Sigma Nutrition Premium

Detailed Study Notes

Table of Contents

Introduction to this Episode

Over the past decade, the increasing uptake and acceptance of the Nova food processing classification system has placed focus on one of the categories in Nova; ultra-processed foods (UPFs). Ultra-processed foods (UPFs) are products created from deconstructed (and recombined) food components, usually with the goal of creating a highly palatable, convenient, and profitable product. This typically means such products are high in nutrients of content (e.g. sugar, sodium, saturated fat, etc.). But in addition, they have other characteristics that may make them detrimental to health, particularly when they replace unprocessed or minimally processed foods in the diet.

There is now clear evidence showing that when such products make up a large proportion of the diet, such a dietary pattern has negative health effects. However, there are still many unanswered questions and many debates within nutrition science about how to best classify UPFs, to what degree they need to be limited, whether some can be beneficial, and what to do with policy going forward.

To offer one perspective on this issue, Associate Professor of Food Politics and Policy at the University of Melbourne, Dr. Gyorgy Scrinis, is on the podcast to discuss his work in the area.

While we have discussed the problem of reductionism in nutrition science previously on the podcast, Dr. Scrinis' use of the term 'reductionism' does differ a bit from the way others use the term. For example, he suggests that nutrition science has been too reductive even at the food-level and dietary-pattern level.

His work on ultra-processed foods and the Nova classification system has attempted to understand the technological and corporate character of ultra-processed foods, the power of food corporations, and how food corporations shape and capture nutrition science for the purposes of promoting and defending their products.

Connection to Previous Episodes

#413: Anthony Fardet, PhD – Nutritional Reductionism, the Food Matrix & Impact of Processing

- Dr. Fardet is a nutrition science researcher in the Human Nutrition Unit at Université Clermont Auvergne, France.
- In this episode we discussed the concept of 'nutritional reductionism' (with reference to Dr. Scrinis' work) and how that compares to 'nutritional holism'.
- We discussed the impact of the degree of processing on the food matrix and composition.
- And beyond that how food matrix characteristics affect nutrient bioavailability, digestion kinetics, glycemic response, and satiety.
- You can find the episode page here or simply navigate to episode #413 in your podcast feed to listen.

#403 Prof. David Jacobs – Food Synergy & The Top-Down Approach to Nutrition Research

- Prof. Jacobs is Professor of Public Health, in the Division of Epidemiology and Community Health, at the University of Minnesota.
- He has talked about why we should think of whole diet patterns or foods as the exposure of interest, rather than individual nutrients.
- This warns against the pitfalls of applying a biomedical lens to nutrition research, as this can be reductive.
- You can find the episode page here or simply navigate to episode #403 in your podcast feed to listen.

#448: Prof. Norman Temple – Can Science Answer Diet-Health Questions?

- Norman Temple is a professor of nutrition at Athabasca University.
- Of relevance to the current episode, Prof. Temple discussed why mechanistic studies won't be able to answer the questions we care about, which is related to the problems with a reductionist focus on individual nutrients or mechanisms.
- You can find the episode page here or simply navigate to episode #448 in your podcast feed to listen.

#339: Prof. Corinna Hawkes – Food Policy, Food Systems & Public Health

- Prof. Hawkes is the Director of the Centre for Food Policy at City, University of London, UK.
- Her work and her appearance on the podcast was referenced in this episode with Dr. Scrinis.
- This was related to some of the topics discussed in episode 339, including:
    - Understanding food systems
    - The forces that dictate the appearance of poor quality food in the food supply (beyond simply market demand because we like the taste of certain foods)
    - The process of making policy change happen
- You can find the episode page here or simply navigate to episode #339 in your podcast feed to listen.

#363: Public Health Policy vs. Personal Responsibility: Evidence vs. Ideology

- In the current episode, Dr. Scrinis referred to how lack of political will (largely driven by a neoliberal ideology) is a significant barrier to making the food system changes that are needed.
- To get into more of the details of how political ideology and health evidence can be in conflict, then Alan and Danny discussed this topic in episode 363.
- It explains the connection between neoliberalism and the lack of effective public health policy in several situations.
- You can find the episode page here or simply navigate to episode #363 in your podcast feed to listen.

#344: Prof. Martin Caraher – Food Poverty & Food Aid Provision

- In the current episode, we also mentioned the work of Martin Caraher, referencing examples he has given where food poverty and social inequality are likely to drive people towards poorer quality foods, even when operating rationally.
- Prof. Martin Caraher is Emeritus Professor of food and health policy at Centre for Food Policy at City, University of London.
- You can find the episode page here or simply navigate to episode #344 in your podcast feed to listen.

Nutritionism

Dr. Scrinis' work on nutritionism involves uncovering the various forms of reductionism within nutrition science, dietary guidelines, nutritional engineering of foods, food marketing and food policy; reductive approaches to the body; and how food corporations have benefited from this nutrient-centric approach.

In his book *Nutritionism*, Dr. Scrinis writes:

> *"Nutritionism— or nutritional reductionism— is characterized by a reductive focus on the nutrient composition of foods as the means for understanding their healthfulness, as well as by a reductive interpretation of the role of these nutrients in bodily health.*
>
> *A key feature of this reductive interpretation of nutrients is that in some instances… it conceals or overrides concerns with the production and processing quality of a food and its ingredients."*

In a 2008 article in the food science journal *Gastronomica*, Scrinis wrote:

> *"[The ideology or paradigm of nutritionism]... is where the nutri-biochemical level of engagement with food and the body becomes the dominant way of understanding the relationship between food and bodily health, and at the expense of other levels and ways of understanding and engaging with food."*

He goes on to expand on this, saying:

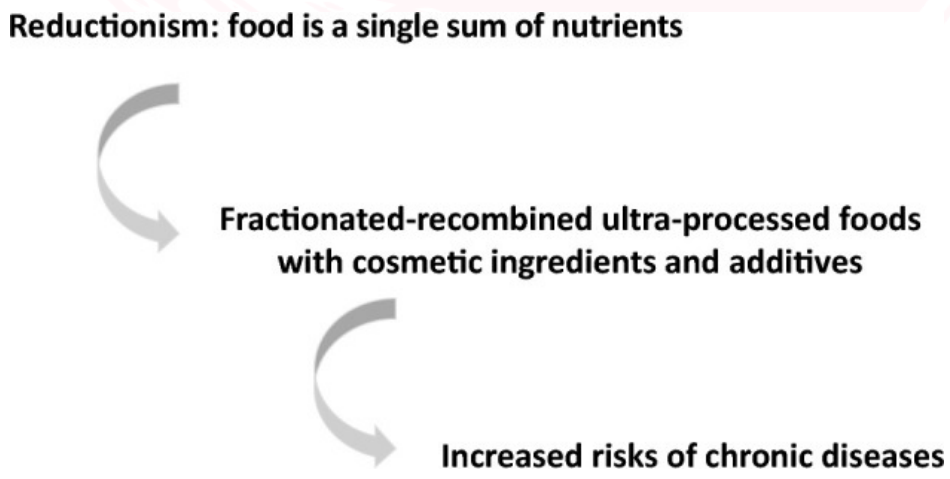
> "The nutritionism paradigm, however, is defined by an overly reductive focus on this nutri-biochemical level. Particular nutrients, food components, or biomarkers—such as saturated fats, kilojoules, the glycemic index (gi), and the body mass index (bmi)—are abstracted out of the context of foods, diets, and bodily processes.
>
> Removed from their broader cultural and ecological ambits, they come to represent the definitive truth about the relationship between food and bodily health. Within the nutritionism paradigm, this nutri-biochemical level of knowledge is not used merely to inform and complement but instead tends to displace and undermine food-level knowledge, as well as other ways of understanding the relationship between food and the body."

In his book, Scrinis also describes many different types of reductionism within nutrition. So in addition to the 'ideology of nutritionism' described above, Scrinis also identifies how a reductive approach can be taken on many levels. A select few examples are shown in the below table.

Table: Forms of Reductionism (adapted from Scrinis, 2013)

Type of Reductionism	Description
Nutritional reductionism	Reductive focus on the nutrient- level of engagement with food, and a reductive interpretation of the role of nutrients in bodily health. Characteristics include decontextualization, simplification, fragmentation, exaggeration, and determinism with respect to the role of nutrients.
Nutrient-level reductionism	The reduction of the understanding and practical engagement with food to the nutrient level.
Single-nutrient reductionism	The further reductive focus on single nutrients within the nutrient level.
Macronutrient reductionism	The reductive focus on and interpretation of the macronutrient profile of a food or dietary pattern with respect to their implications for health or weight impacts.
Food- level reductionism, single- food reductionism	Reductive focus on, and interpretation of, foods with respect to their health implications

Adapted from: Scrinis, G. (2013). Nutritionism: The science and politics of dietary advice (1st ed.)



Taken from: Fardet & Rock, Adv Nutr. 2018 Nov; 9(6): 655–670.

Nova Food Processing Classification

Nova was developed by Prof. Carlos Monteiro and his team.

Image from: Fardet, Adv Food Nutr Res. 2018;85:79-129

Nova differentiates four categories of foods based on the extent and purpose of the industrial processing they are subjected to:

- **Group 1** = unprocessed or minimally processed foods
- **Group 2** = processed culinary ingredients
- **Group 3** = processed foods
- **Group 4** = ultra-processed foods

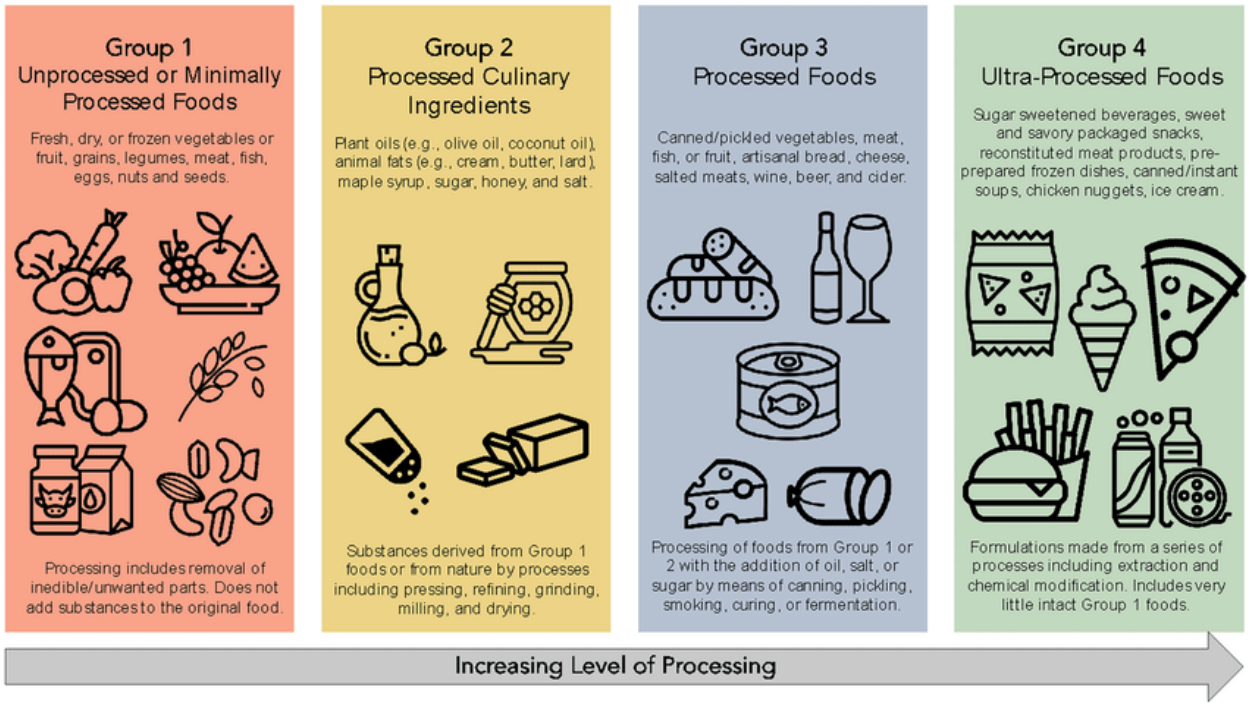


Image from: Crimarco et al., Curr Obes Rep. 2022 Sep;11(3):80-9

Ultra-processed foods (UPFs) are defined as:

> *"industrial formulations manufactured by deconstructing foods into their component parts, modifying them and recombining them with a myriad of additives and little, if any, whole foods."* (Scrinis and Monteiro, 2022)

Companies create UPFs in order to sell products that are:

- Convenient (durable, ready-to-consume)
- Tasteful (often hyper-palatable)
- Highly profitable (cheap ingredients, value adding)

In addition to the potential direct problem of these products containing high amounts of nutrients that can be problematic (e.g. salt and sugar), they have the additional negative effect of displacing more minimally-processed, health-promoting foods in the diet.

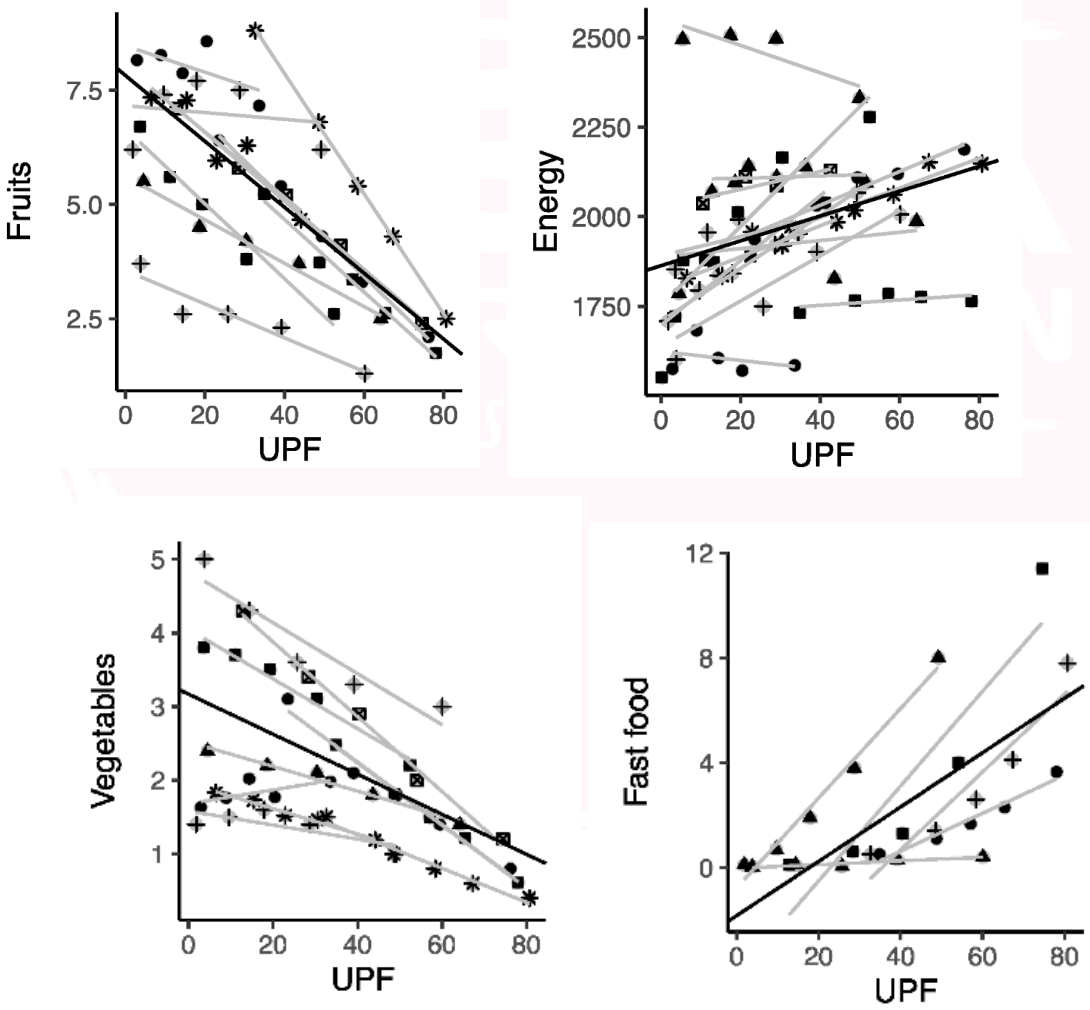
Scrinis & Monteiro (2022) outlined impacts of UPFs across three dietary levels:

1. Nutrients
2. Foods
3. Dietary patterns

Impact of UPFs at the Nutrient Level

- UPF products are typically high in one or more of the 'nutrients-to-limit':
  - Added sugars
  - Sodium
  - Saturated fat
  - Trans-fats
  - Energy density
- And they are relatively deficient in 'nutrients-to-promote' (e.g. fiber, micronutrients).

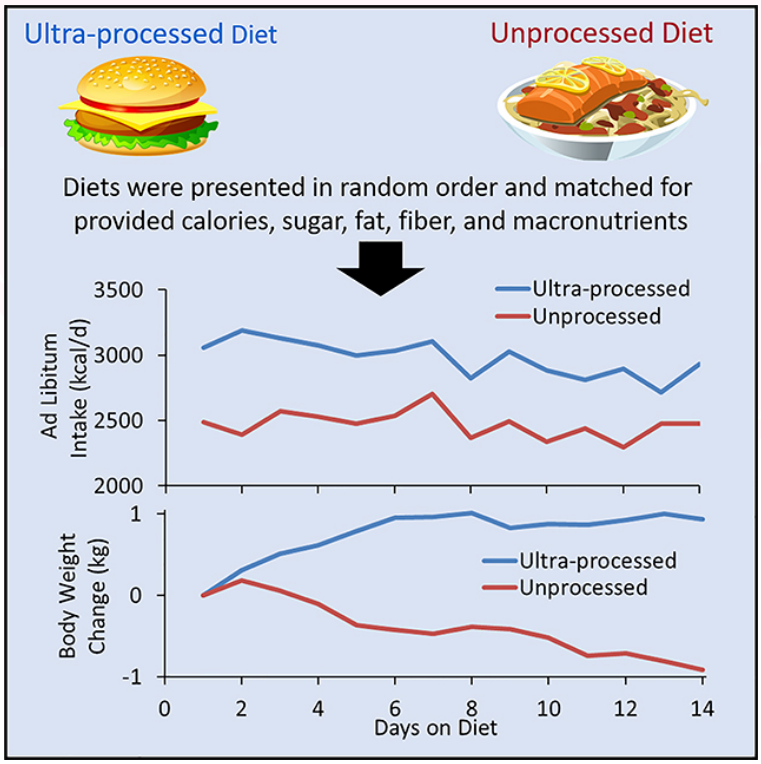
Studies from 13 countries have shown a strong inverse correlation between the proportion of UPFs in the diet and the nutritional quality of the diet (Martini et al., 2021):



Above graphs taken from: Martini et al., Nutrients 2021, 13(10), 3390

Impact of UPFs at the Food Level

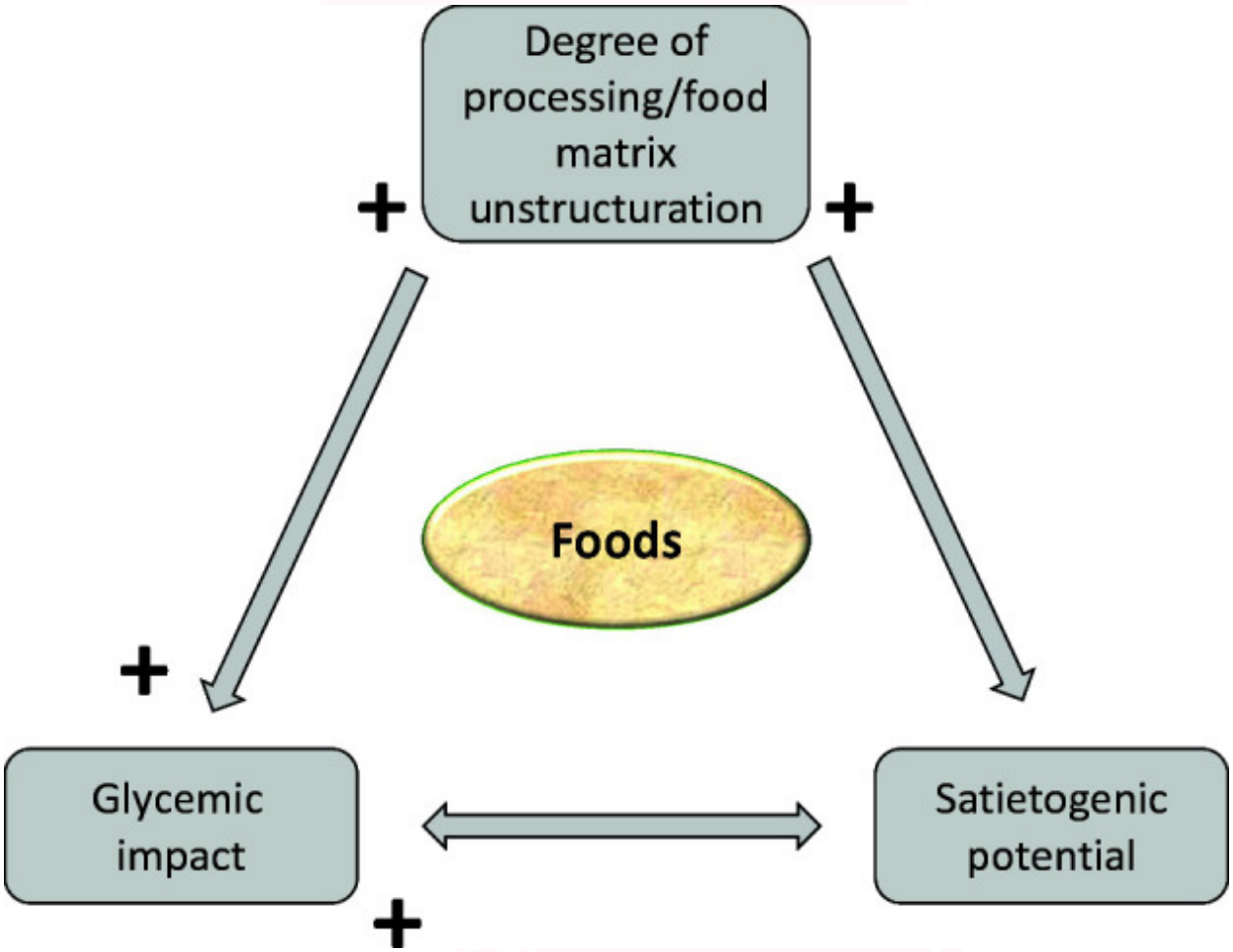
- In UPFs, the ingredients are often reconstituted due to processing. For example:
    - extrusion of grains
    - hydrogenation of oils
    - chemical modification of starches
    - mechanical extraction of meat
- This leads to a food matrix that is not like one found in normal whole foods or meals.
- "Artificialization" occurs via the addition of colorants, flavors, artificial sweeteners, emulsifiers, and other additives.
- Some of the physicochemical characteristics, additives and excessive quantities of refined ingredients used in the manufacture of UPFs create hyper-palatable products that promote increased, rapid and more frequent consumption
    - See: Hall et al., 2019 - Inpatient RCT
    - See: episode 458 of the podcast on satiety where UPFs where discussed
- The potential negative impact of UPFs is not simply the ingredients they contain. But it is just as much down to what is lacking in terms of nutrients, or what is lost in processing (e.g. loss of fiber).



From: Hall et al., Cell Metab. 2019 Jul 2; 30(1): 67–77.e3.

Processing techniques lead to a breakdown and transformation of the **food matrix**.

- Despite a food having a nutrient profile that looks good (e.g. it has had levels of sugar and salt reduced), there is a suggestion this doesn't tell us everything, as the restructuring of the food matrix can alter characteristics and effects.
- For example, Fardet & Rock (2018) discussed how the degree of processing (and thus degree of food matrix "unstructuration") can have impacts on the satiety potential of a food and the glycemic response to it:



Taken from: Fardet & Rock, Adv Nutr. 2018 Nov; 9(6): 655–670.

Impact of UPFs at the Dietary Pattern Level

Useful to compare two opposing dietary patterns:

1. a minimally processed dietary pattern
2. an ultra-processed dietary pattern

Minimally processed dietary pattern	Ultra-processed dietary pattern
• Based on a variety of unprocessed or minimally processed foods. • Typically freshly prepared dishes and meals. • Foods are primarily made in the home • Use relatively modest amounts of processed culinary ingredients. • Only supplemented by processed foods.	• Largely made up of ultra-processed drinks, ready-to-eat packaged foods and fast foods • Such foods are typically manufactured and distributed by large food corporations.

The increase in UPF consumption over time has primarily occurred via a displacement of nutritious unprocessed or minimally processed food (rather than replacing other highly processed foods).

So in addition to more UPFs, the dietary pattern is now much lower in the types of foods that public health typically encourages.

A meta-analysis (Pagliai et al., 2020) of cross-sectional and prospective cohort studies found there are dose–response associations between dietary patterns with higher proportion of UPF products and poor health outcomes (such as increased incidence of chronic diseases).

UPF Intakes Across Countries & Demographics

Many countries now have high amounts of the average diet made up of ultra-processed foods.

In some high-income countries, such as the US and the UK, the average diet in the population has more than 50% of its calories coming from UPFs.

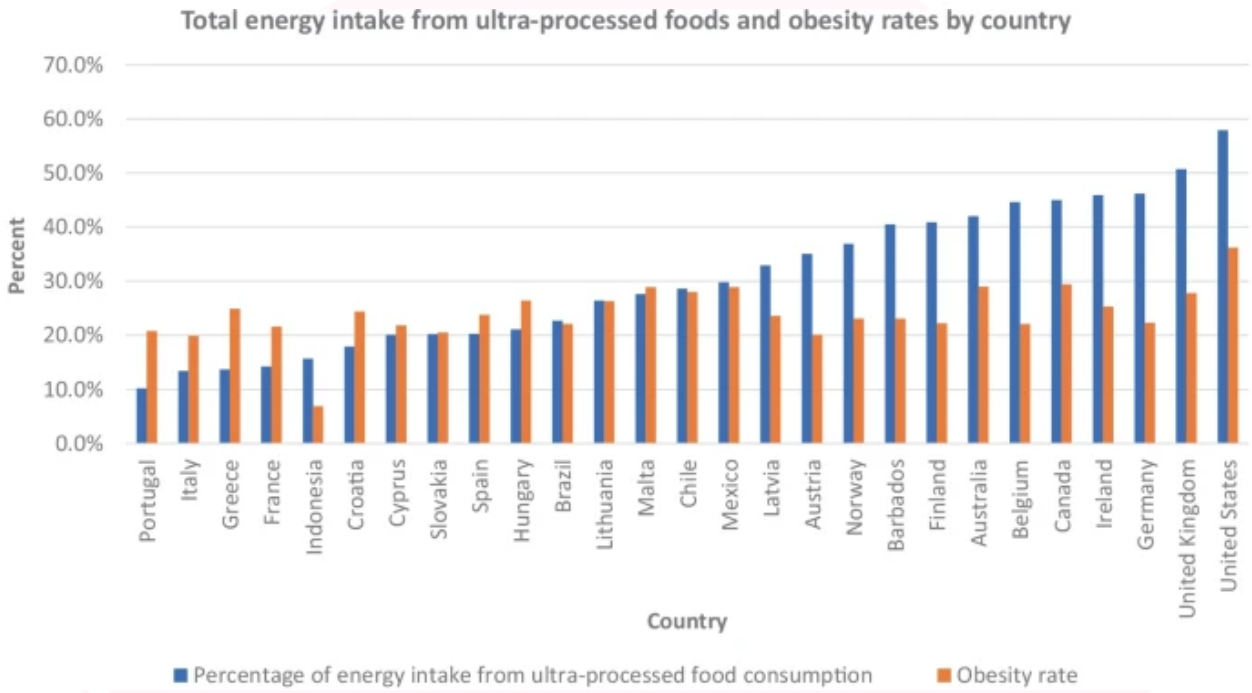


Image from: [Crimarco et al., Curr Obes Rep. 2022 Sep;11(3):80-9]

There is wide variation within these populations though.

- For example, in Australia the top quintile (top fifth) of UPF consumers in the population have 80% of their calories coming from UPFs, while for the bottom quintile the amount is only 17%.

Socioeconomics also plays a role, with those in more socially deprived areas having higher intakes of UPFs.

- In previous podcast episodes (listed at the start of these notes), we've discussed how more socially deprived areas have higher densities of fast-food restaurants, and how those on the lowest incomes may have to compromise on buying healthy foods for economic reasons (e.g. some can't afford to use a cooker/oven every day, or others don't own a refrigerator).

The Limits of Product Reformulation

- Product reformulation commonly refers to policies and practices aimed at reducing the quantities of 'nutrients-to-limit' in packaged or fast-food products.
- Such nutrients include sodium, added sugars, saturated fat, and trans fatty acids.
- The success or otherwise of these public and private reformulation policies is usually evaluated in terms of reductions in the quantities of these nutrients-to-limit within particular food products.
- A significant number of public health experts have criticized aspects of some current policies, particularly related to policies that are voluntary (i.e. self-regulation by industry) and thus often have inadequate targets and timelines for reformulation.
    - [More on this in episode 461 with Prof. Emma Boyland]
- As an example, in Ireland, the Department of Health has set some targets which they are asking the food corporations to (voluntarily) hit. These are intended for 2021 - 2025:

NUTRIENT	TARGET
Salt	10% reduction focused on the 76 food groups that contribute most to people's salt intakes
Sugar	A 20% reduction is proposed in the sugar content of nine food categories* that are currently the focus of the Public Health England sugar reduction programme
Saturated Fat	A 10% reduction in the saturated fat content of processed foods that contribute most to saturated fat intakes in Ireland is proposed.
Energy (Calories)	A 20% reduction in calories is proposed, focused on product categories that contribute significantly to children's calorie intakes.
Products targeted explicitly at babies and young children:	The FSAI will develop targets for this category based on its previous work in this area (2012 and 2018).

**Food categories: biscuits, breakfast cereals, chocolate confectionary, ice cream, lollies and sorbets, puddings, sweet spreads and sauces, sweet confectionary, yogurts and fromage frais, cakes, morning goods.*

From: Food Safety Authority of Ireland

- Therefore it is often suggested that higher and mandatory independent standards be legislated by governments.
- However, Dr. Scrinis has criticisms that extend well beyond these noted above. In his view, not only are there limitations of reformulation policies, but there are potential risks that they cause more harm.

In one of their commentary articles, Scrinis and Monteiro distinguish between three types of reformulation:

1. **Nutrients-to-limit reformulation** - the aim is largely to reduce the harmfulness of food products containing these negative nutrients.
2. **Positive-nutrient reformulation** – the addition of 'positive' nutrients – or so-called 'nutrients-to-encourage'
3. **Wholefood reformulation** - involves the replacement of highly processed with minimally and unprocessed foods and ingredients.

It is the first of these (i.e. nutrients-to-limit reformulation) that Scrinis and Monteiro see as misguided or potentially harmful.

One concern Scrinis mentioned in the podcast episode was that reformulation may lead to a reduction of one nutrient, but as the food is still ultra-processed (and industry could add more of other nutrients/additives), the net result may still be an unhealthy food product. Yet industry can now promote these products as "healthier".

As Scrinis & Monteiro (2018) write:

> *"Reformulation policies effectively provide positive endorsement for the consumption of (reformulated) ultra-processed products, as long as these reformulated products have met the required single-nutrient goals."*

Ultimately, Scrinis and Monteiro suggest that, rather than reformulation, in order to reduce the nutrients of concern, the focus should be on reducing the amount of UPFs in the diet:

> *"If there is a genuine concern with reducing the consumption of nutrients-to-limit, then strategies that aim to restrict and reduce the production and consumption of ultra-processed products ultimately need to be considered."*