eggs/tofu/nuts/seeds/legumes; milk/yoghurt/cheese/alternatives; vs. Discrectionary Foods (DF)

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Does the presence of FoP labeling improve the nutritional quality of purchased goods?

Results: Both FFG and discretionary foods had HSRs ranging from 0.5 to 5 stars, though the variability of discretionary foods (IQR 2.1) was higher than that for FFG foods (IQR 1). The median HSR for the categories of FFG foods ranged from 3.5 to 4.5. The median for discretionary snacks was higher at 4 compared to that of bakery foods (1.5).

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Does the presence of FoP labeling improve the nutritional quality of purchased goods?

Conclusions:

"The HSR system is undermining the ADG recommendations. Nutrient-based HSRs displayed on a substantial proportion of foods are non-concordant with food-based advice to increase consumption of FFG foods and reduce consumption of discretionary foods. The HSR system is contributing to a confusing food and nutrition information environment, potentially exacerbating prevalent dietary excesses and imbalances and creating a public health risk.."

Lawrence MA. et al. Do Nutrient-Based Front-of-Pack Labelling Schemes Support or Undermine Food-Based Dietary Guideline Recommendations? Lessons from the Australian Health Star Rating System. Nutrients, 10 (2018) doi:10.3390/nu10010032

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Are there unintended consequences in the application of FOP labeling?

N=2058

Perceived healthiness

4 products (cookies, corn flakes, pizza, yogurts)

8 mock packs randomly presented

First 2, NIP only

Remaining 6, 2 per condition (GDA, TLL, HSR)

Are there unintended consequences in the application of FOP labeling?

Nutrition information		Food type			
		Cookies	Corn flakes	Pizza	Yoghurt
Health claims	No claim	-	-	-	-
	Nutrient content claim	Reduced saturated fat	High in fiber	Reduced salt	High in calcium
	General level health claim	Reduced saturated fat to help reduce total blood cholesterol	High in fiber to help improve digestive function	Reduced salt to help maintain healthy blood pressure	High in calcium for strong bones
	Higher level health claim	Reduced saturated fat. A diet low in saturated fat helps reduce the risk of coronary heart disease.	High in fiber. A diet high in fiber helps reduce the risk of bowel cancer.	Reduced salt. A diet low in salt helps reduce the risk of hypertension.	High in calcium. A diet high in calcium helps reduce the risk of osteoporosis.
Front-of-pack labels	Daily Intake Guide				
	Multiple Traffic Lights				
	Health Star Rating				

Figure 1. Health claims and front-of pack labels by food type.

Are there unintended consequences in the application of FOP labeling?
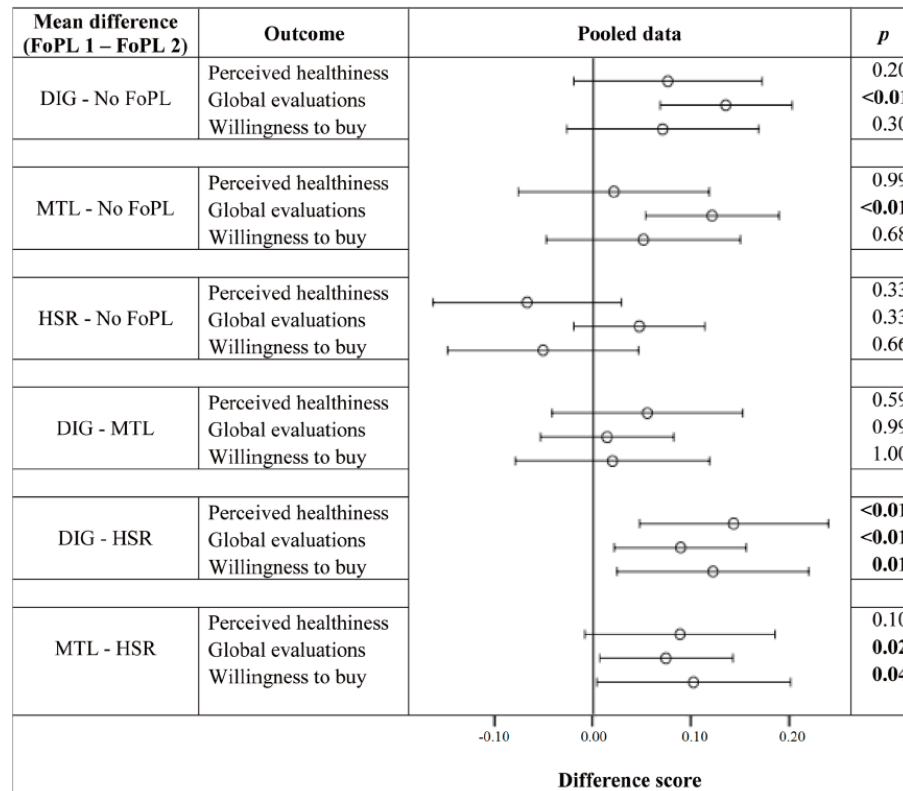

Figure 2. Difference in ratings between FoPLs (⊖) and the upper (⊢) and lower (⊣) bounds of 95% confidence intervals for perceived healthiness, global evaluations and willingness to buy for pooled data.

Does the presence of FoP labeling improve the nutritional quality of purchased goods?

Conclusions:

"The results of the present study indicate that reductive FoPs can potentially lead to more positive evaluations of unhealthy products compared to no FoP. Further behavioural research is needed to determine the extent to which this may lead to unhealthy foods being consumed at a higher rate than they otherwise would be or at a higher rate compared to healthier products without a FoP.."

Talati Z. et al. Do Health Claims and Front-of-Pack Labels Lead to a Positivity Bias in Unhealthy Foods?. Nutrients, 8(2016) doi:10.3390/nu8120787

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Are there unintended consequences in the application of FOP labeling?

RESEARCH ARTICLE

To See or Not to See: Do Front of Pack Nutrition Labels Affect Attention to Overall Nutrition Information?
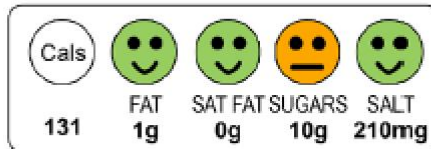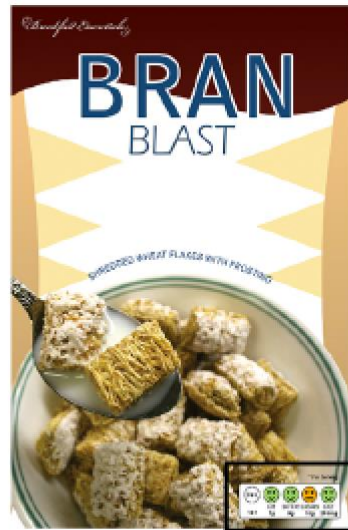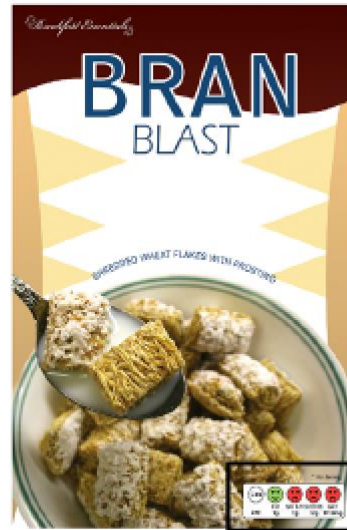
N=74

Eye tracking (time spent on label)

2 products (cereals, crackers)

2 label conditions (TL FoP yes/no)

2 healthy representation (healthy/unhealthy)

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Healthy FOP Treatment

Cals	FAT	SAT FAT	SUGARS	SALT
131	1g	0g	10g	210mg

Unhealthy FOP Treatment

Cals	FAT	SAT FAT	SUGARS	SALT
240	1g	7g	12g	1110mg

B

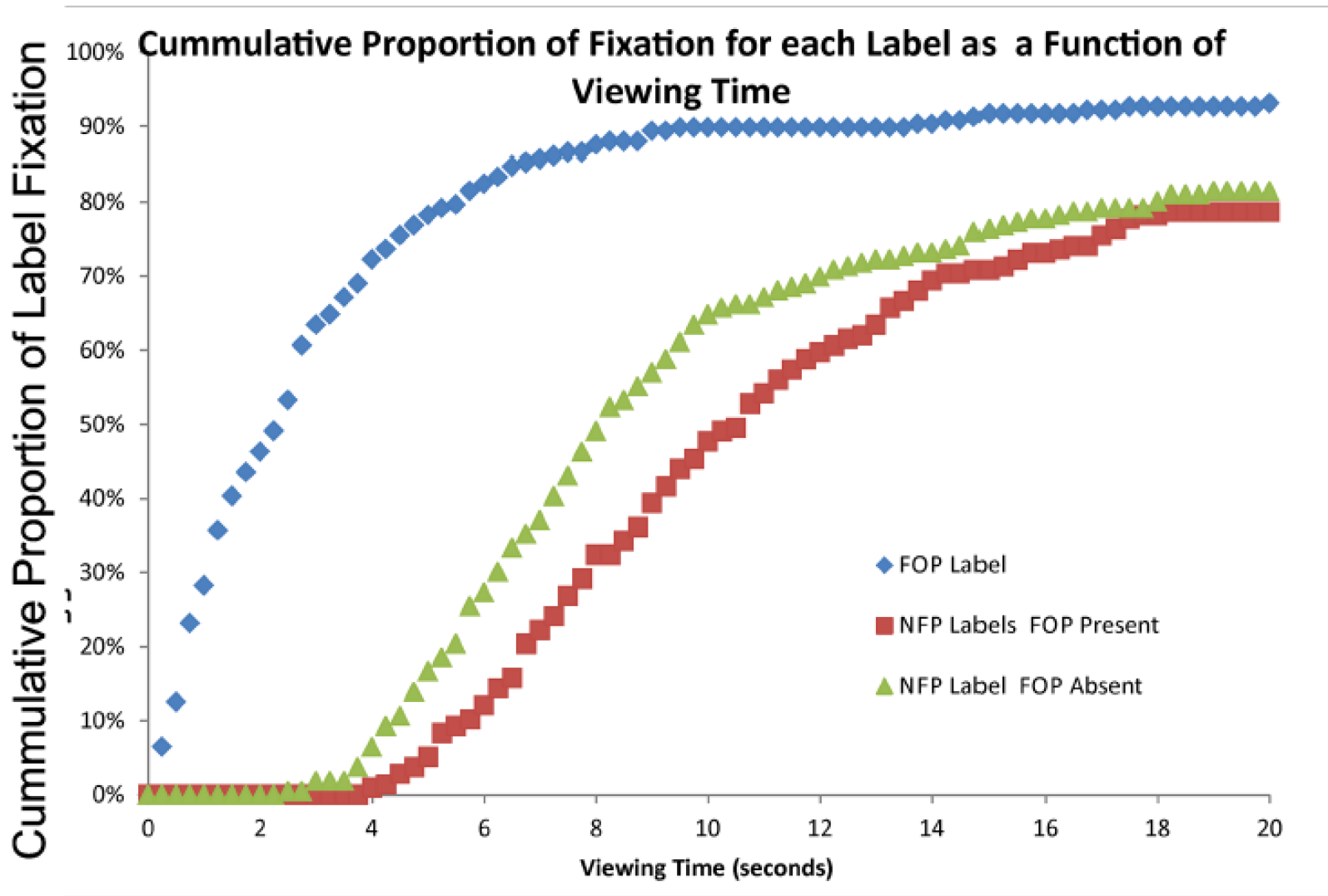US Standard NFP
(Present on all
packages)

C

Fig 3. Plots the percentage of each type of nutritional label that has been fixated as a function of viewing time. Data were collapsed across participants so the percentage was based on the number of labels fixated out of the 220 total labels per label type (4 labels x 55 participants)

Are there unintended consequences in the application of FoP labeling?

Conclusions:

"FoP labels are effective at gathering attention to nutrition information. The added presence of color-coded FoP labels on food packages attracted attention to nutrition information more rapidly and increased the total time that people spent attending to any nutrition information. However, we also found that FoP labels can be used, under certain situations, as a short-cut, thereby decreasing people's attention to the more comprehensive information found in the NFP. (....) Conversely, this "short-cut" finding suggests that manufacturers should not be allowed to selectively report nutrition information on the front-of-pack, as it has the potential to mislead consumers."

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General conclusions

Food-Based Dietary Guidelines and labelling schemes represent evidence-informed manifestations of two alternative paradigms of nutrition science about the causes of and solutions to dietary risk factors. FBDGs operate within a holistic paradigm in which the causes of dietary risk factors are seen to be dietary inadequacies, excesses and imbalances and it is changes to the amount, type and variety of foods within dietary patterns that it is believed are necessary to correct dietary risk factors. Alternatively, FoP schemes operate within a reductionist paradigm in which the causes of dietary risk factors are seen to be nutrient inadequacies and excesses, and it is changes to the amount of nutrients within foods that it is believed are necessary to correct dietary risk factors.

General conclusions

Expectations about nutrient-based FoP schemes in general need to be kept in perspective. Even when well designed and appropriately informed by nutrition science, such schemes can only achieve so much in tackling dietary risk factors. Comprehensive nutrition policies are essential if society is to effectively and safely prevent obesity and chronic diseases.

Frustratingly, around the world much investment of time and budget as well as political and professional will have been directed at flawed systems and this appears to have been at the expense of realising true educative national nutrition policies. There is a potential constructive role for reformed, science-based, FoP systems to contribute as one **modest** component within such a national nutrition policy in the future but first that policy needs to be formulated and implemented.