

A talk on nutrition

Furio Brighenti
University of Parma

Agenda

- Understanding nutrition basics
- Nutrition-related risks in Europe
- Guidance and education

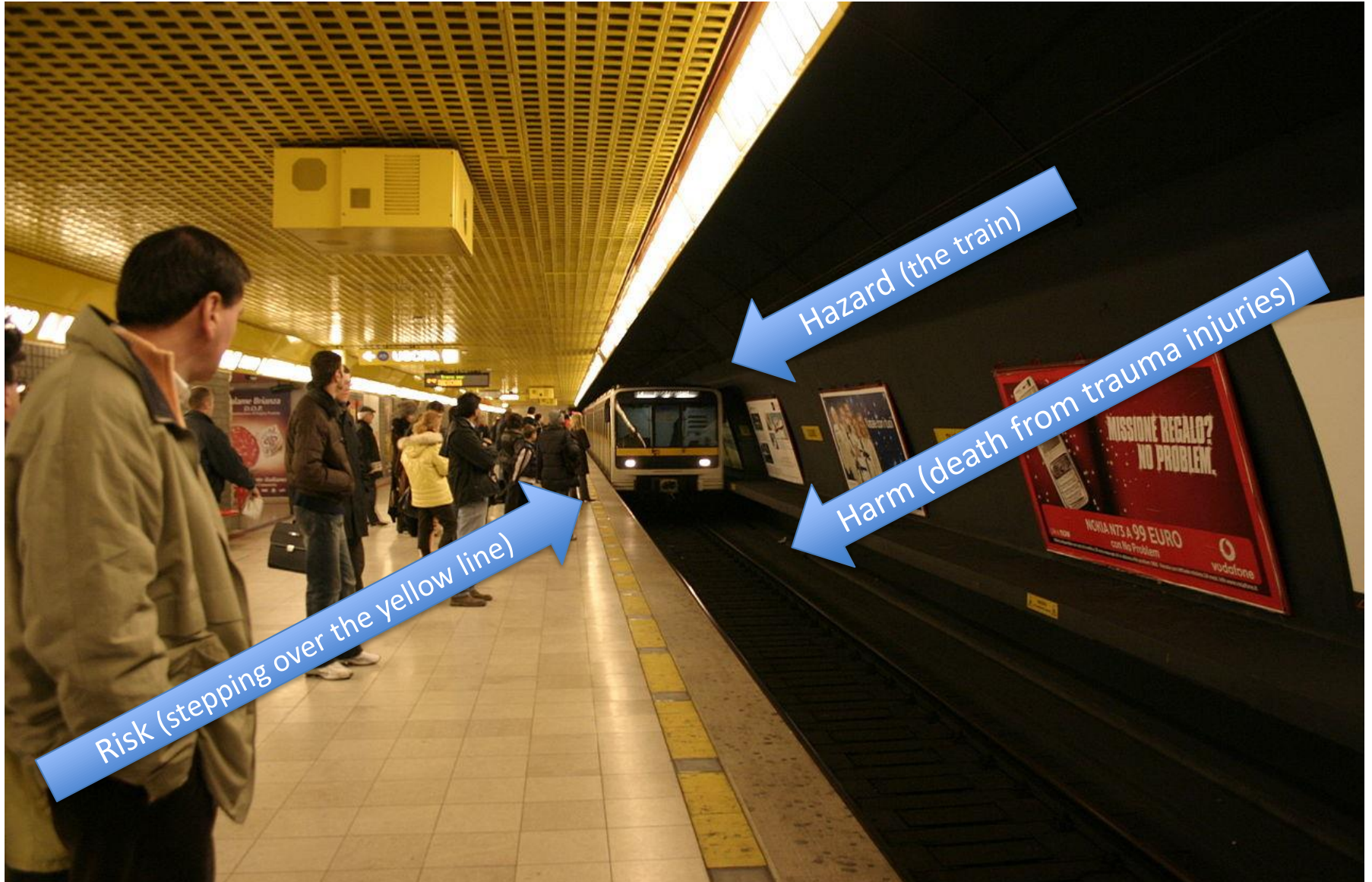
Agenda

- Understanding nutrition basics
- Nutrition-related risks in Europe
- Guidance and education

Nutrition mantra

- Risk
- Benefit
- Assessment
- Management
- Communication





Risk (stepping over the yellow line)

Hazard (the train)

Harm (death from trauma injuries)

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 we are dealing with in nutritional risk assessment?

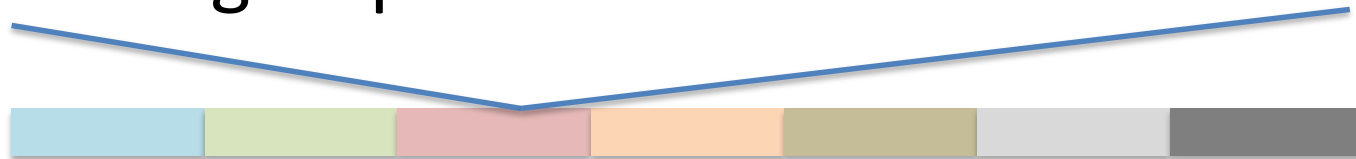
- Micronutrients, macronutrients, bioactives, supplements



- Foods (including novel foods)



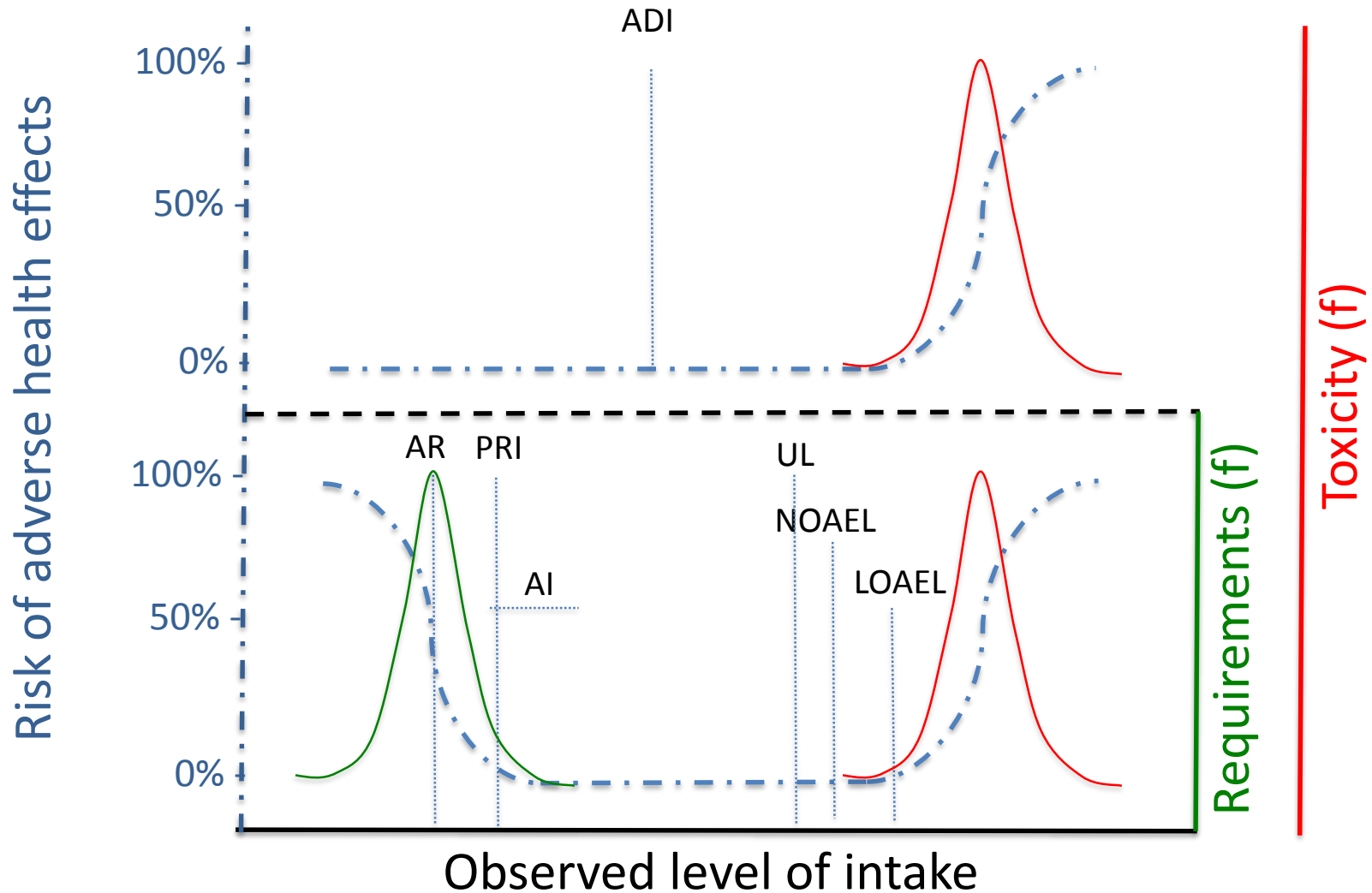
- Food groups



- Dietary patterns



Similarities and differences between food safety and nutrient adequacy



Assessing Nutrient adequacy

- Knowing the distribution of requirements for a nutrient allows the estimation of the prevalence of inadequacy;
- They form the basis for setting the DRVs;
- Adequacy should be set for subgroups of population, i.e taking into account whenever possible not only gender/age/special needs/genetic background but also the actual and expected prevalence of nutrient deficiency

Assessing Nutrient adverse effects

- The situation is somewhat different for adverse effects.
- In particular, knowing a threshold for adverse effects allows estimation of the proportion of the population at risk of adverse effects, not the proportion experiencing adverse effects.

Assessing Nutrient adverse effects

- The scientific principles of risk assessment for non-nutrient substances can be adapted for setting limits to deal with adverse effects of nutrients.

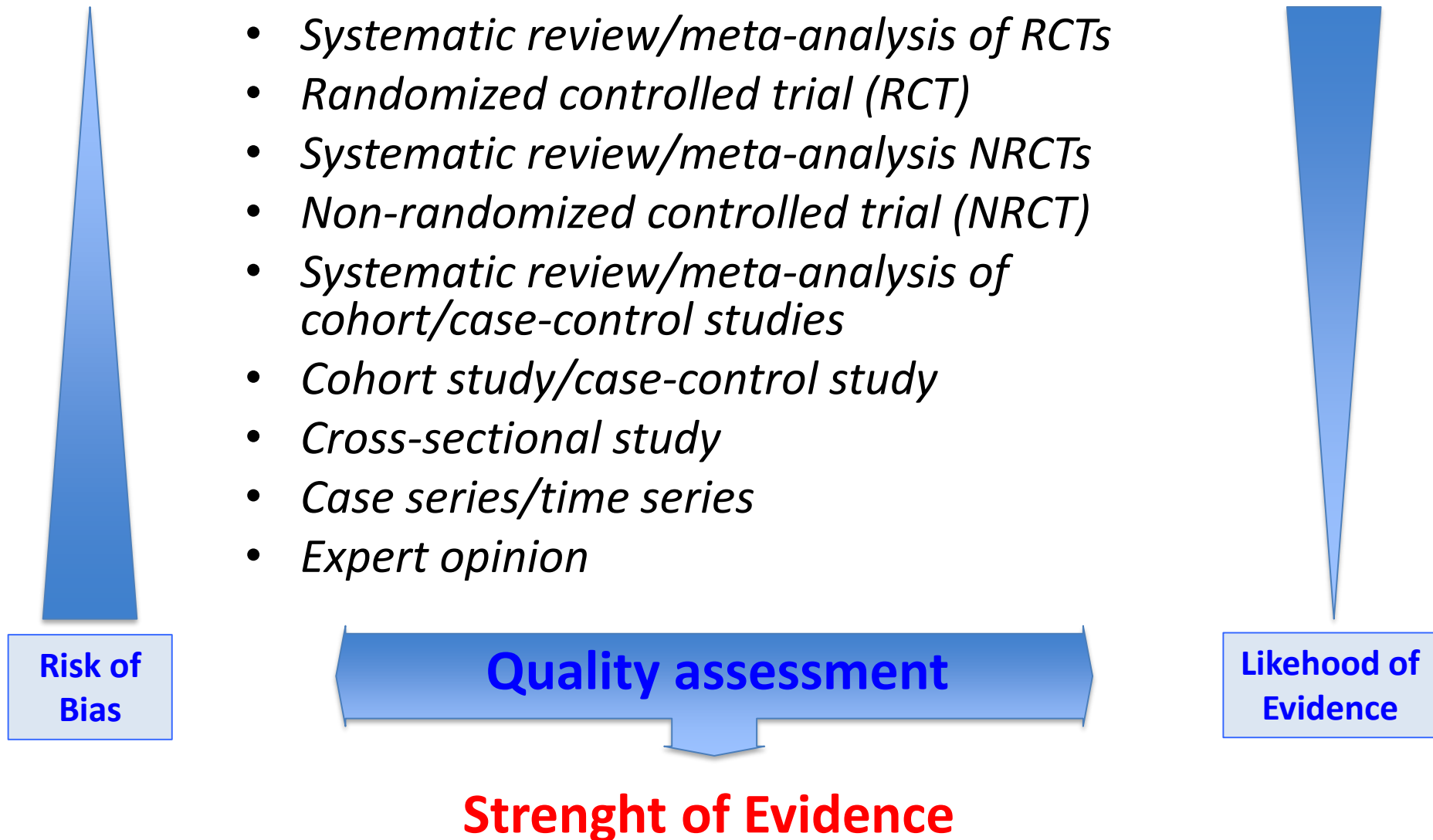
A Model for Establishing Upper Levels of Intake for Nutrients and Related Substances: Report of a Joint FAO/WHO Technical Workshop on Nutrient Risk Assessment (FAO/WHO, 2005), <http://www.who.int/ipcs/methods/nra/en/index.html>.

- We'll not go further on this topic



**DEMAND
EVIDENCE
AND
THINK
CRITICALLY**

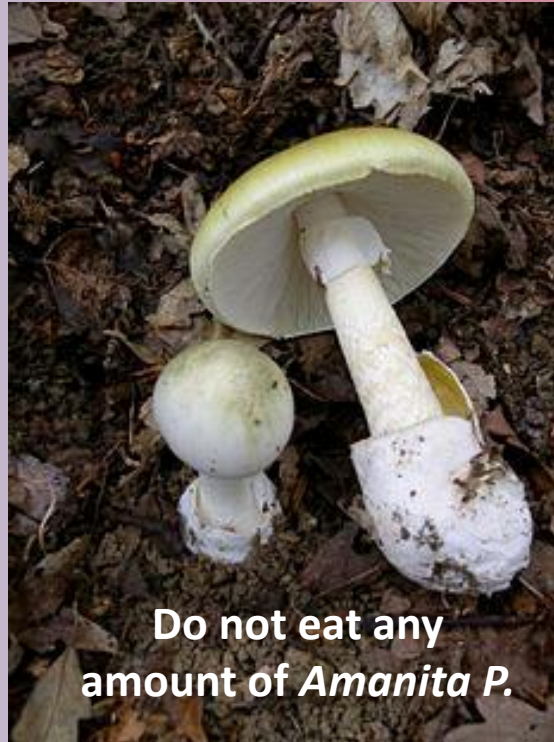
Hierarchy of evidence in Evidence-Based Medicine



Risk of chronic disease. Which evidence for outcomes?

- Hard points (i.e. disease/impaired function)
- Validated surrogate markers of effect (i.e. risk factors of disease)
- Dose/response effect on risk factors
- Mechanisms of action
- Consider co-causes

The problem of risk factor Vs. surrogate marker of disease Vs. Disease



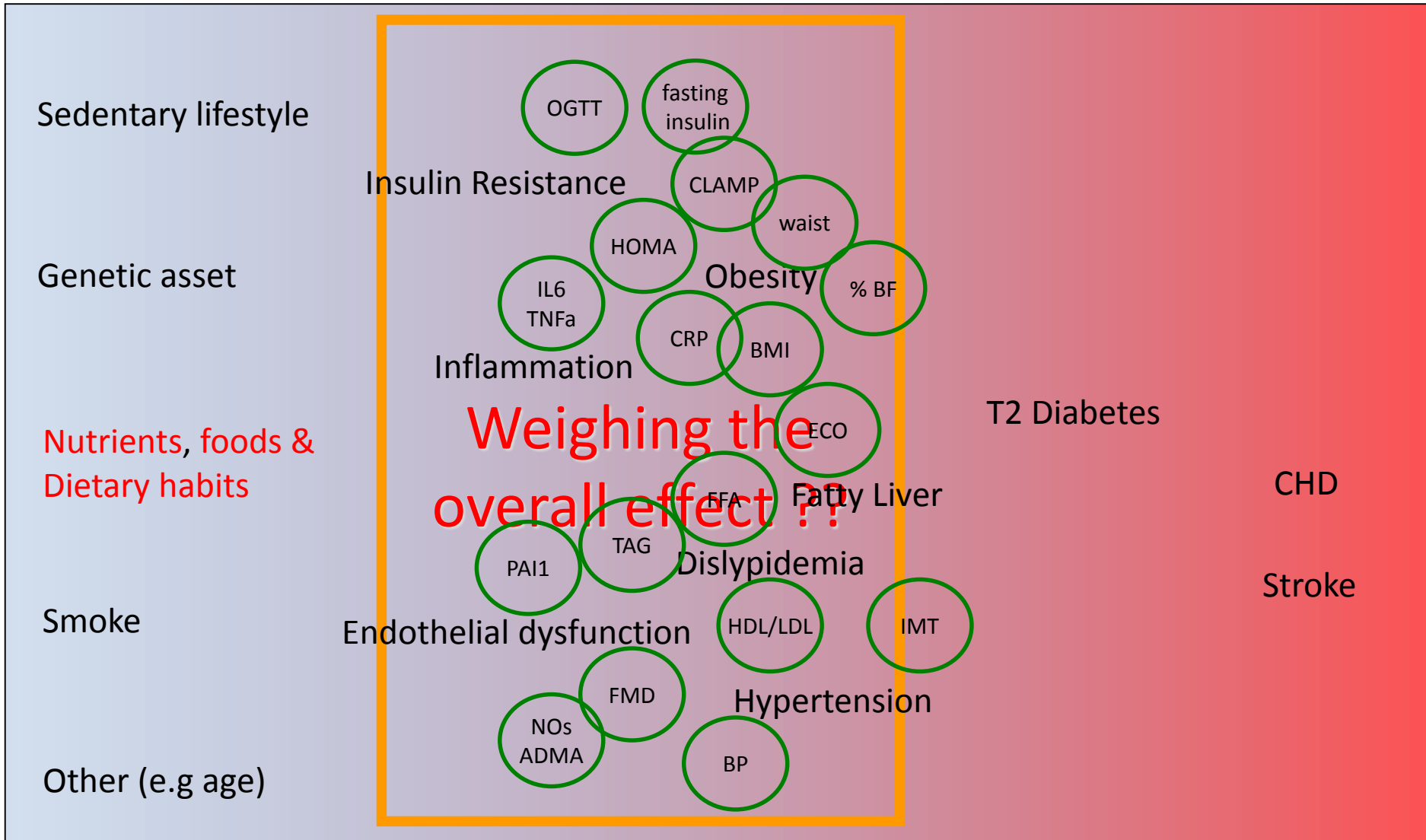
Do not eat any
amount of *Amanita P.*

Amanita Phalloides
(α -amanitin)

Occurrence of accidental poisoning + animal studies

Liver failure,
kidney failure,
death

The problem of risk factor(s) Vs. surrogate marker(s) of disease Vs. Disease



The Best Part (Interlude)

for SSAA Choir
Duration: ca. 0:25

Words and Music by
MEGHAN TRAINOR

Allegretto $\text{♩} = 116$ ($\text{♩} - \text{♩} - \text{♩} - \text{♩}$)

Soprano *mf* *smc*

Alto *mf*

I got a heart full of fly-then that beats with no pain... I got a
head full of mel-o-dies... stuck in my brain... But the best part of be-ing a

Interlude

surrogate markers of disease, do we miss something in calculating the effect of n6-polyunsaturated fats on CVD risk?

Low fat diets

Low SAFA
/high
n6-PUFA

Lower
(LDL)
plasma
cholesterol

Lower risk for CHD
/ atherosclerotic
plaque

Dietary
fibre(s)

Drugs
(Statins)

Phytosterols
/stanols



Re-evaluation of the traditional diet-heart hypothesis: analysis of recovered data from Minnesota Coronary Experiment (1968-73)

Christopher E Ramsden,^{1,2} Daisy Zamora,³ Sharon Majchrzak-Hong,¹ Keturah R Faurot,² Steven K Broste,⁴ Robert P Frantz,⁵ John M Davis,^{3,6} Amit Ringel,¹ Chirayath M Suchindran,⁷ Joseph R Hibbeln¹

- **Design:** Double-blind randomized controlled trial;
- **Intervention:** Serum cholesterol-lowering diet that replaced saturated fat (mainly animal) with linoleic acid (corn oil);
- **Study subjects:** randomized cohort of 9423 women and men aged 20-97;
- **Study setting:** close setting (one nursing home and six state mental hospitals with all food provided by the institution)
- **Analysis:** longitudinal data on serum cholesterol for the 2355 participants exposed to the study diets for a year or more (up to 5 years); 149 completed autopsy files.
- **Results:** The intervention group had the expected significant **reduction in serum cholesterol compared with controls** (mean change from baseline -13.8% v -1.0% ; $P < 0.001$). However, this did not translate to improved survival. Paradoxically, MCE participants who had greater reductions in serum cholesterol had a a 22% higher risk of death for all causes for each 30 mg/dL (0.78 mmol/L) reduction in serum cholesterol. There was **no evidence of benefit in the intervention group for coronary atherosclerosis or myocardial infarcts**.

End of interlude

The Best Part (Interlude)

for SSAA Choir
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Interlude

SRMA – what about sugar?

Guideline:

**Sugars intake for
adults and children**

Added sugars <10%E (strong recommendation)

Added sugars <5% E (conditional recommendation)

Based on outcomes : obesity & dental caries

A sugar (fructose)-centric view of cardiometabolic disease emerges



By GARY TAUBES
Published: April 13, 2011
On May 28, 2009, Robert Lustig gave a lecture called "Sugar: The Bitter Truth," which was posted on YouTube the following July. Since then, it has been viewed well over 800,000 times, gaining new viewers at a rate of about 50,000 per month, fairly remarkable numbers for a 90-minute discussion of the nuances of fructose biochemistry and human physiology.

Food & Beverage

Sugar debate turns sour for food groups

By Scheherazade Daneshmandi, Consumer Industries Editor

Sweet enough
Sugar content in common food products

Sugar in fizzy drinks and food came under fresh attack from scientists on both sides of the Atlantic this week in an escalating public health debate about the link between added sugar and mounting global health problems.

A growing number of scientists and public health authorities are putting pressure on food and beverage companies to reduce added sugar – sugar that does not occur naturally – which they say is overused to help sales but contributes to problems of obesity, diabetes, heart disease and cancer.

EDITORIALS
Science souring on sugar
Accumulating evidence points towards a role for carbohydrates in the development of obesity

Opinionator
Exclusive Online Commentary From The Times

Mark Pritchard February 27, 2013, 9:47 pm [22 Comments]

It's the Sugar, Folks

By MARK PRITCHARD

Mark Pritchard on food and all things related

Tags: [Dietetics](#), [Food and Drug Administration](#), [Obesity](#), [Sugar](#), [Soy](#)

Sugar is indeed toxic. It may not be the only problem with the it's the sugar one.

Abstract published in the Feb. 27 issue of the journal PLoS One
Experts aim to evaluate the reduction in salt levels in our diet

In other words, according to this study, it's not just obesity that can cause diabetes: sugar can cause it, too, irrespective of obesity. And obesity does not always lead to diabetes.

THE GLOBE AND MAIL

Sugar is the new tobacco. Here's why

THOMAS ALBERT
Reporter in The Globe and Mail
Published: January 29, 2014, 11:59 PM EST
Last revised: Tuesday, Feb. 25, 2014, 11:18 PM EST

When you think of the new tobacco, you probably think of the new food products that are loaded with sugar. The new tobacco is not a plant, but a product that is loaded with sugar. The new tobacco is not a plant, but a product that is loaded with sugar.

The Telegraph

RESEARCH

cbcnews | Health

How 'toxic' is sugar?
Research suggests links to deadly diseases but some doubt

2-DAY NEW YEAR DIET

LOSE WEIGHT AND beat those mid-life blues

Daily Mail

Mayhem at High Court as jury rules gangster shot by police was 'lawfully killed'

SUGAR IS 'THE NEW TOBACCO'
Health chiefs tell food giants to slash levels by a third

Soft drink consumption and obesity: it is all about fructose
George A. Bray

Purpose of review:
The purpose of the review is to suggest that fructose, a component of both sucrose (common sugar) and high-fructose corn syrup, should be of concern to both healthcare providers and the public.

Recent findings:
Consumption of sugar-sweetened beverages has increased steadily over the past century and with this increase has come more and more reports associating their use with the risk of overweight, diabetes and cardiometabolic disease. In a meta-analysis of the relationship between soft drink consumption and cardiometabolic risk, there was a

Dietary Sugar and Body Weight: Have We Reached a Crisis in the Epidemic of Obesity and Diabetes? Health Be Damned: Pour on the Sugar

George A. Bray, and Barry M. Popkin

FINANCIAL TIMES

Sugar: Drastic measures
Food and drink companies are reviving stricter regulation in emerging economies that threatens to slash profits

BMJ Group Blogs

Balaji Ravichandran: Sugar is the new tobacco
15 Mar, 13 | by BMJ Group

Sugar is the new tobacco. It is dangerous, addictive, and toxic, and it cannot be controlled by education or legislation alone. This is a war, between public health and private industry, and one that is best waged through the courts.

These were some of the more dramatic pronouncements heard at what was ostensibly an academic symposium on sugar, obesity, and metabolic syndrome. But then the keynote speaker of the event was Professor Robert Lustig, a paediatric endocrinologist from University of California, San Francisco, known as much for his forthright manner and

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Making decisions

- How do we best conclude if carbs/sugar (fructose) causes harm?
- How do clinicians make clinical decisions?
- How are clinical practice guidelines made?

Research article Related Commentary, page 1089



Cardiovascular and Metabolic Risk
BRIEF REPORT

Consuming fructose-sweetened, not glucose sweetened, beverages increases visceral adiposity and insulin sensitivity in young adults

Markedly Blunted Metabolic Effects of Fructose in Young Female Subjects

**Randomized Controlled Trials
= Gold Standard**

Kimber L. Stanhope,^{1,2} Andrew A. Bremer,⁷ James Wei Zhang,⁶ John P. M. Ernst J. Schaefer,¹⁰ Masumi A. Carine Beysen,¹² Marc K. Hellerstein,^{12,13} Lars Berglund,^{6,14} and Peter J. Havel^{1,2}

OBONI, DSC
K, MD
ENTER, PHD

conditions were applied in a randomized order with a 4-week washout period. On the seventh day, subjects underwent metabolic assessment including hormone and substrate concentrations.

A suitable means to collate information

- An Ideal Review: comprehensive and unbiased
- Narrative Review vs Systematic Review

What is a narrative review?

- discusses and summarizes the literature on a particular **topic**
- Usually a **comprehensive overview** of a topic by **“a content expert”**, rather than addressing a specific question
- **do not often report on how** the search for literature was carried out or how it was decided which studies were relevant to include

What is a systematic review?

- “A review of a clearly formulated question that uses systematic and explicit methods to identify, select and critically appraise relevant research, and to collect and analyze data from the studies that are included in the review.”

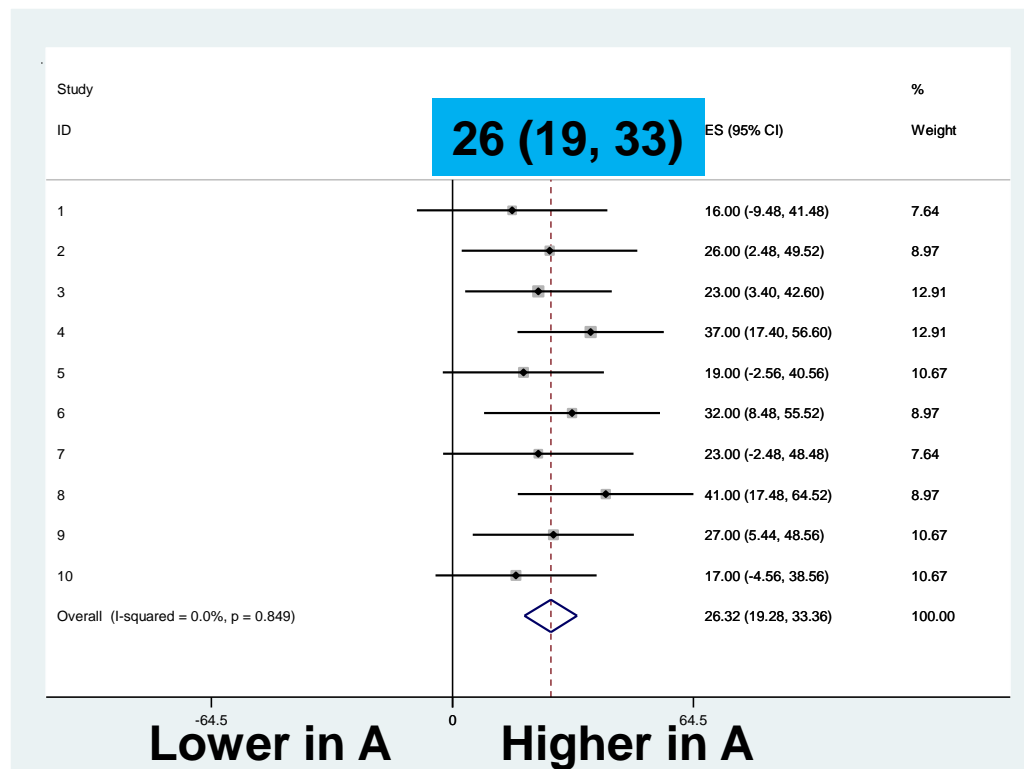
What is “meta-analysis”?

- a **statistical technique** for combining the findings from several independent studies
- **combines data** from two or more randomized controlled trials (or observational studies) – resolves discrepancies
- provides a **quantitative estimate** of the treatment effect, giving due weight to the size and precision of the different studies included
- Gives a larger sample size and more events than any individual study = greater precision of estimates
- Identify sources of diversity (different patient types, settings)

Are all meta-analyses systematic reviews?

Dr. Black found 10 studies in which **A raised** tissue **vitamin X** levels by 26 units compared with **B**,

Meta-Analysis Conclusion: Highly consistent effect showing **A raised** tissue **vitamin X** levels

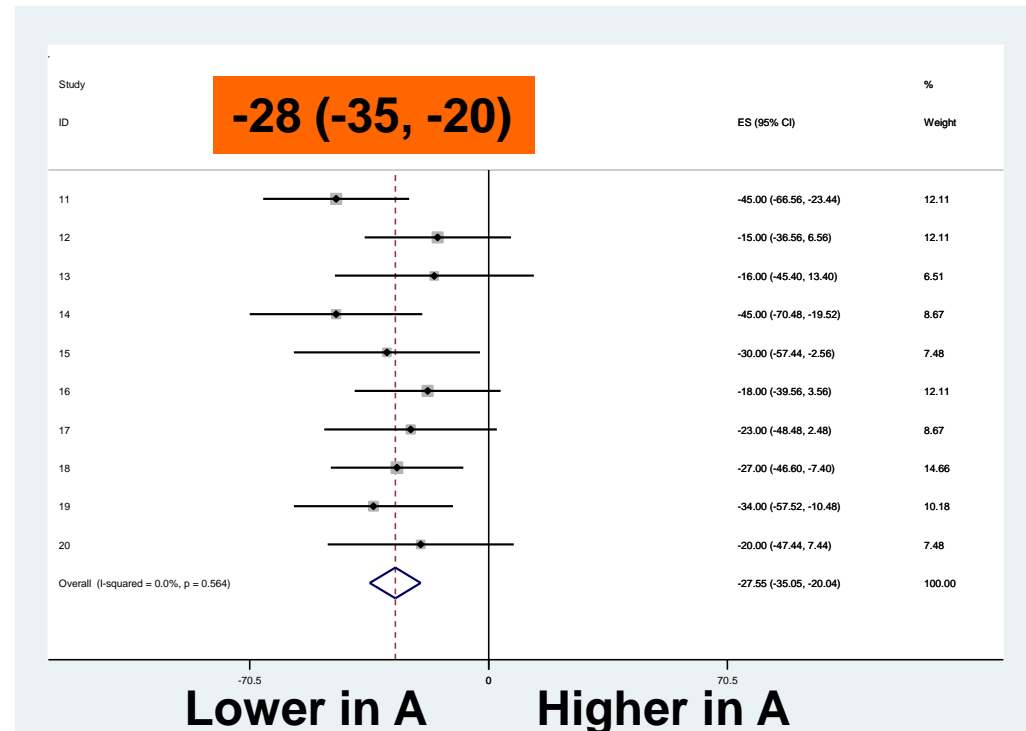


Heterogeneity $\chi^2 = 4.83$ (d.f. = 9) $p = 0.849$
 I^2 (variation in ES attributable to heterogeneity) = 0.0%
Test of ES=0 : $z = 7.33$ $p = 0.000$

Are all meta-analyses systematic reviews?

Dr. White found 10 studies in which **A** lowered tissue vitamin X by 28 units compared with **B**.

Meta-Analysis Conclusion: Highly consistent effect showing **A** lowered tissue vitamin X levels



Heterogeneity $\chi^2 = 7.70$ (d.f. = 9) $p = 0.564$
 I^2 (variation in ES attributable to heterogeneity) = 0.0%
Test of ES=0 : $z = 7.20$ $p < 0.001$

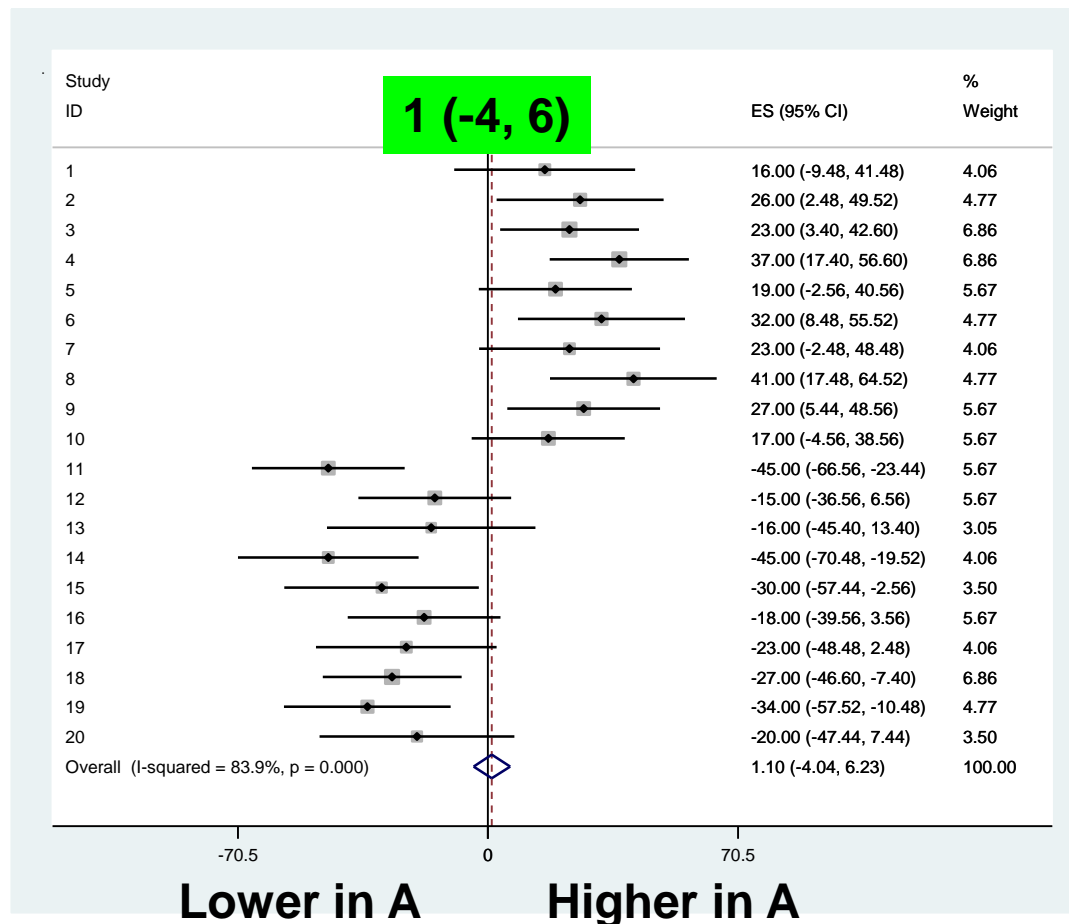
Are all meta-analyses systematic reviews?

Dr. Grey conducted a **systematic review** and meta-analysis of 20 studies of the effect of treatment (A vs. B) on tissue levels of Vitamin X

SR & Meta-analysis

Conclusion:

No treatment effect



Heterogeneity $\chi^2 = 117.80$ (d.f. = 19) $p < 0.001$
 I^2 (variation in ES attributable to heterogeneity) = 83.9%
Test of ES=0 : $z = 0.42$ $p = 0.676$

How a SRMA is Conducted

DEVELOP PROTOCOL

1. Formulate the question

2. Define the eligibility criteria for studies to be included in terms of Patient, Intervention, Comparison, Outcome, Time, and Study design (PICOTS)

3. Develop a priori hypotheses to explain heterogeneity

Why is the research question important?

- The answer you get will depend on the question you pose
- Defines the types of studies you will include
- Defines the outcomes you will look at
- Defines the exposures/intervention
- Consult with an information specialist

How a SRMA is Conducted

DEVELOP YOUR PROTOCOL

1. Formulate the question

2. Define the eligibility criteria for studies to be included in terms of Patient, Intervention, Comparison, Outcome, Time, and Study design (PICOTS)

3. Develop a priori hypotheses to explain heterogeneity

Developing Eligibility Criteria

- **P** opulation
 - **I** ntervention (**E**xposure)
 - **C** omparator
 - **O** utcome
 - **T** ime
 - **S** tudy Design
-
- In _____(P), how does _____(I) compared to _____(C) affect _____(O) within _____(T)?

PICOTS – Eligibility Criteria

- E.g. fructose-containing sugars & cardiometabolic risk
- In adults (P), how do fructose-containing sugars (I) compare to other carbohydrates (C) on cardiometabolic risk factors (O) within randomized controlled trials ≥ 3 weeks (T, S)?

Additional Considerations

- E.g. Population you wish to include OR exclude:
 - Healthy
 - Overweight/obese
 - Diabetes
 - Cancer

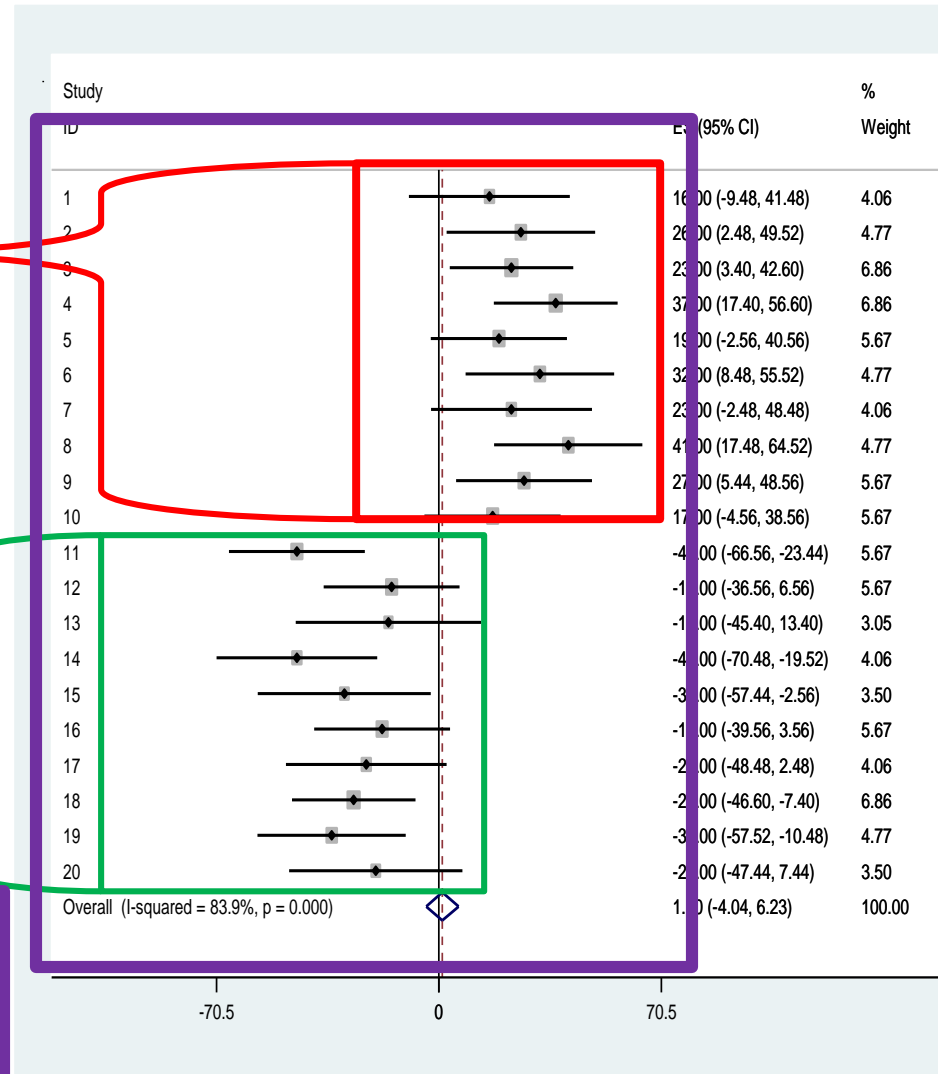
Understanding the Research Question

Let's say all these studies are in cancer patients

Let's say all these studies are in healthy patients

Pooling together the studies on both the cancer patients and healthy patients

- THE "AVERAGE" MAY NOT BE USEFUL



Assessments of Quality of Evidence

- Risk of Bias
- Publication Bias
- GRADE

Assessments of Quality of Evidence

- Risk of Bias
 - **Sequence generation** -> selection bias (randomization)
 - **Allocation concealment** -> selection bias
 - **Blinding**->performance bias (of participants and personnel)
 - **Incomplete outcome data**->attrition bias (how missing data was handled; assessed if influential)
 - **Selective outcome reporting**-->reporting bias (specified 1^o, 2^o outcomes)
- HIGH, LOW, UNCLEAR
- Cochrane Risk of Bias Tool

Assessments of Quality of Evidence



- **GRADE:**
 - Evidence Assessment
 - The strength of the evidence for each outcome will be assessed using the Grading of Recommendations Assessment, Development and Evaluation
 - **Quality of evidence** = the extent to which we are confident that an estimate of the effect is correct

GRADE	DEFINITION
High ⊕⊕⊕⊕	Further research is very unlikely to change our confidence in the estimate of effect.
Moderate ⊕⊕⊕○	Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low ⊕⊕○○	Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low ⊕○○○	Any estimate of effect is very uncertain.

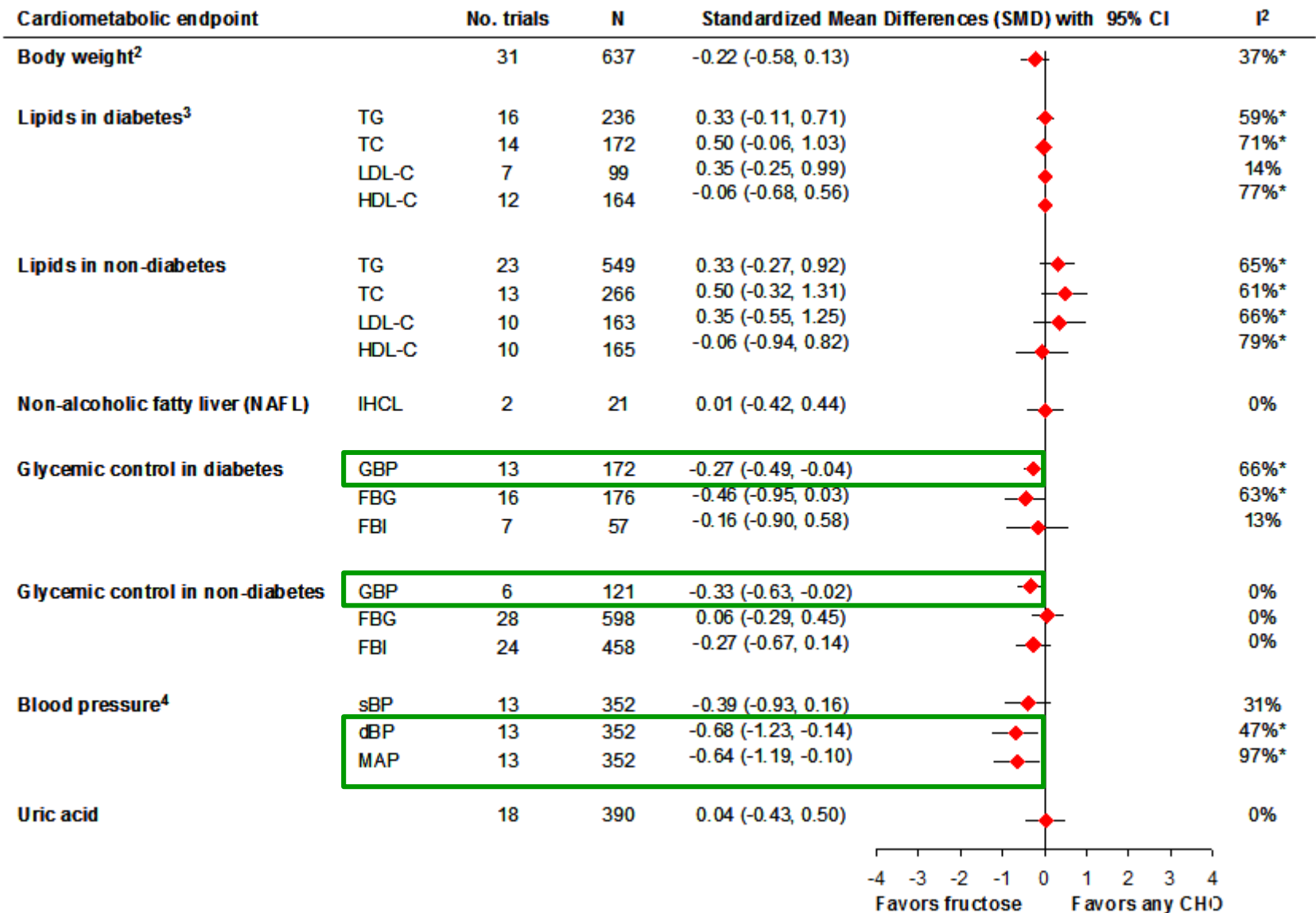
GRADE is widely used



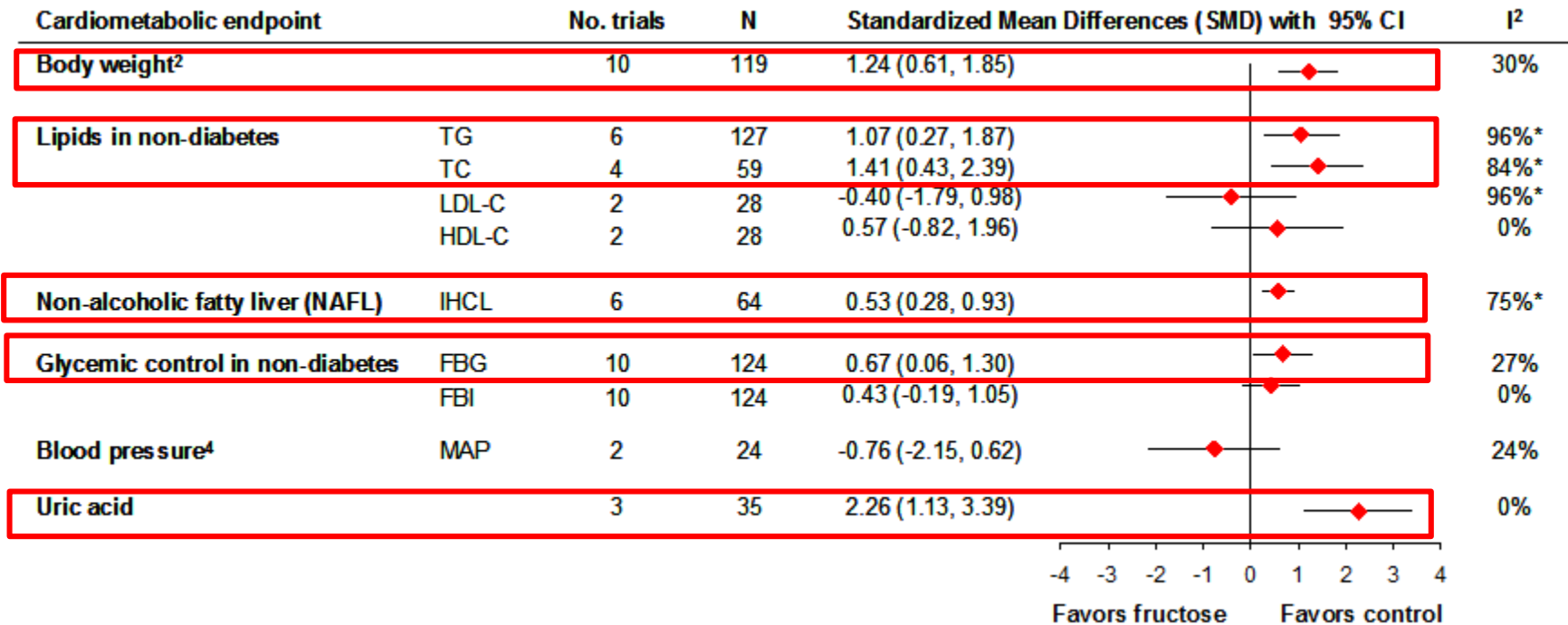
Results

Fructose & cardiometabolic risk factors

Isocaloric conditions



Hypercaloric conditions



Overall Conclusions

1. There is a moderate body of consistent evidence from controlled feeding trials that fructose-containing sugars at low to moderate doses do not harm body weight, serum fasting or postprandial lipids, blood pressure, uric acid, and NAFLD and may even benefit glycemic control in humans.
2. There is an emerging body of consistent evidence from controlled feeding trials that fructose consumed under hypercaloric feeding conditions may promote weight gain, fasting and postprandial dyslipidemia, raised uric acid levels, and NAFLD, effects which may be more attributable to the excess energy than the fructose itself.
3. The shorter duration, poor quality and heterogeneity in the available trials creates some uncertainty about the true effects of fructose. There is a need for larger, longer-term, higher quality “real world” feeding trials to guide our understanding of the metabolic effects of fructose.

End of interlude

Agenda

- Understanding nutrition basics
- **Nutrition-related risks in Europe**
- Guidance and education

Health Metrics

DALY

Disability Adjusted Life Years is a measure of overall disease burden, expressed as the cumulative number of years lost due to ill-health, disability or early death

$$= \text{YLD} + \text{YLL}$$

Years Lived with Disability + Years of Life Lost



Healthy life



Disease or Disability



Early death

Expected life years

GBD dietary risk

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



IHME

Institute for Health Metrics
and Evaluation

Agenda

- Understanding nutrition basics
- Nutrition-related risks in Europe
- **Guidance and education**

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

Additional Forms of Expression - FOP

DIMENSIONS ON WHICH FOP LABELS DIFFER:


Nutrition Facts Panel (NFP)



Each serving contains				
Calories	Sugars	Fat	Saturates	Salt
218	6.3g	3.2g	1.4g	0.2g
11%	7%	5%	7%	3%

Guideline Daily Amount (GDA)
European Union

Facts Up Front-
An initiative of the Food Marketing Institute (FMI) and the Grocery Manufacturer's Association (GMA) US




Each 1/2 pack serving contains

MED	LOW	MED	HIGH	MED
Calories	Sugar	Fat	Sat Fat	Salt
353	0.9g	20.3g	10.8g	1.1g
18%	1%	29%	54%	18%

Source: Food Standards Agency
of your guideline daily amount

Traffic Light Labelling (color) depicted with % GDA United Kingdom




LOW Fat


LOW Saturates

HIGH Sugar


MED Salt




Canada Health Check




The Netherlands



Nordic Keyhole (Sweden, Norway and Denmark)



The Heart Symbol Finland



Smart Choices-
Used briefly in the US

A. Non Directive

B. Semi Directive

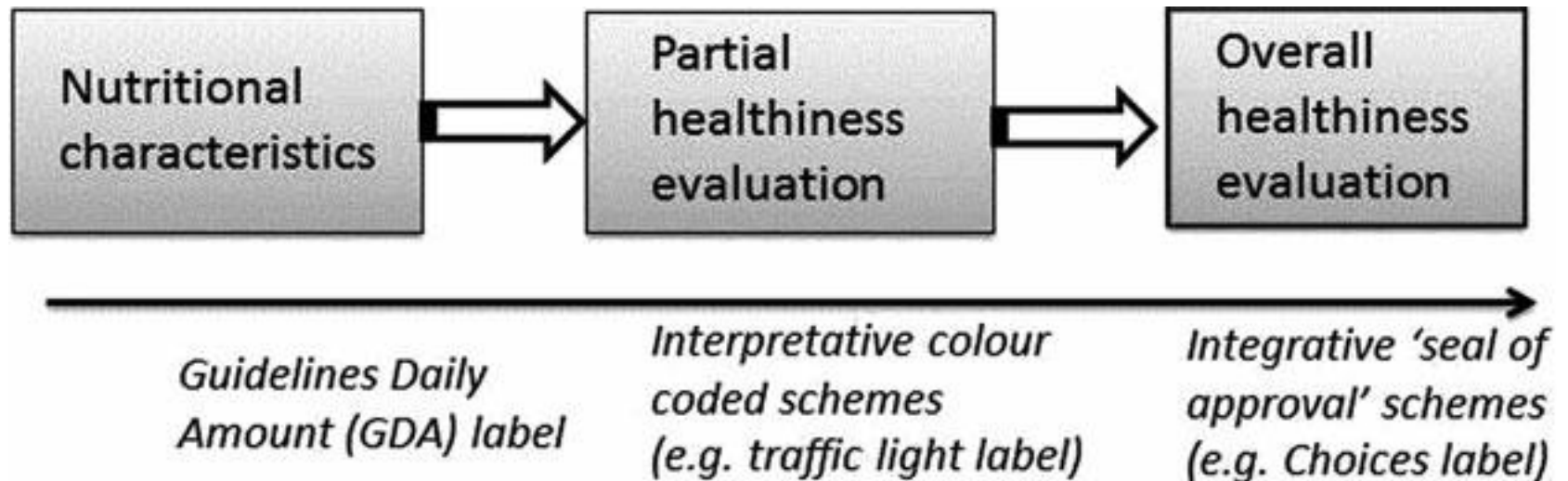
C. Directive

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

Additional Forms of Expression - FOP

DIMENSIONS ON WHICH FOP LABELS DIFFER:



Ellen Van Kleef & Hans Dagevos (2015) *The Growing Role of Front-of-Pack Nutrition Profile Labelling: A Consumer Perspective on Key Issues and Controversies*, *Critical Reviews in Food Science and Nutrition*, 55:3, 291-303,
DOI: 10.1080/10408398.2011.653018

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?



BEUC The European
Consumer
Organisation

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, 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?



PLOS

ONE

PLOS ONE | DOI:10.1371/journal.pone.0140898 October 28, 2015

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)

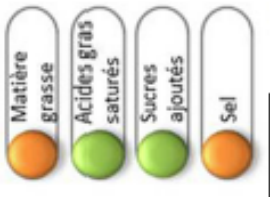
5 labelling alternatives



How different FOP schemes are perceived?

//

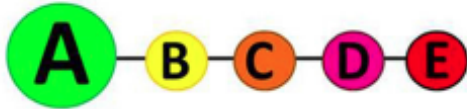
No label (None)



Traffic lights (TL)



Guideline daily Amounts (GDA)

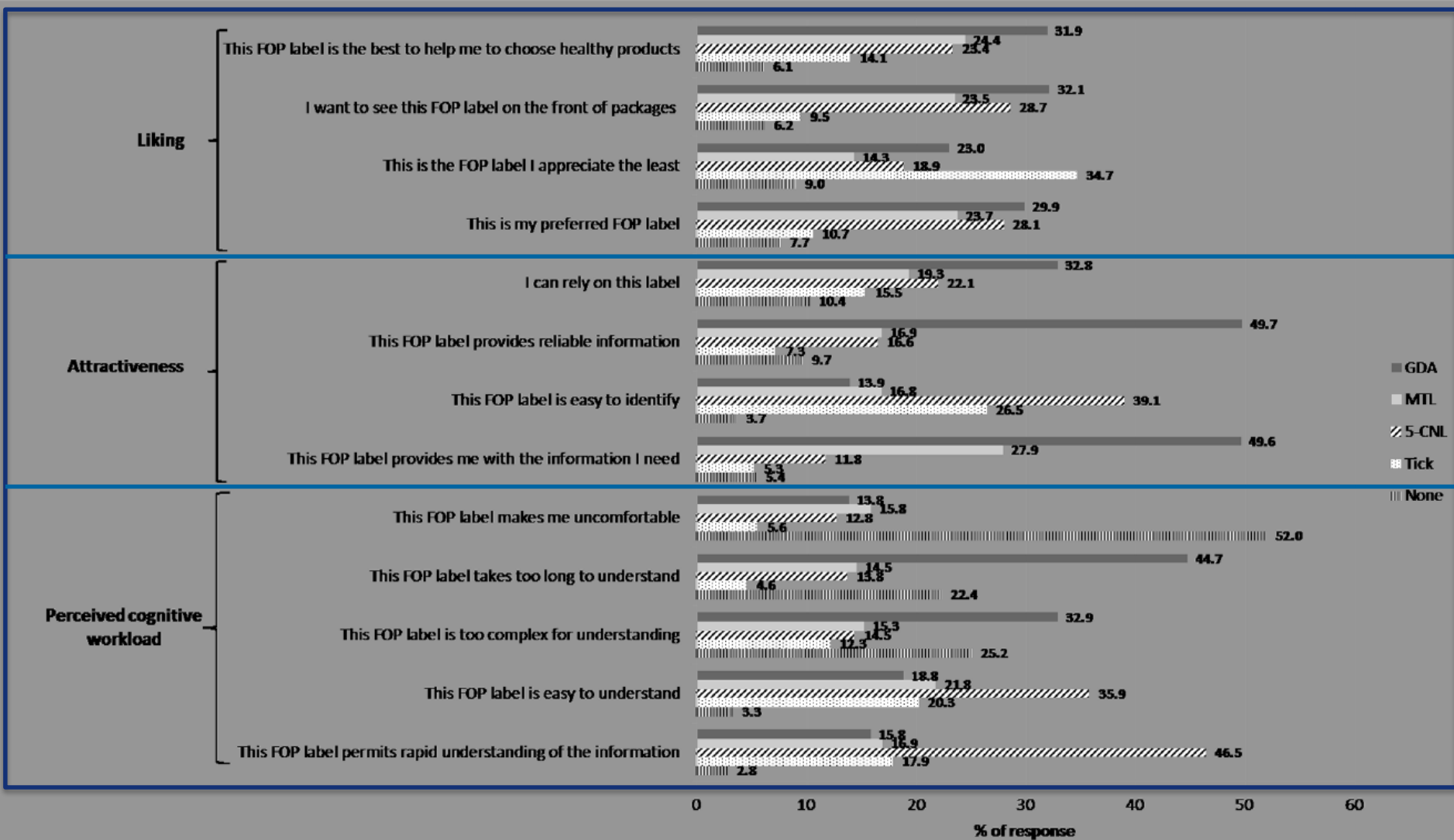


5-colours nutrition label (5-CNL)



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?

British Journal of Nutrition (2015), **113**, 1652–1663
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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

Schemes tested

Energy	Sugars	Fat	Saturates	Salt
xx kJ	xx g	xx g	xx g	xx g

Basic label (BL)

Energy	Low	Med	High	Low
xx kJ	Sugars xx g	Fat xx g	Saturates xx g	Salt xx g

Traffic lights (TL)

Energy	Sugars	Fat	Saturates	Salt
xx kJ	xx g	xx g	xx g	xx g
X%	X%	X%	X%	X%

Guideline daily Amounts (GDA)

Energy	Sugars	Fat	Saturates	Salt
xx kJ	xx g	xx g	xx g	xx g
X%	X%	X%	X%	X%

Hybrid TL + GDA (HYB)

Energy	Sugars	Fat	Saturates	Salt
xx kJ	xx g	xx g	xx g	xx g



Health logo (HL)

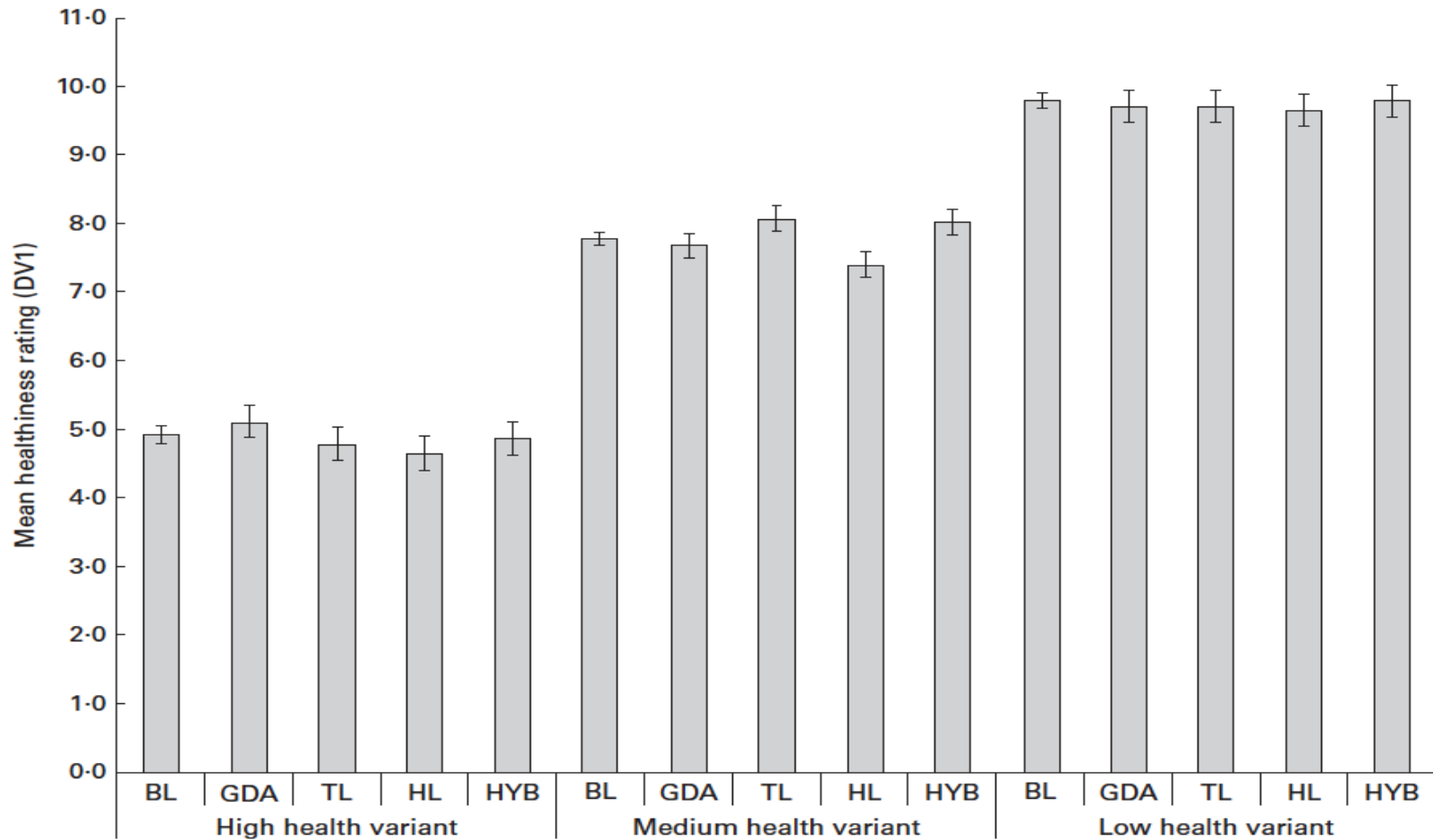


Fig. 3. Front-of-pack \times healthiness \times system interaction utilising dependent variable 1 (DV1; mean healthiness ratings). $F^1(5.9,3989.5) = 7.17$, $P \leq 0.001$, $\eta_p^2 = 0.010$. Within the different healthiness variant groups, the following statistically significant differences were observed. High health variant: basic label (BL) v. health logo (HL) ($P \leq 0.001$), guideline daily amounts (GDA) v. HL ($P = 0.014$). Medium health variant: BL v. traffic lights (TL) ($P = 0.013$), BL v. HL ($P = 0.005$), BL v. GDA + TL hybrid (HYB) ($P = 0.023$), GDA v. TL ($P \leq 0.001$), GDA v. HYB ($P = 0.004$), TL v. HL ($P \leq 0.001$), HL v. HYB ($P \leq 0.001$). Low health variant: BL v. HYB ($P = 0.013$).

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 Promot. Int., 24:2 344-352

DOI: 10.1093/heapro/dap032

Does the presence of FOP labeling **improve the nutritional quality** of purchased goods?

ONGOING LARGE FIELD STUDIES:

- **Methods:** 5-wk RCT design; three FOP labels:
 - *Star label, traffic light label, no FOP (nutrition label only)*
 - *Assisted by phone App*
 - Outcome: healthiness of food purchased at supermarket
- **Expected Results:** The Starlight randomised, controlled trial will determine the effects of interpretive front-of-pack nutrition labels on the healthiness of consumer food purchases in the real world.

Volkova E. et al. Effects of interpretive front-of-pack nutrition labels on food purchases: protocol for the Starlight randomised controlled trial. *BMC Public Health* 14 (2014) 968-75

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?

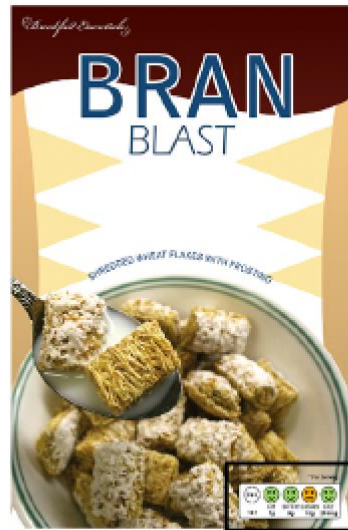
N=74

Eye tracking (time spent on label)

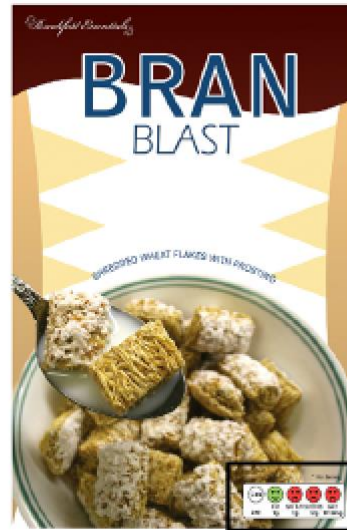
2 products (cereals, crackers)

2 label conditions (TL FOP yes/no)

2 healthy representation (healthy/unhealthy)



Healthy FOP Treatment



Unhealthy FOP Treatment

B

Nutrition Facts	
Serving Size 1/2 Cup (50g)	
Servings Per Container 7	
Total Fat 4g	8%
Saturated Fat 1g	2%
Trans Fat 0g	0%
Polysaturated Fat 0.5g	
Monosaturated Fat 0g	
Cholesterol 0mg	0%
Sodium 10mg	0%
Potassium 150mg	3%
Total Carbohydrate 44g	10%
Dietary Fiber 2g	4%
Sugar 1g	2%
Other Carbohydrate 2g	
Protein 1g	
Vitamin A	10%
Vitamin C	10%
Calcium	10%
Iron	10%
Vitamin E	10%
Vitamin B1	10%
Vitamin B2	10%
Vitamin B3	10%
Vitamin B6	10%
Vitamin B12	10%
Phosphorus	10%
Magnesium	10%
Zinc	10%
Vitamin K	10%

US Standard NFP
(Present on all packages)

C

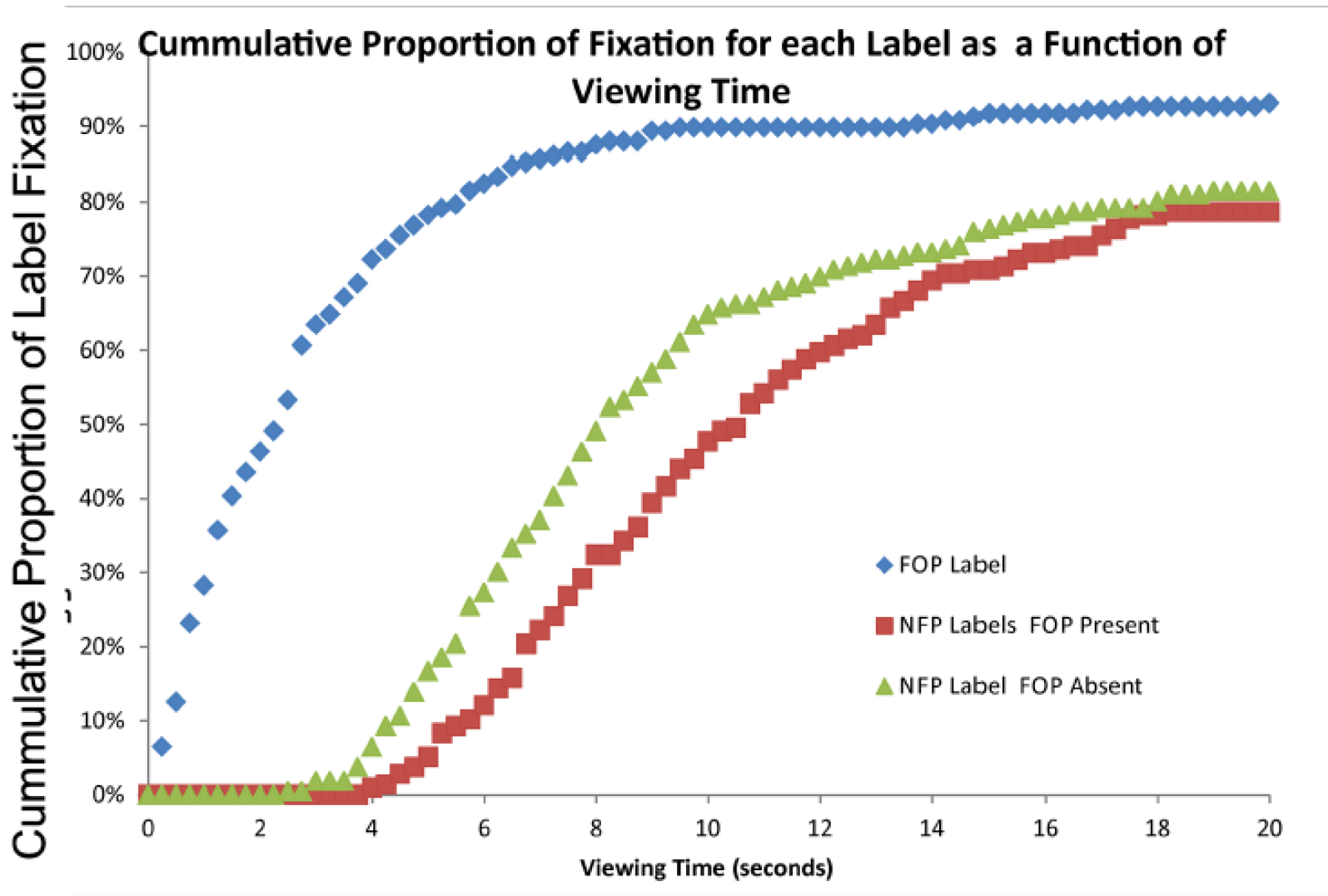


Fig 3. Plots the percentage of each type of nutritional label that has been fixated as a function of viewing time. Data were collapsed across participants so the percentage was based on the number of labels fixated out of the 220 total labels per label type (4 labels x 55 participants)

Are there **unintended consequences** in the application of FOP labeling?

Conclusions:

“FOP labels are effective at garnering 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.”