De schadelijkheid van ultraprocessed voedsel

Jaap Seidell

	High Nutrient / Low Calorie	**High Nutrient / High Calorie**
	Fresh and frozen vegetables Fresh and frozen fruits Lean meats and fish Skinless poultry Low fat dairy Broth based soups	Nuts and seeds Avocado Beans and legumes High fat dairy Poultry with skin Starchy vegetables Whole grains Dried fruits
	Low Nutrient / Low Calorie	**Low Nutrient / High Calorie**
	Water Tea Coffee Artificially sweetened beverages Sugar-free candy	Potato chips French fries Sugar sweetened beverages Baked goods Sweets Fried foods

More Nutritious (vertical axis)

More Caloric (horizontal axis) →

The food matrix:
nutrition science shifts from nutrients to whole foods

The reductionist approach has delivered essential insights in nutrition science. However, to fully understand the health effects of whole foods and food patterns, nutrition science has to move up to a next level. The concept of the food matrix shows that food is more than the sum of its nutrients.

TEKST DR. STEPHAN PETERS (NZO, DUTCH DAIRY ASSOCIATION) AND DR. EMMA FEENEY (UNIVERSITY COLLEGE DUBLIN, INSTITUTE OF FOOD AND HEALTH)

Nutrient science
Many of the major discoveries of the role of nutrients with respect to health were made decades, and in some cases centuries, ago. These were related to severe nutrient deficiencies. In the 17th century, it was discovered that scurvy could be prevented by eating citrus fruit. Nowadays, we know that scurvy was a severe vitamin C deficiency. Another famous example is beriberi, vitamin B1 (thiamine) deficiency. The discovery of the role of nutrients in metabolism is very important for understanding the health effects of foods. Until the 1990s, scientific research into the relationship between foods and health was mainly been focused on the effects of nutrients. This is called *the reductionist approach*: the study of individual nutrients in isolation rather than considering their effects when eaten in a food component or as a whole food.[1]

Reductionism
So, how does this reductionist approach work in general? To begin with, there is epidemiological science, which tries to find associations between the intake of foods and aspects of health among entire populations or their subpopulations. Subsequently, if any associations are found, scientists try to find a mechanism behind the observed effects, mainly based on the assumption that nutrients play a role in this mechanism. The interaction between the nutrient and the supposed mechanism can then be tested *in vitro* or on animals in the lab. Finally, for ultimate proof, a placebo-controlled study is conducted to prove the nutrient's health effect on humans. Thanks to this approach we know a lot about the effects of individual nutrients in the body. For example, it was discovered that amino acids, and in particular the amino acid leucine, stimulate protein synthesis in skeletal muscles. We also know a lot about components in food with antioxidative effects, such as some vitamins and glutathione.

Reductionist science doesn't always translate
Unfortunately, science always comes with uncertainties. This also applies to nutrition science. Considering food health effects only by its nutrients may lead to misinterpretations, with all its

Hoeveel ultra-bewerkt voedsel eten we en wat is de invloed op voedingskwaliteit?

Diet Quality & Ultra-processed Food

#1 New York Times bestseller

MICHAEL MOSS

"A *Fast Food Nation* for the processed food industry."
—MICHAEL POLLAN

SaLt SuGAr faT

How the Food Giants Hooked Us

Unprocessed or minimally processed foods include fresh, dried, or frozen vegetables, grains, legumes, fruits, meats, fish, eggs, and milk. They are the basis of healthy dishes and meals.

Ultra-processed foods include fast food, sugary drinks, snacks, chips, candies, cookies, sweetened milk products, sweetened cereals, and sauce and dressings. They are nutritionally poor.
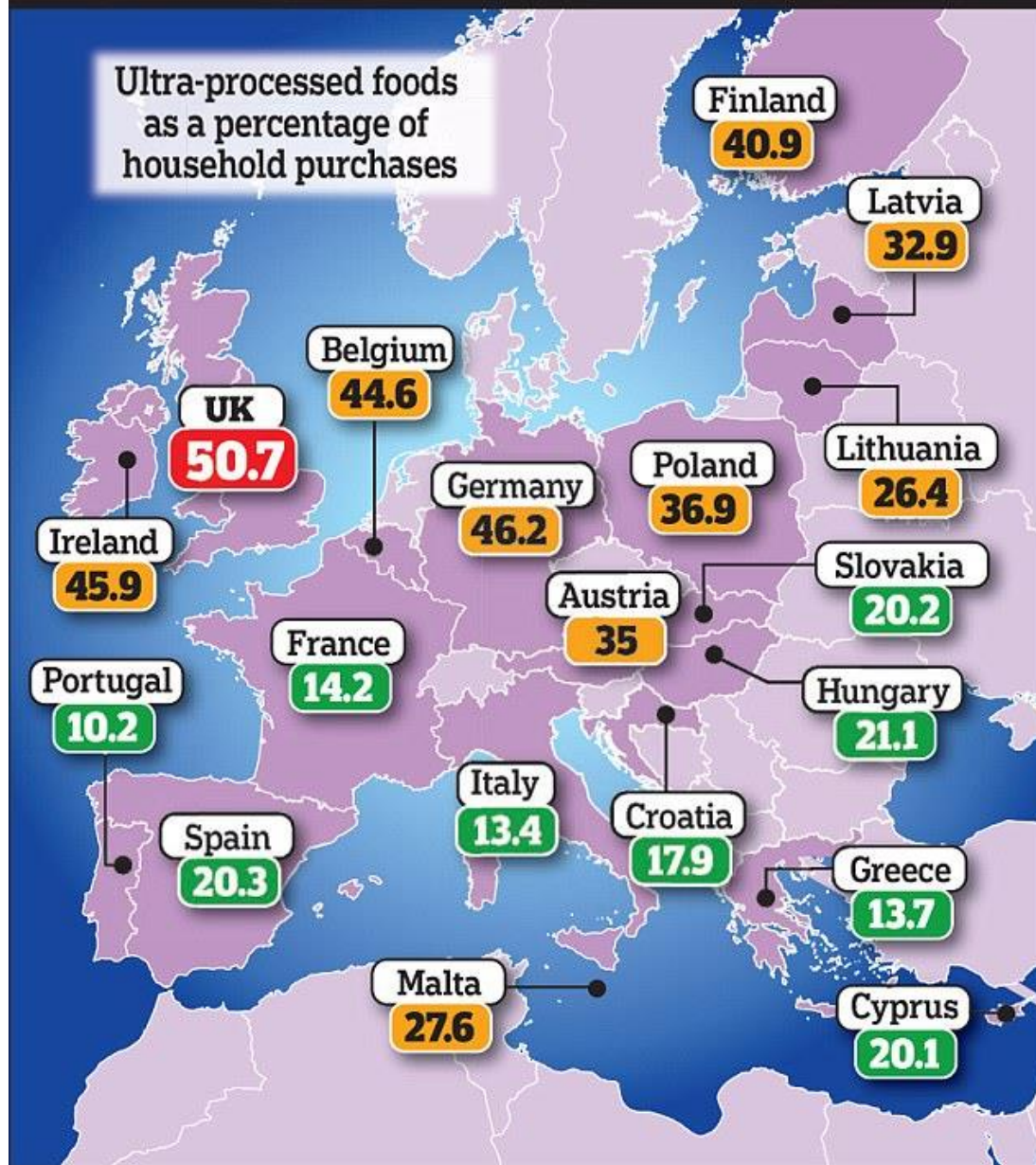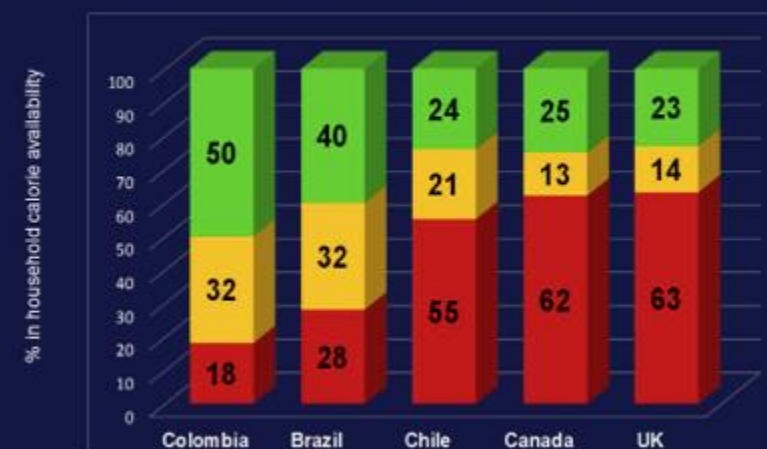
Heart&Stroke

8

BULK BUY – BRITAIN TOPS LIST

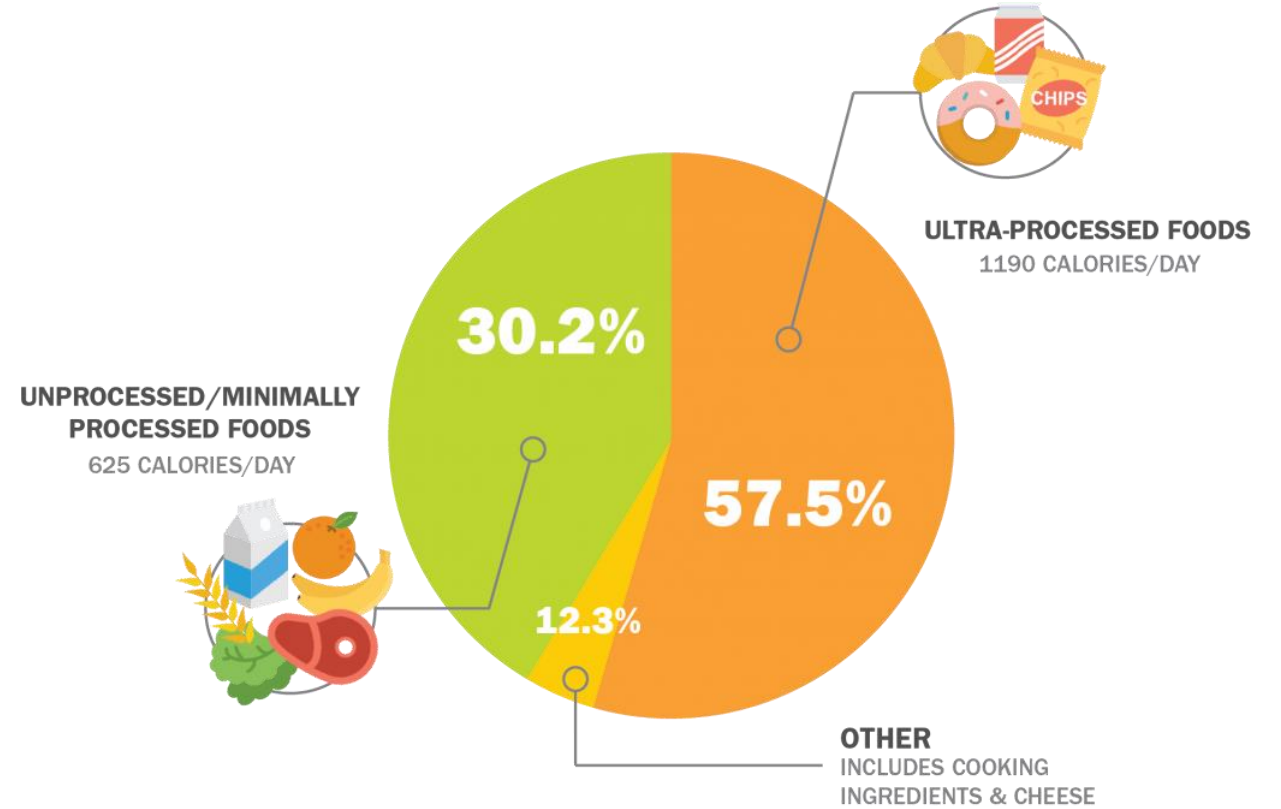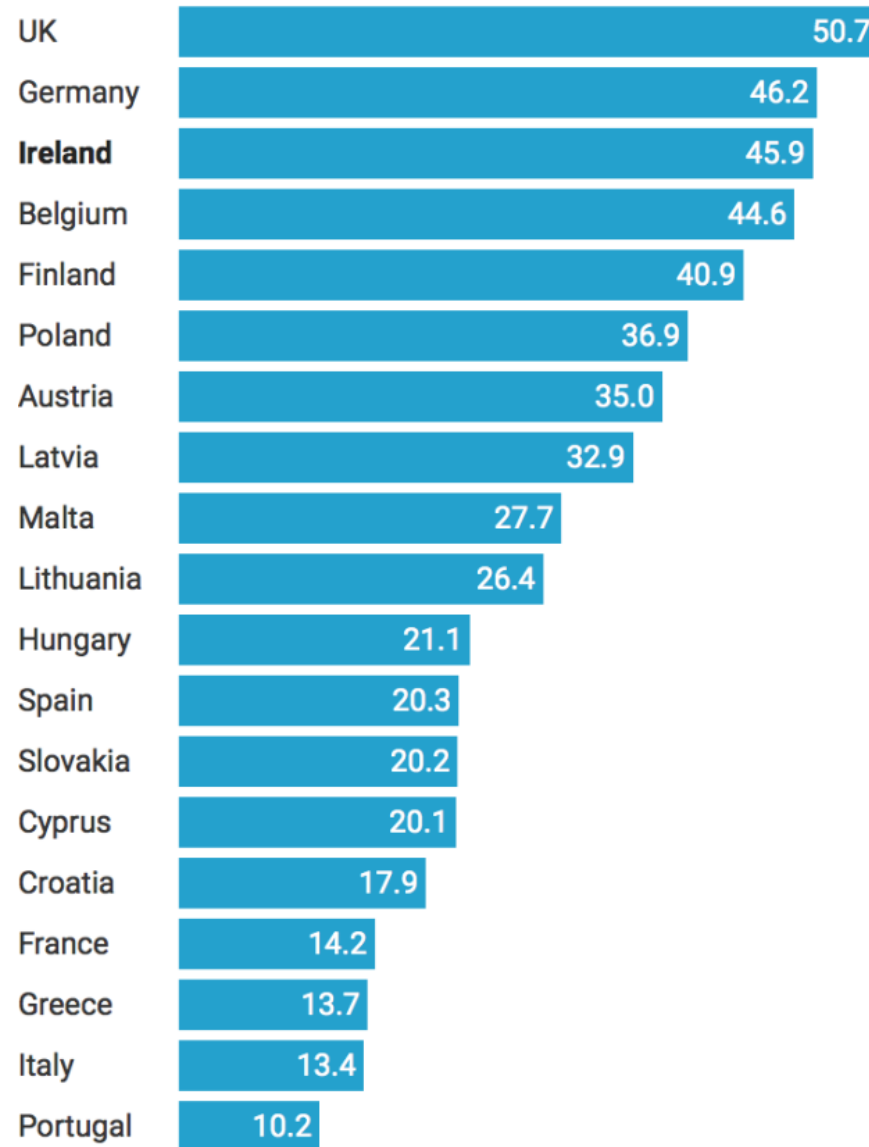Ultra-processed foods as a percentage of household purchases

Finland 40.9
Latvia 32.9
Belgium 44.6
UK 50.7
Lithuania 26.4
Germany 46.2
Poland 36.9
Ireland 45.9
Slovakia 20.2
Austria 35
France 14.2
Hungary 21.1
Portugal 10.2
Italy 13.4
Croatia 17.9
Greece 13.7
Spain 20.3
Malta 27.6
Cyprus 20.1

Penetration of ultra-processed products

% in household calorie availability

	Colombia	Brazil	Chile	Canada	UK
Green	50	40	24	25	23
Yellow	32	32	21	13	14
Red	18	28	55	62	63

Ultra-processed food

% of household purchases

Country	%
UK	50.7
Germany	46.2
Ireland	45.9
Belgium	44.6
Finland	40.9
Poland	36.9
Austria	35.0
Latvia	32.9
Malta	27.7
Lithuania	26.4
Hungary	21.1
Spain	20.3
Slovakia	20.2
Cyprus	20.1
Croatia	17.9
France	14.2
Greece	13.7
Italy	13.4
Portugal	10.2

ULTRA-PROCESSED FOODS
1190 CALORIES/DAY

UNPROCESSED/MINIMALLY PROCESSED FOODS
625 CALORIES/DAY

30.2%

57.5%

12.3%

OTHER
INCLUDES COOKING
INGREDIENTS & CHEESE

As intake of ultra-processed foods increase, sodium intake goes up and potassium intake goes down
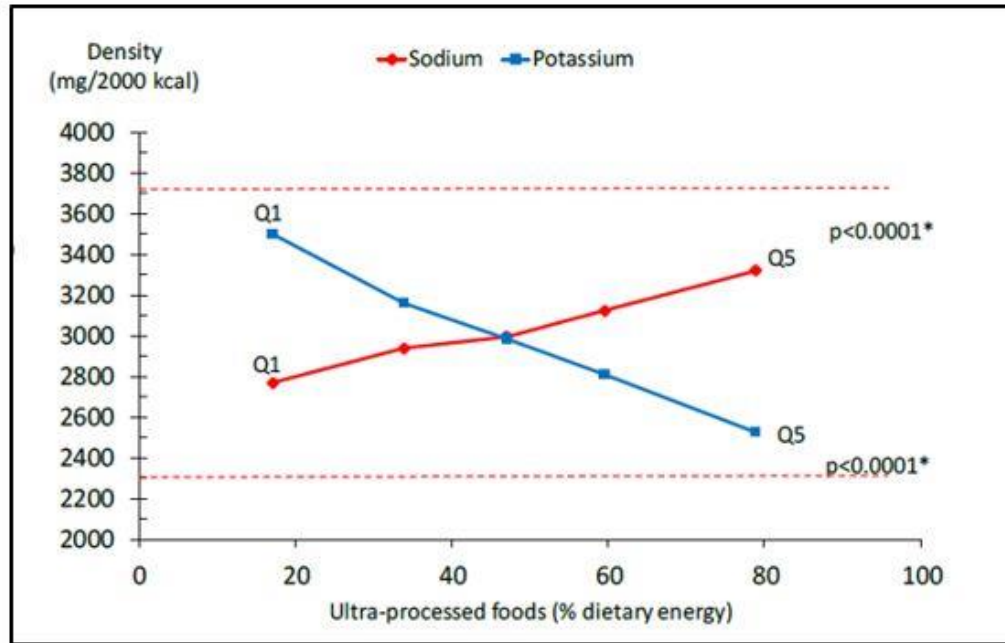
Density (mg/2000 kcal) vs Ultra-processed foods (% dietary energy). Sodium (red), Potassium (blue). p<0.0001*

*This chart comes from the report commissioned by the Heart & Stroke Foundation of Canada (full link to report below)

As intake of ultra-processed foods increase, sugar intake increases significantly as well
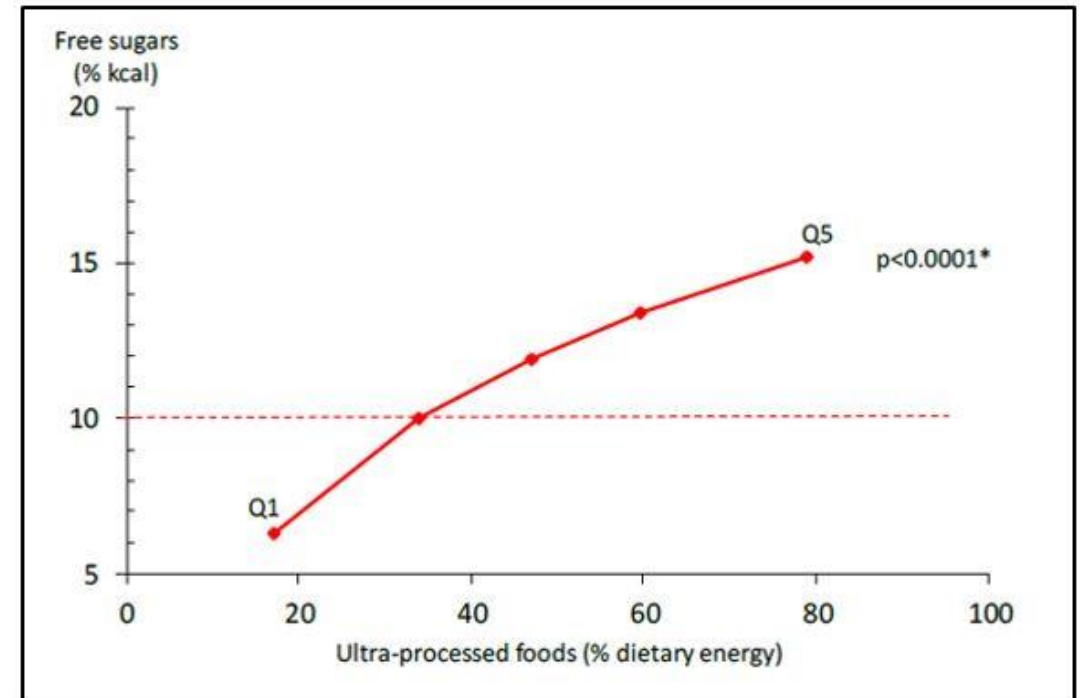
Free sugars (% kcal) vs Ultra-processed foods (% dietary energy). p<0.0001*

*This chart comes from the report commissioned by the Heart & Stroke Foundation of Canada (full link to report below)
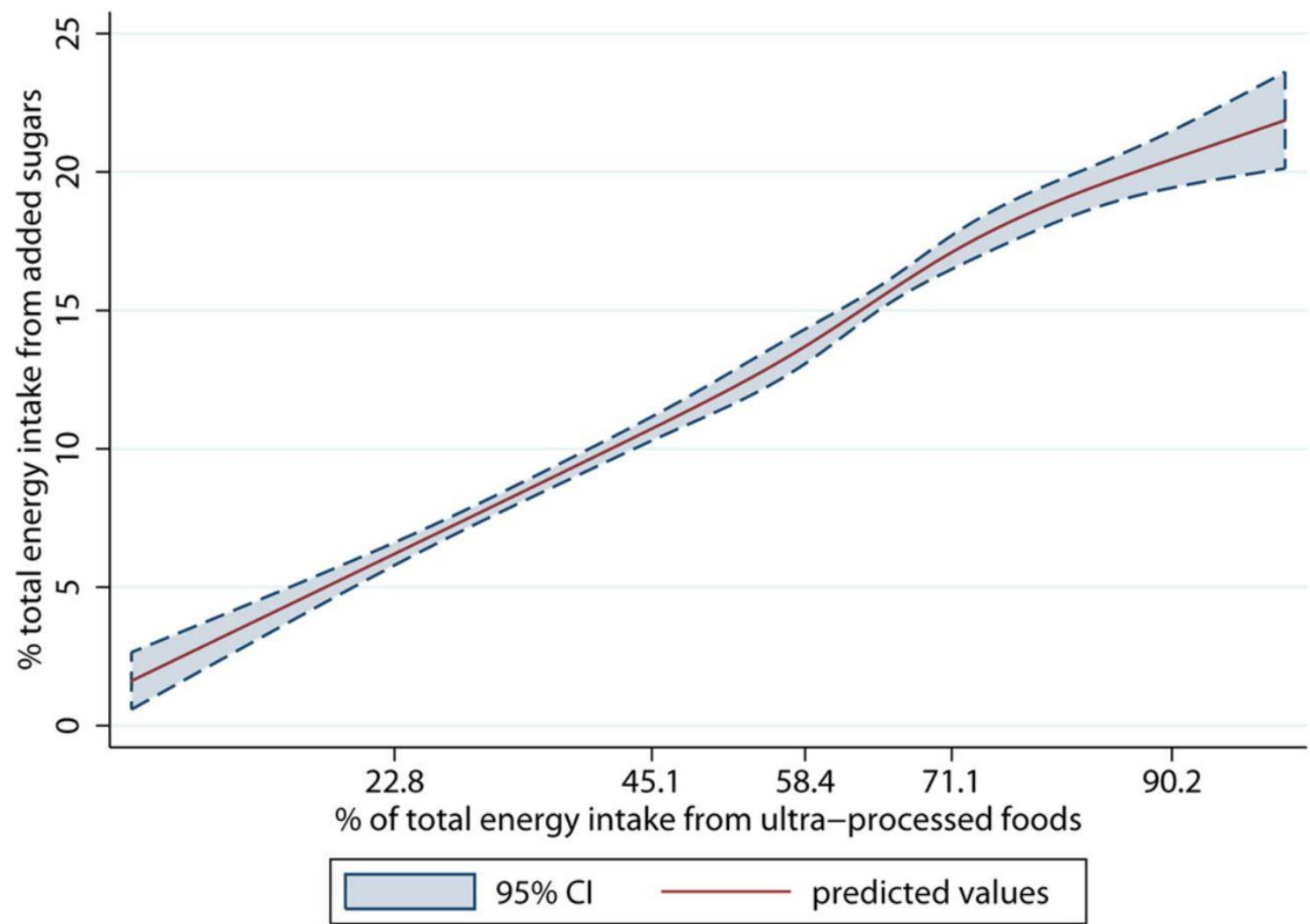
Food/Nutrient	Unprocessed/minimally processed food		Processed/ultra-processed food	
	G1	G2	G3a	G3b
Salt intake (g/day)	0.4–0.7 (WA 0.5)	0.05–0.1 (WA 0.06)	0.8–1.35 (WA 0.91)	3.8–5.05 (WA 4.14)
Saturated Fat (% energy intake/day)	2.71–3.08 (WA 2.87)	1.24–2.44 (WA 1.61)	1.66–1.82 (WA 1.74)	7.22–7.67 (WA 7.45)
Trans Fat *(% energy intake/day)	0	0	0	0.66 to 0.78 (WA 0.68)

WA = weighted average

*The values for trans-fat are assumptions based on data collected from the National Diet and Nutrition Survey.

PLOS | ONE

Comparing Different Policy Scenarios to Reduce the Consumption of Ultra-Processed Foods in UK: Impact on Cardiovascular Disease Mortality Using a Modelling Approach
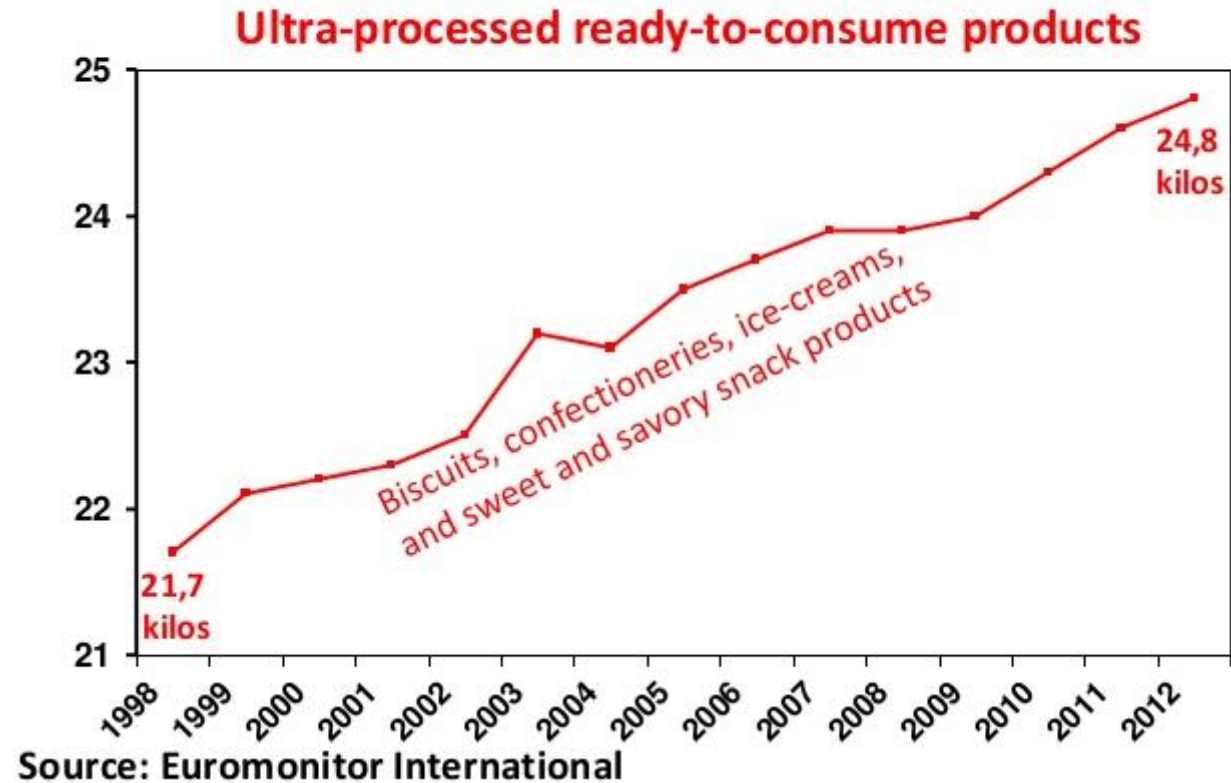
Patricia V. L. Moreira[1]*, Larissa Galastri Baraldi[2], Jean-Claude Moubarac[2], Carlos Augusto Monteiro[2,3], Alex Newton[1], Simon Capewell[1], Martin O'Flaherty[1]

1 Department of Public Health, University of Liverpool, Liverpool, England, 2 Centre for Epidemiological Studies in Health and Nutrition, University of São Paulo, São Paulo, Brazil, 3 Department of Nutrition, School of Public Health, University of São Paulo, São Paulo, Brazil

* patriciamoreira1111@hotmail.com

Annual per capita retail sales of foods and food products in West Europe (1998-2012)

Ultra-processed ready-to-consume products

Biscuits, confectioneries, ice-creams, and sweet and savory snack products

21,7 kilos

24,8 kilos

Source: Euromonitor International

Dietary energy density according to national quintiles of the dietary share of ultra-processed products

Energy density (g/kcal)

Ultra-processed products (% of total energy)
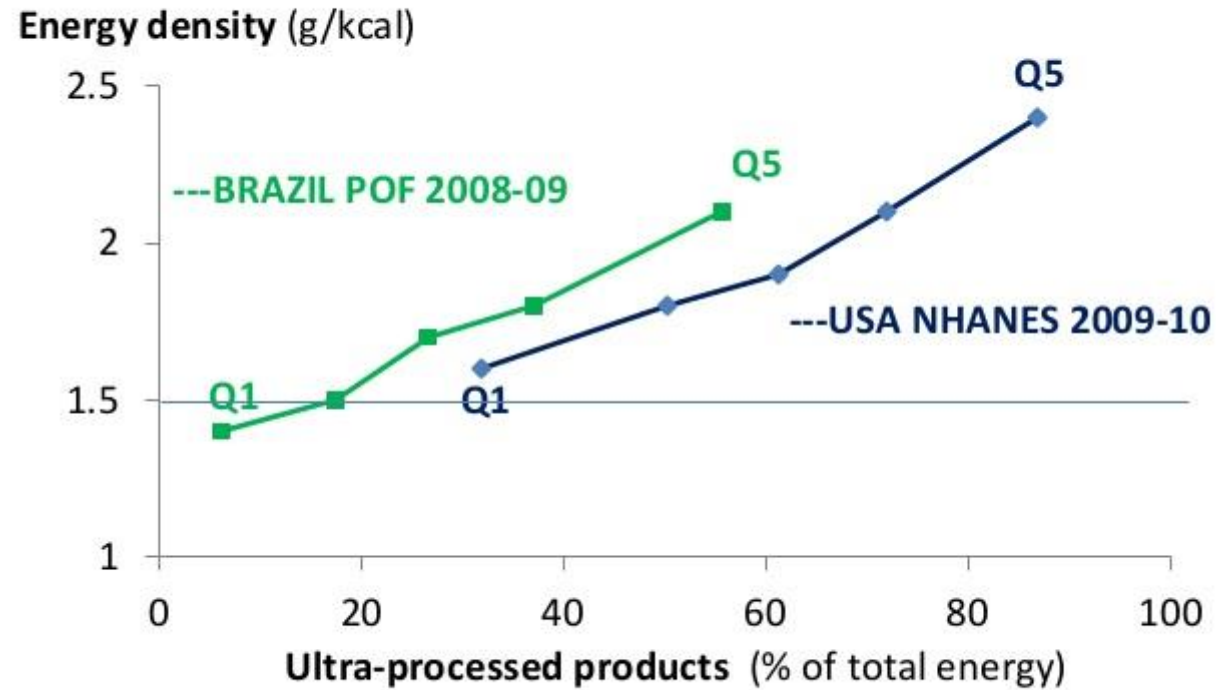
SOURCES: Louzada ML et al, Martinez E et al (manuscripts in preparation as part of PhD theses

ULTRA-PROCESSED FOODS

INCREASES

DECREASES

ZINC
PROTEIN
FIBER
VITAMINS
CALCIUM

SUGAR
CARBOHYDRATES
SATURATED FATS

1575 Kcal
High Energy Density

1575 Kcal
Low Energy Density

foodwatch

ONZE CAMPAGNES   **DOE MEE**   **DONEREN**   **OVER FOODWATCH**   🔍

foodwatch.nl – De Voedselwaakhond > persberichten > 2017 > 70% supermarkt bestaat uit omstreden 'ultra-proces...

PERSBERICHTEN | 30.08.2017

70% supermarkt bestaat uit omstreden 'ultra-processed foods'

PERSBERICHTEN
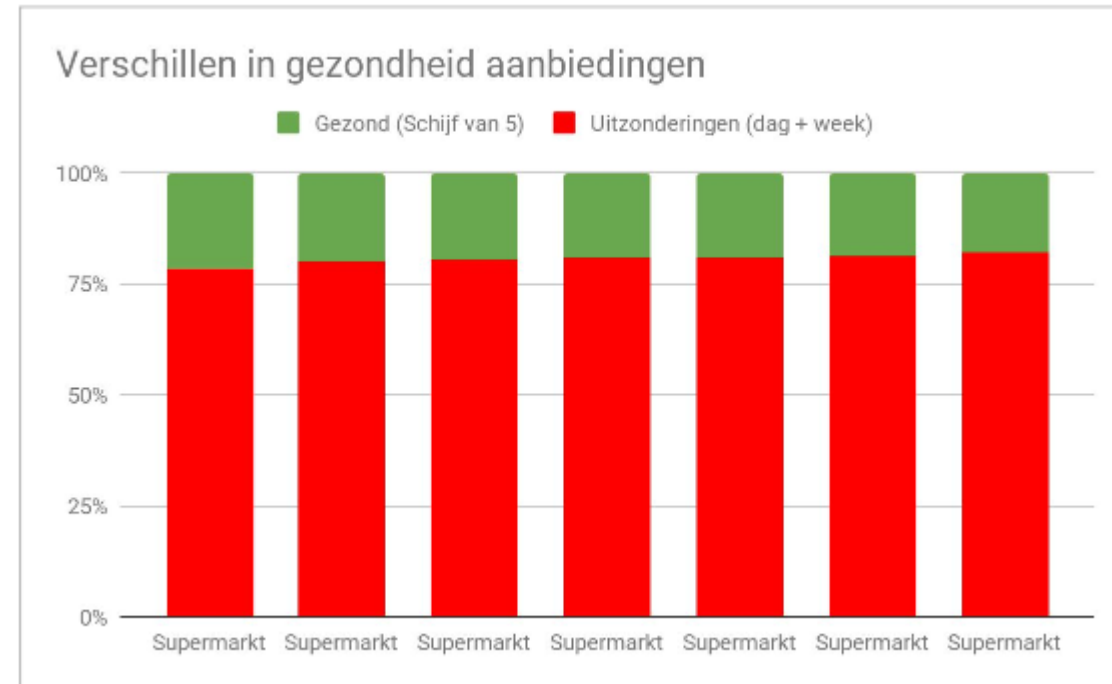

[f] **FACEBOOK**   [🐦] **TWITTER**

Uit onderzoek van foodwatch blijkt dat 70% van assortiment in de supermarkten uit de omstreden 'ultra-processed foods' bestaat. Ultra-processed foods zijn sterk bewerkt fabrieksvoedsel. Tot deze categorie voedsel behoren relatief veel ongezonde producten als frisdrank, snacks en fastfood. Zo bevatten ze vaak veel suiker, vet en zout en weinig mineralen, vitaminen en vezels. Ultra-processed foods worden in verband gebracht met

Superlijst. Wie maakt **duurzaam & gezond** de makkelijke keuze?

Inventarisatie van verschillen tussen supermarkten

Gezondheid aanbiedingen gemiddeld

- Gezond (Schijf van 5): 20,0%
- Dagkeuze: 14,0%
- Weekkeuze: 66,0%

Verschillen in gezondheid aanbiedingen

Gezond (Schijf van 5) — Uitzonderingen (dag + week)

Supermarkt, Supermarkt, Supermarkt, Supermarkt, Supermarkt, Supermarkt, Supermarkt

Nutrients are expensive. Calories are not.

Low nutrient density, 2000 kcal

High nutrient density, 2000 kcal

$3.52

$36.32

Monsivais, P. and Drewnowski, A. 2007. The Rising Cost of Low-Energy-Density Foods. *Journal of American Dietetic Association* 107:2071-2076.

Voedselkeuze wordt bepaald door aanbod

Gezondheidseffecten observationeel en experimenteel

Association between consumption of ultra-processed foods and all cause mortality: SUN prospective cohort study

Anaïs Rico-Campà,[1,2] Miguel A Martínez-González,[1,2,3,4] Ismael Alvarez-Alvarez,[1] Raquel de Deus Mendonça,[1,5] Carmen de la Fuente-Arrillaga,[1,2,3] Clara Gómez-Donoso,[1] Maira Bes-Rastrollo[1,2,3]

ABSTRACT

OBJECTIVE
To evaluate the association between consumption of ultra-processed foods and all cause mortality.

DESIGN
Prospective cohort study.

SETTING
Seguimiento Universidad de Navarra (SUN) cohort of university graduates, Spain 1999-2018.

PARTICIPANTS
19 899 participants (12 113 women and 7786 men) aged 20-91 years followed-up every two years between December 1999 and February 2014 for food and drink consumption, classified according to the degree of processing by the NOVA classification, and evaluated through a validated 136 item food frequency questionnaire.

with a 62% relatively increased hazard for all cause mortality. For each additional serving of ultra-processed food, all cause mortality increased by 18%.

STUDY REGISTRATION
ClinicalTrials.gov NCT02669602

Ultra-processed food intake and risk of cardiovascular disease: prospective cohort study (NutriNet-Santé)

Bernard Srour,[1] Léopold K Fezeu,[1] Emmanuelle Kesse-Guyot,[1] Benjamin Allès,[1] Caroline Méjean,[2] Roland M Andrianasolo,[1] Eloi Chazelas,[1] Mélanie Deschasaux,[1] Serge Hercberg,[1,3] Pilar Galan,[1] Carlos A Monteiro,[4] Chantal Julia,[1,3] Mathilde Touvier[1]

ABSTRACT

OBJECTIVE

ctive associations between processed foods and risk of es.

ort study.

, France 2009-18.

aged at least 18 years. Dietary d using repeated 24 hour r each participant on average), artici

risk of overall cardiovascular disease (1409 cases; hazard ratio for an absolute increment of 10 in the percentage of ultra-processed foods in the diet 1.12 (95% confidence interval 1.05 to 1.20); P<0.001, 518 208 person years, incidence rates in high consumers of ultra-processed foods (fourth quarter) 277 per 100 000 person years, and in low consumers (first quarter) 242 per 100 000 person years), coronary heart disease risk (665 cases; hazard ratio 1.13 (1.02 to 1.24); P=0.02, 520 319 person years, incidence rates 124 and 109 per 100 000 person years, in the high and low consumers, respectively), and cerebrovascular disease risk (829 cases; hazard ratio 1.11 (1.01 to 1.21); P=0.02, 520 023 person years,

Consumption of ultra-processed foods and cancer risk: results from NutriNet-Santé prospective cohort

Thibault Fiolet,[1] Bernard Srour,[1] Laury Sellem,[1] Emmanuelle Kesse-Guyot,[1] Benjamin Allès,[1] Caroline Méjean,[2] Mélanie Deschasaux,[1] Philippine Fassier,[1] Paule Latino-Martel,[1] Marie Beslay,[1] Serge Hercberg,[1,4] Céline Lavalette,[1] Carlos A Monteiro,[3] Chantal Julia,[1,4] Mathilde Touvier[1]

ABSTRACT
OBJECTIVE
To assess the prospective associations between consumption of ultra-processed food and risk of cancer.

DESIGN
Population based cohort study.

SETTING AND PARTICIPANTS
104 980 participants aged at least 18 years (median age 42.8 years) from the French NutriNet-Santé cohort (2009-17). Dietary intakes were collected using repeated 24 hour dietary records, designed to register participants' usual consumption for 3300 different food items. These were categorised according to their degree of processing by the NOVA classification.

statistically significant after adjustment for several markers of the nutritional quality of the diet (lipid, sodium, and carbohydrate intakes and/or a Western pattern derived by principal component analysis).

CONCLUSIONS
In this large prospective study, a 10% increase in the proportion of ultra-processed foods in the diet was associated with a significant increase of greater than 10% in risks of overall and breast cancer. Further studies are needed to better understand the relative effect of the various dimensions of processing (nutritional composition, food additives, contact materials, and neoformed contaminants) in these associations.
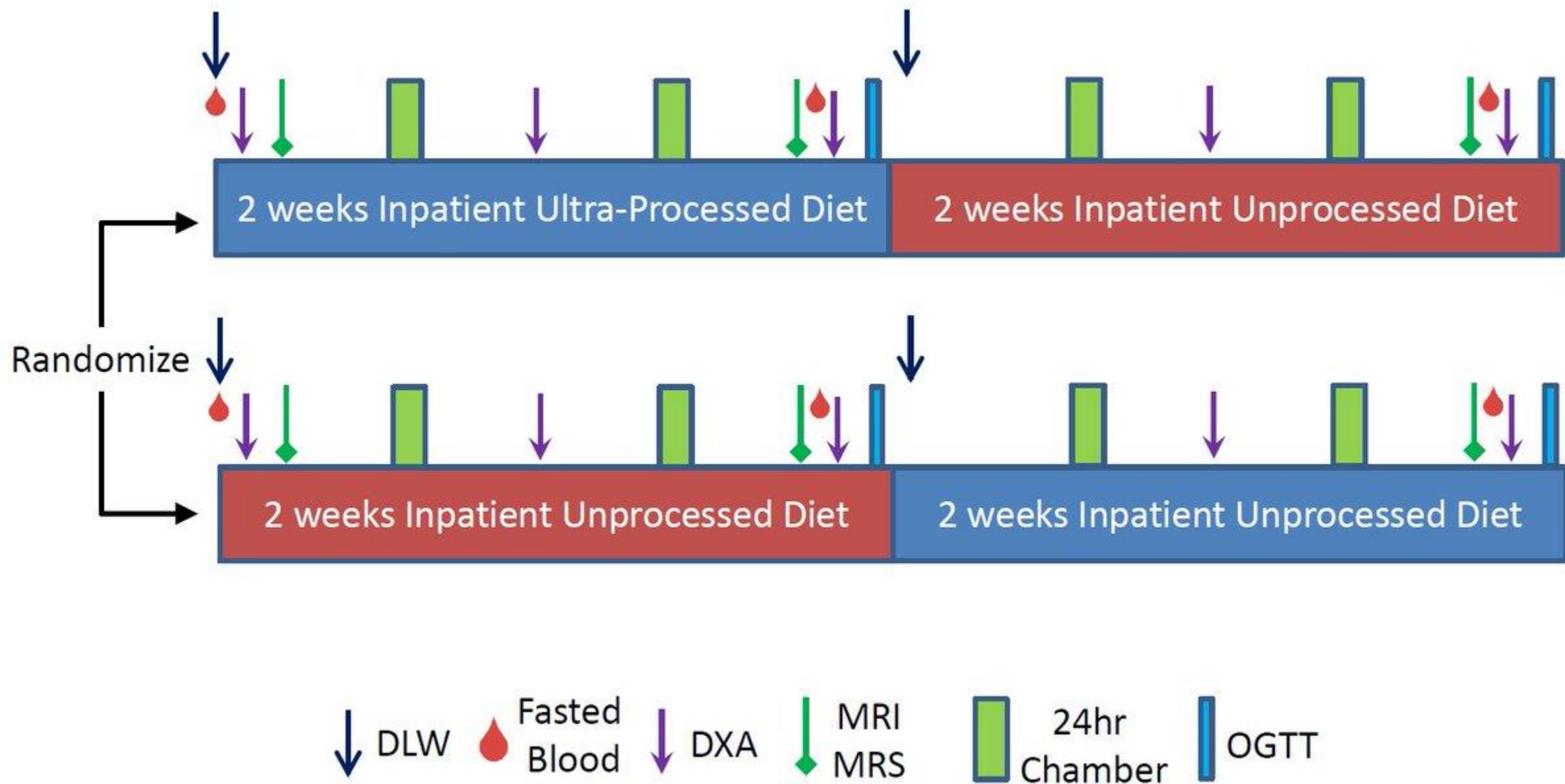
STUDY REGISTRATION

Page 1 of 2

EDITORIALS

Ultra-processed food and adverse health outcomes

Fresh evidence links popular processed foods with a range of health risks

Mark A Lawrence *professor*, Phillip I Baker *researcher*

Institute for Physical Activity and Nutrition, School of Exercise and Nutrition Science, Deakin University, Geelong, Australia
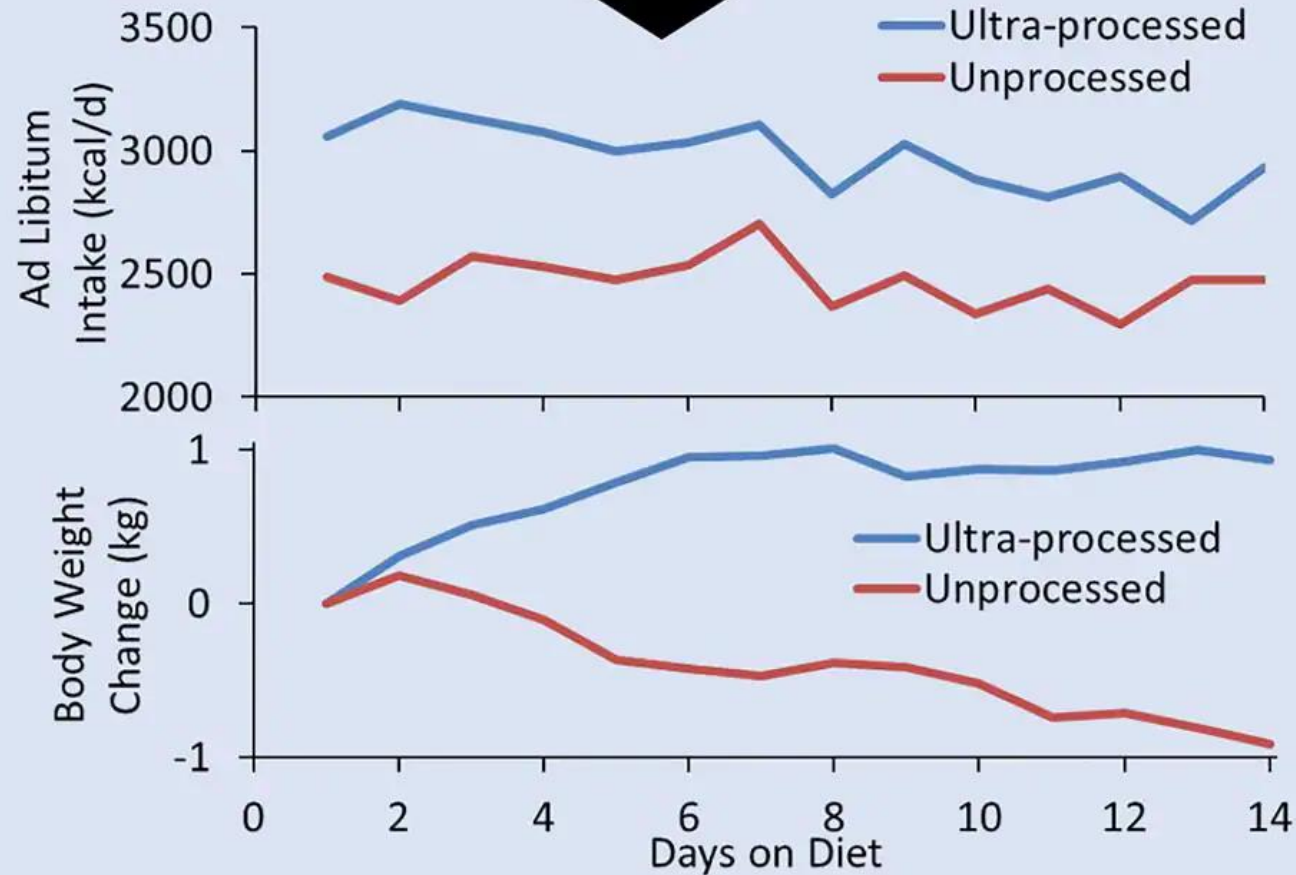
2 weeks Inpatient Ultra-Processed Diet | 2 weeks Inpatient Unprocessed Diet

Randomize

2 weeks Inpatient Unprocessed Diet | 2 weeks Inpatient Unprocessed Diet

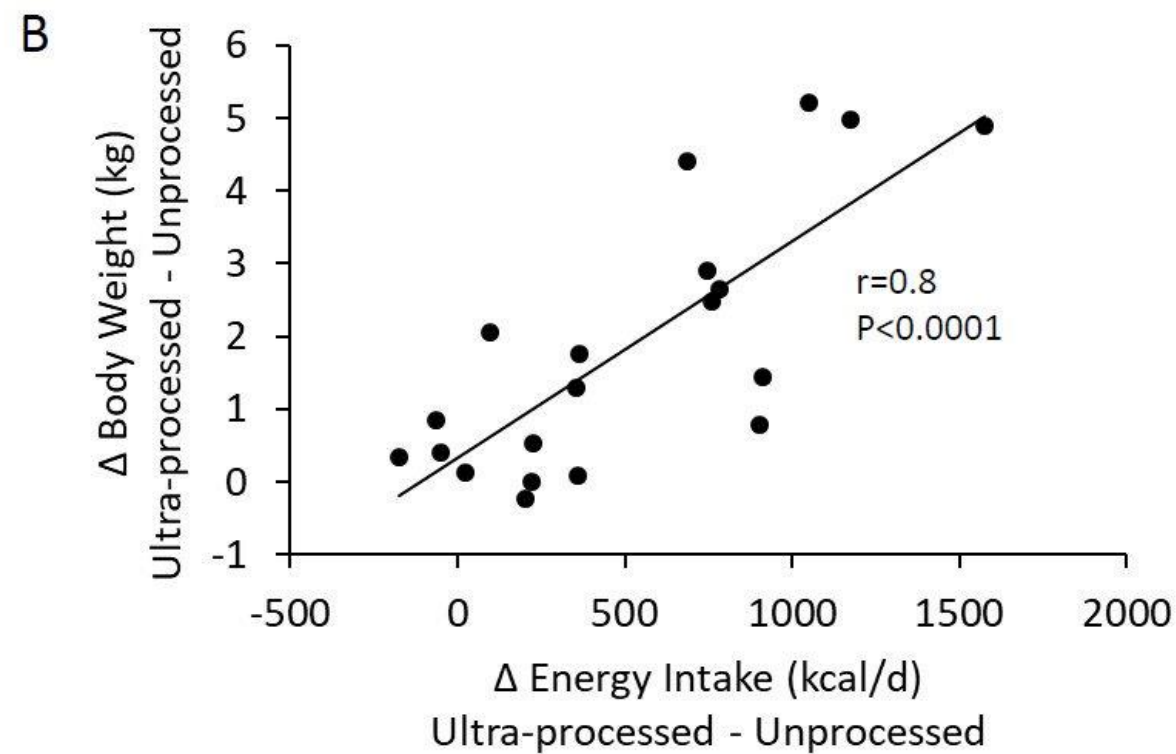DLW   Fasted Blood   DXA   MRI MRS   24hr Chamber   OGTT

Ultra-processed Diet

Unprocessed Diet

Diets were presented in random order and matched for provided calories, sugar, fat, fiber, and macronutrients

Ad Libitum Intake (kcal/d)

— Ultra-processed
— Unprocessed

3500

3000

2500

2000

Body Weight Change (kg)

— Ultra-processed
— Unprocessed

1

0

-1

Days on Diet

0   2   4   6   8   10   12   14

A

Δ Body Weight   Δ Fat Mass   Δ Fat-free Mass

■ Ultra-processed   ■ Unprocessed

B

r=0.8
P<0.0001
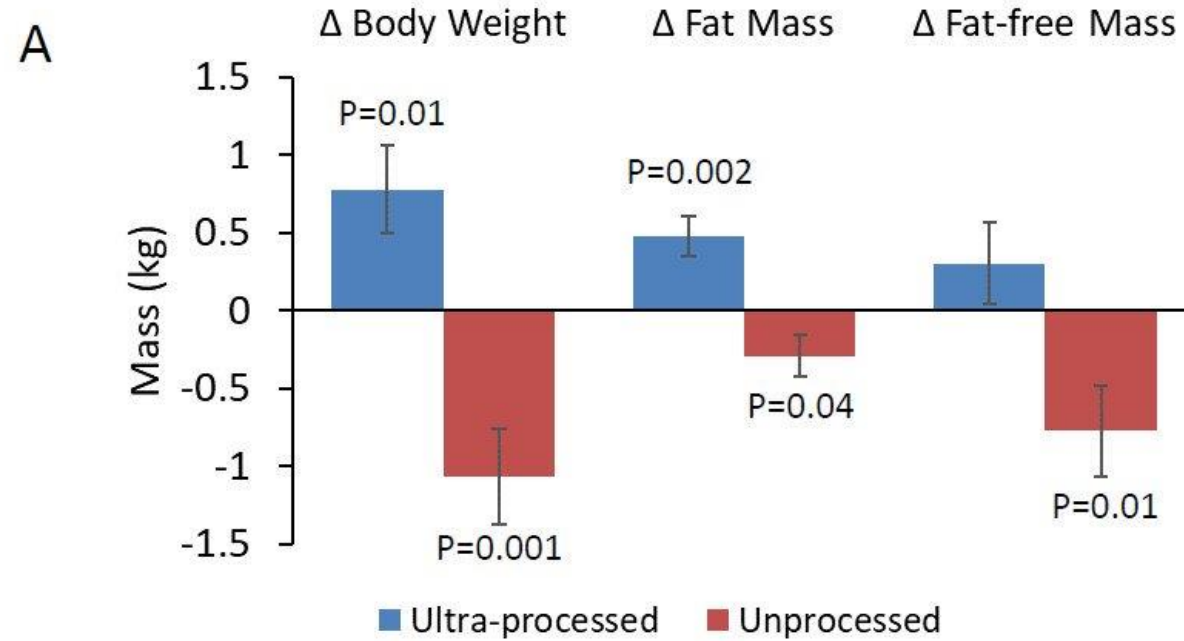
Uitstapje: ultra-bewerkt eten en keuzelogo

NUTRISCORE = B!! France officially receiving the message that these are health-promoting foods

Crisps and nachos?!!!

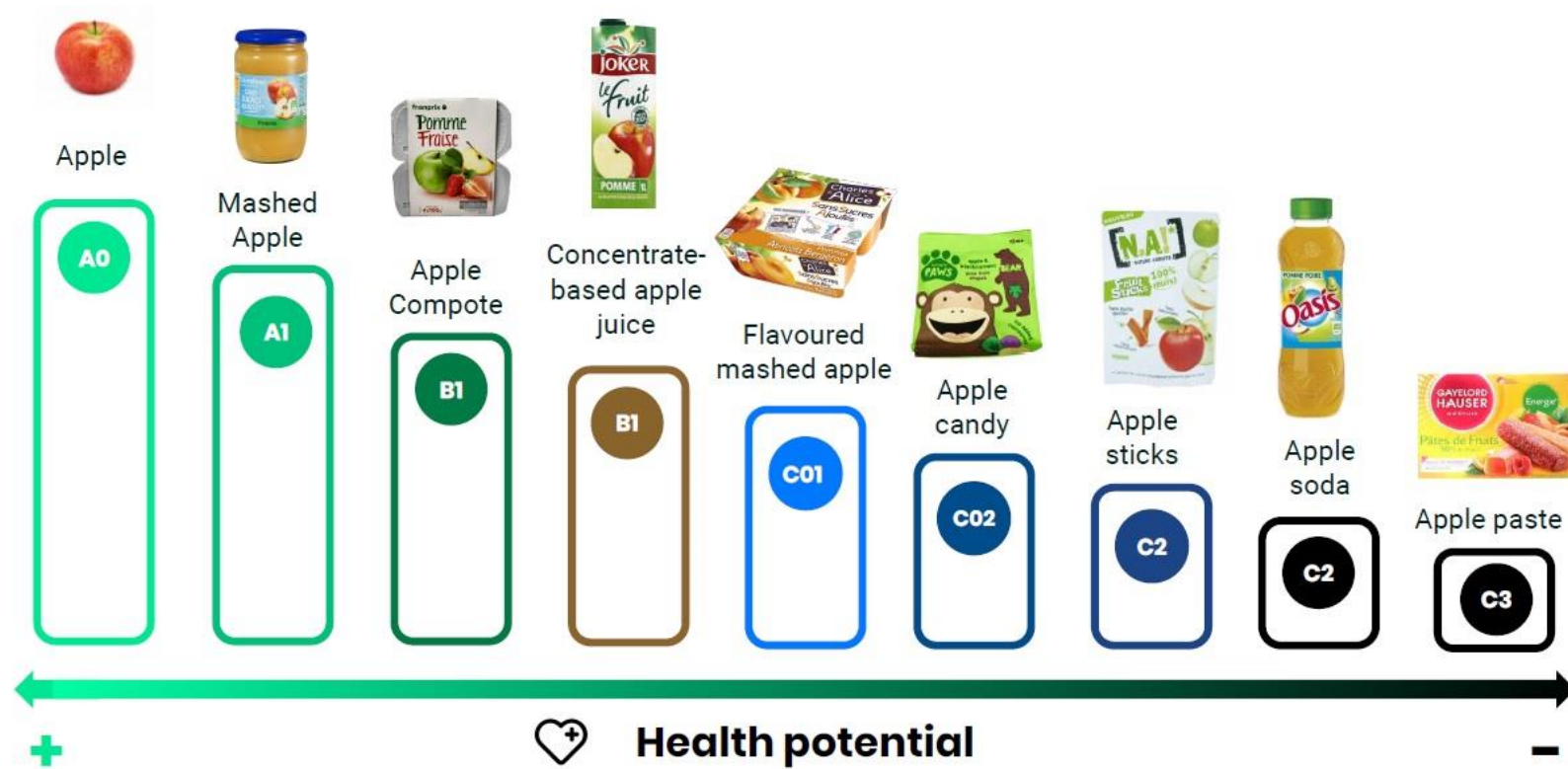Health foods?

NUTRI-SCORE

OLIVE OIL | EXTRA VIERGE
50 cl · 7,58 €/l

BLUE CHEESE
100 gr · 35,90 €/kg

SARDINES | GRILLED
120 gr · 19,08 €/kg

JAMON IBERICO
80 gr · 86,88 €/kg

La classification siga

PRO   CONSO

Aliments pas ou peu transformés

| A0 | 1 | Aliments non transformés |
| A1 | 2 | Aliments peu transformés |

Aliments transformés

| B1 | 3 | Aliments transformés équilibrés |
| B2 | 4 | Aliments transformés gourmands |

Aliments ultra-transformés niveau 0

| C01 | 5 | Aliments ultra-transformés niveau 0 acceptables |
| C02 | 6 | Aliments ultra-transformés niveau 0 occasionnels |

Aliments ultra-transformés niveau 1,2 & 3

C1	7	Aliments ultra-transformés niveau 1
C2	8	Aliments ultra-transformés niveau 2
C3	9	Aliments ultra-transformés niveau 3

Apple — A0

Mashed Apple — A1

Apple Compote — B1

Concentrate-based apple juice — B1

Flavoured mashed apple — C01

Apple candy — C02

Apple sticks — C2

Apple soda — C2

Apple paste — C3

♡+ **Health potential**

+   -

B1

C01

C1

C2

C3

Only simple ingredients!

Local soup

légumes, huile d'olive extra-vierge, sel, poivre

NUTRI-SCORE
A B C D E

Yuka ● 54/100 Bon

Cream of pumpkin soup

amidon de riz

NUTRI-SCORE
A B C D E

Yuka ● 79/100 Excellent

cream of 12 vegetables soup

arôme, extrait de levure, amidon modifié, huile raffinée

NUTRI-SCORE
A B C D E

Yuka ● 66/100 Bon

Cream of tomatos soup

extraits, arômes, amidon transformés, sirop de glucose

NUTRI-SCORE
A B C D E

Yuka ● 66/100 Bon

Cream of pumpkin soup

2 additifs évalués à risque, amidon, sirop de glucose

NUTRI-SCORE
A B C D E

Yuka ● 57/100 Bon

With equal nutritional value, these soups do not have the same health potential

NATURAL	PROCESSED	ULTRA-PROCESSED
TOMATOES		
INGREDIENTS 1	DOLMIO BOLOGNESE ORIGINAL — INGREDIENTS 11	GOODFELLA'S THIN & CRISPY ITALIANO TAKEAWAY — INGREDIENTS 26
RASPBERRIES		
1	TESCO Raspberry Jam — 6	25
CHICKEN		
1	CARVERY ROAST CHICKEN — 10	Birds Eye 22 CHICKEN DIPPERS — 16

Do food choices contribute to the maintenance of eating disorders?
A retrospective observational study of dietary intake of patients in a specialist service

Mr James Dugan[1], Dr Oliver Wroe Wright[2], Ms Eimear Galvin[2], Dr Agnes Ayton[1,2]

[1]University of Oxford   [2]Oxford Health NHS Foundation Trust

agnes.ayton@oxfordhealth.nhs.uk

Introduction

Eating disorders (ED) are a significant mental health problem with subsequent impact on physical health. Several different diagnoses, with different psychopathologies and consequences, including anorexia nervosa (AN), bulimia nervosa (BN) and binge eating disorder (BED), fall into the broader ED categorisation. Hormonal regulation of satiety has been studied extensively and is related to the macronutrient composition of intake [1,2]. Recent evidence suggests that ultra-processed foods interact with these hormonal systems in a different way [3,4]. We were interested whether the degree of industrial processing in ED patients' diets differed based on their diagnosis and whether there was a link between ultra-processed food intake and bingeing behaviours.

Methods

Patients with a diagnosis of AN, BN or BED were randomly selected from the service database in Cotswold House Oxford between 2017-19. 69 patients were identified, of which 64 had adequate dietary information to be included in the study. Dietary intake was obtained from the electronic health records. The NOVA classification was used to stratify the degree of industrial food processing in each patient's diet. NOVA comprises of 4 groups, from 1 to 4; group 1 being unprocessed or minimally processed foods (fruit, grains etc) and group 4 comprising ultra-processed foods (chocolate, cola etc). Frequencies of meals by NOVA group was collected for each diagnosis. T-test and one-way ANOVA were carried out with SPSS.

Summary of Results

Demographics: 63 were female and 1 male. AN n=19, BN n=23, BED n=22. Mean BMI by diagnosis: AN 18.0, BN 25.1, BED 37.9. Mean age by diagnosis: AN 24, BN 28, BED 40.

There was no significant difference in processed food intake by ED diagnosis. However, binge foods were 100% ultra-processed (NOVA group 4) and were significantly more processed than regular meals ($p < 0.01$).

Conclusion

In conclusion, no significant difference in processed food intake was found in different ED diagnoses. However, binge-foods were significantly more likely to be ultra-processed in comparison to regular diet. Further study into dietary intake of patients with ED is warranted, particularly whether changes to processed food intakes can reduce bingeing behaviours.

People with eating disorders binge on **ultra-processed** (NOVA 4) foods **100% of the time**

Regular meals included unprocessed, processed and ultra-processed foods…

…but binge foods were **always ultra-processed**

Results Tables

Table 1 – Frequency counts of NOVA classification of meals by different eating disorder diagnosis.

Diagnosis	NOVA Classification			
	1	2	3	4
Anorexia Nervosa	21	0	4	40
Bulimia Nervosa	15	0	9	50
Binge Eating Disorder	21	0	3	51

Table 2 – Frequency counts of NOVA classification of regular meals and foods consumed during episodes of bingeing.

Meal Type	NOVA Classification			
	1	2	3	4
Regular Meal	57	0	16	141
Binge	0	0	0	26

Table 3 – Statistical comparison of mean NOVA scores by ED diagnosis (one-way ANOVA) and regular meals vs binge

About the NOVA Classification

The NOVA classification system was developed by Monteiro *et al.* for the classification of foods according to the degree to which they are industrially processed. The following descriptions are modified from [5].

Nova Group 1 – Unprocessed or Minimally Processed Foods
Unprocessed foods are edible parts of plants or of animals and also fungi, algae and water, after separation from nature.
Examples: Fruit, vegetables, grains, milk, eggs etc

Nova Group 2 – Processed Culinary Ingredients
These are substances obtained directly from group 1 foods or from nature by processes such as pressing, refining, grinding, milling, and spray drying. They are not consumed on their own but are used as culinary ingredients.
Examples: Vegetable oils, salt, spices etc

Nova Group 3 – Processed Foods
These are relatively simple products made by adding sugar, oil, salt or other group 2 substances to group 1 food. [...] ods have two or three ingredients.
Examples: Unpackaged [...] nned fruit etc

Nova Group 4 – Ultra-processed Food and Drink Products

References

[1] DiFeliceantonio *et al.* **2018** *Cell Metabolism*, 28, 1-12.
[2] Gosby *et al.* **2014** *Obesity Reviews*, 15, 183-191.
[3] Small and DiFeliceantonio **2019** *Science*, 363, 6425, 346-347.
[4] Onaolapo and Onaolapo **2018** *Pathophysiology*, 25, 263-276.
[5] Monteiro *et al.* **2016** *World Nutrition*, 7, 1-3, 28-38.

Oxford Health NHS NHS Foundation Trust

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Kan het ook met minder processing?

Mediteranean diet

U.S. Version 🇺🇸	U.K. Version 🇬🇧

Ingredients: Whole Grain Rolled Oats, Sugar, Creaming Agent (Maltodextrin, Sunflower And Palm Oils, Whey, Sodium Caseinate), Flavored And Colored Fruit Pieces (Dehydrated Apples [Treated With Sodium Sulfite], Artificial Strawberry Flavor, Citric Acid, Red 40), Salt, Guar Gum, Artificial Flavor, Citric Acid, Niacinamide, Vitamin A Palmitate, Reduced Iron, Pyridoxine Hydrochloride, Riboflavin, Thiamin Mononitrate, Folic Acid.

Ingredients: Quaker Wholegrain Rolled Oats, Sugar, Freeze Dried Raspberry Pieces, Freeze Dried Strawberry Pieces, Natural Flavouring.

McDonald's Fries in the U.S. 🇺🇸

Potatoes, Vegetable Oil (**Canola Oil, Corn Oil, Soybean Oil, Hydrogenated Soybean Oil, Natural Beef Flavor**), Dextrose, **Sodium Acid Pyrophosphate**, Salt. Fried in a vegetable oil blend with Citric Acid and **Dimethylpolysiloxane**.

McDonald's Fries in the U.K. 🇬🇧

Potatoes, Vegetable Oil (Sunflower, **Rapeseed**), Dextrose. Fried in non-hydrogenated vegetable oil. Salt is added after cooking.

FOOD BABE
Vani Hari

U.S. Version	U.K. Version
Ingredients: Tomato Concentrate, Distilled Vinegar, High Fructose Corn Syrup, Corn Syrup, Salt, Spice, Onion Powder, Natural Flavoring.	**Ingredients:** Tomatoes, Spirit Vinegar, Sugar, Salt, Spice and Herb Extracts, Spice.

FOOD BABE
Vani Hari

U.S. Version 🇺🇸	U.K. Version 🇬🇧	U.S. Version 🇺🇸	U.K. Version 🇬🇧

Carbonated Water, High Fructose Corn Syrup, Concentrated Orange Juice, Citric Acid, Natural Flavor, Sodium Benzoate, Caffeine, Sodium Citrate, Erythorbic Acid, Gum Arabic, Calcium Disodium EDTA, Brominated Vegetable Oil, Yellow 5.

Carbonated Water, Sugar, Citric Acid, Ascorbic Acid, Caffeine, Flavourings, Potassium Sorbate, Gum Arabic, Colour (Beta Carotene).

Ingredients: Corn, Vegetable Oil (Corn, Canola, And/or Sunflower Oil), Maltodextrin, Salt, Tomato Powder, Corn Starch, Lactose, Whey, Skim Milk, Corn Syrup Solids, Onion Powder, Sugar, Garlic Powder, Monosodium Glutamate, Cheddar Cheese (Milk, Cheese Cultures, Salt, Enzymes), Dextrose, Malic Acid, Buttermilk, Natural And Artificial Flavors, Sodium Acetate, **Artificial Color (Red 40, Blue 1, Yellow 5)**, Sodium Caseinate, Spice, Citric Acid, Disodium Inosinate, And Disodium Guanylate.

Ingredients: Corn, Vegetable Oils (Sunflower, Rapeseed), Cool Original Flavour, Salt, Glucose Syrup, Sugar, Potassium Chloride, Cheese Powder, Flavour Enhancers (Monosodium Glutamate, Disodium 5'-Ribonucleotide), Acidity Regulators (Malic Acid, Sodium Acetate, Citric Acid), **Colour (Annatto)**, Milk Proteins, Spice.

Mate van bewerking en gezondheid

- Een bruikbaar concept om voedingskwaliteit te beoordelen.
- De inname is hoog (> 50%) en groeiend.
- Hoge inname geassocieerd met slechtere voedingskwaliteit.
- Hoge inname geassocieerd met grotere kans op NCD's en stimuleert overconsumptie.