

PROCESSED GRAIN-BASED FOOD: BOON OR BAN

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LEARNING OBJECTIVES

▪Processed foods, the current environment and definitions

▪Comparison of nutrient data on processed foods using various classifications

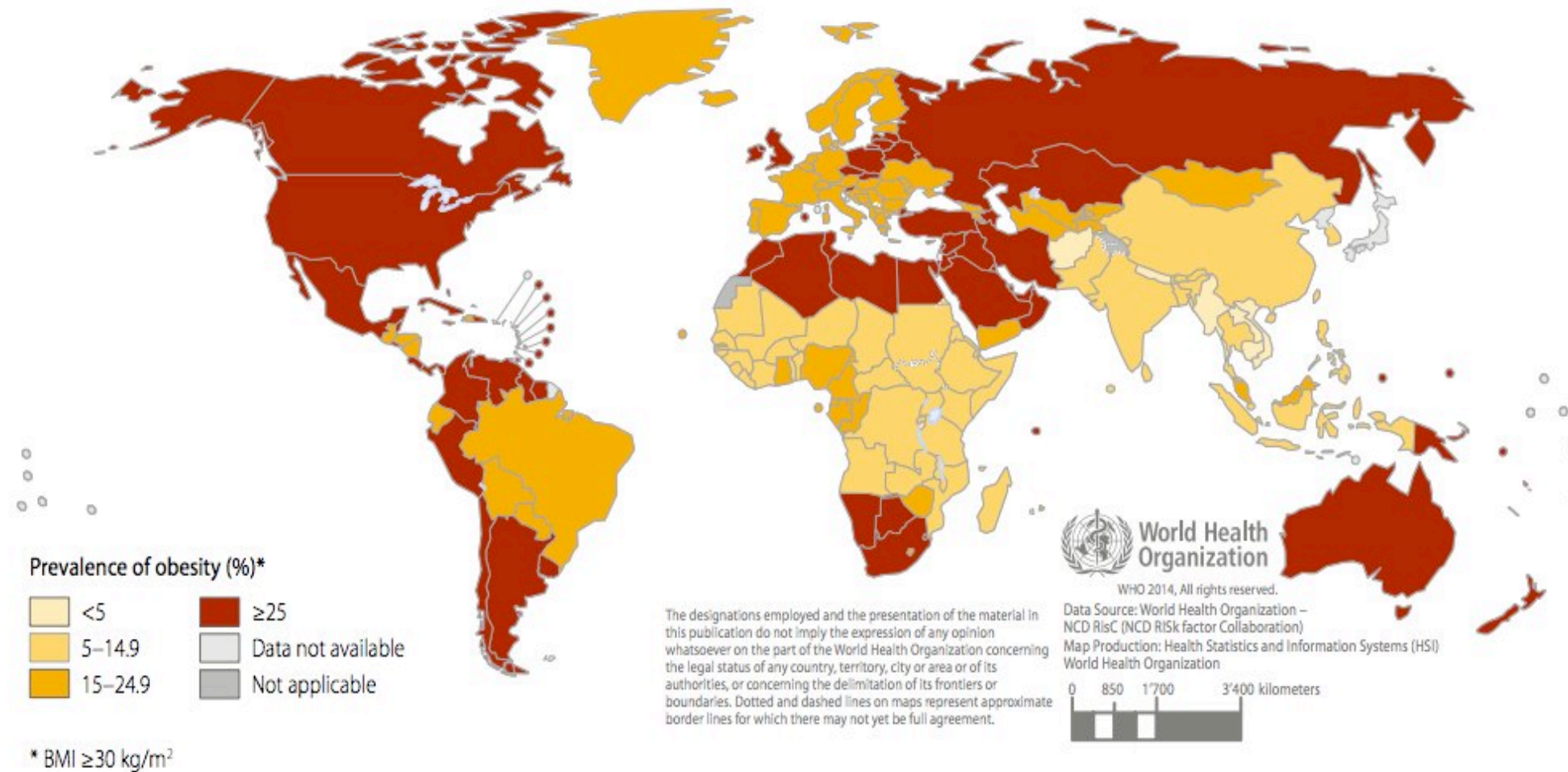
- Data from the IFIC classification
- Data Show that diet plans with processed foods can provide practical and economical ways to meet nutrient needs and promote healthy eating for a range of types of consumers with varying levels of time, skill, resources and money
- Show healthy food patterns (DASH / Mediterranean) include a mix of foods from all levels of processing. The development of obesity and chronic disease is about proper food selection patterns and not about degree of processing.
- Show how food selection by processing level may be problematic and that nutrition and diet quality have little to do with level of processing

▪Issues with processed foods

▪Refocus nutrition efforts on calories, portion size and balance of food groups.



Fig. 7.2 Age-standardized prevalence of obesity in women aged 18 years and over (BMI ≥ 30 kg/m²), 2014



CHRONIC DISEASE



Brazil

Foods consumed in many countries are processed to some extent



US - California
Daniels NYT, Menzel, Hungry Planet,
Menzel Photography Licensing with permission



Cuernavaca, Mex

BLOGGERS LOOK AT PROCESSED FOOD

<https://s-media-cache-ak0.pinimg.com/236x/6a/ac/29/6aac2958909f435ccfa5152f1de0c1f4.jpg>

The Consumer and Processed Food

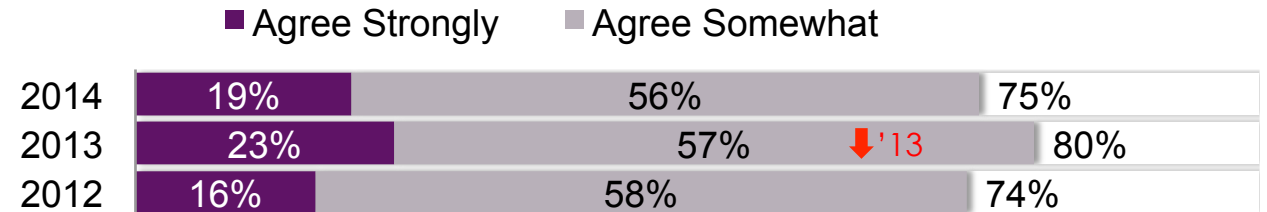


Gargantuan, Gaseous, Greasy, Good Tasting

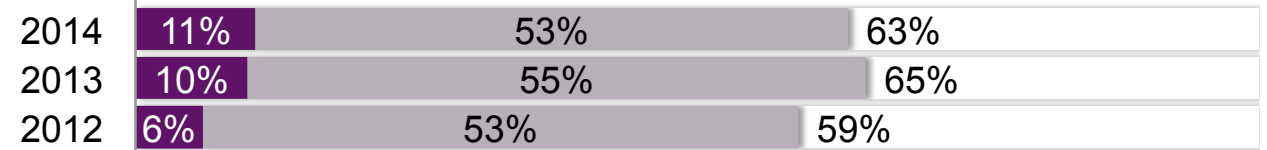
BELIEFS ABOUT PROCESSED FOOD

In general, to what extent do you agree or disagree with the following statements about processed foods?

Food processing can help foods stay fresh longer



Some processed foods can provide affordable, nutritious options



Food processing can help improve food safety



Processed foods can contain the nutrients I need for a healthful diet



2014 n=503 (Split Sample); 2013 n=1,006; 2012 n=1,057

Arrows indicate significant (.95 level) differences vs. prior year(s); comparison year is labeled.

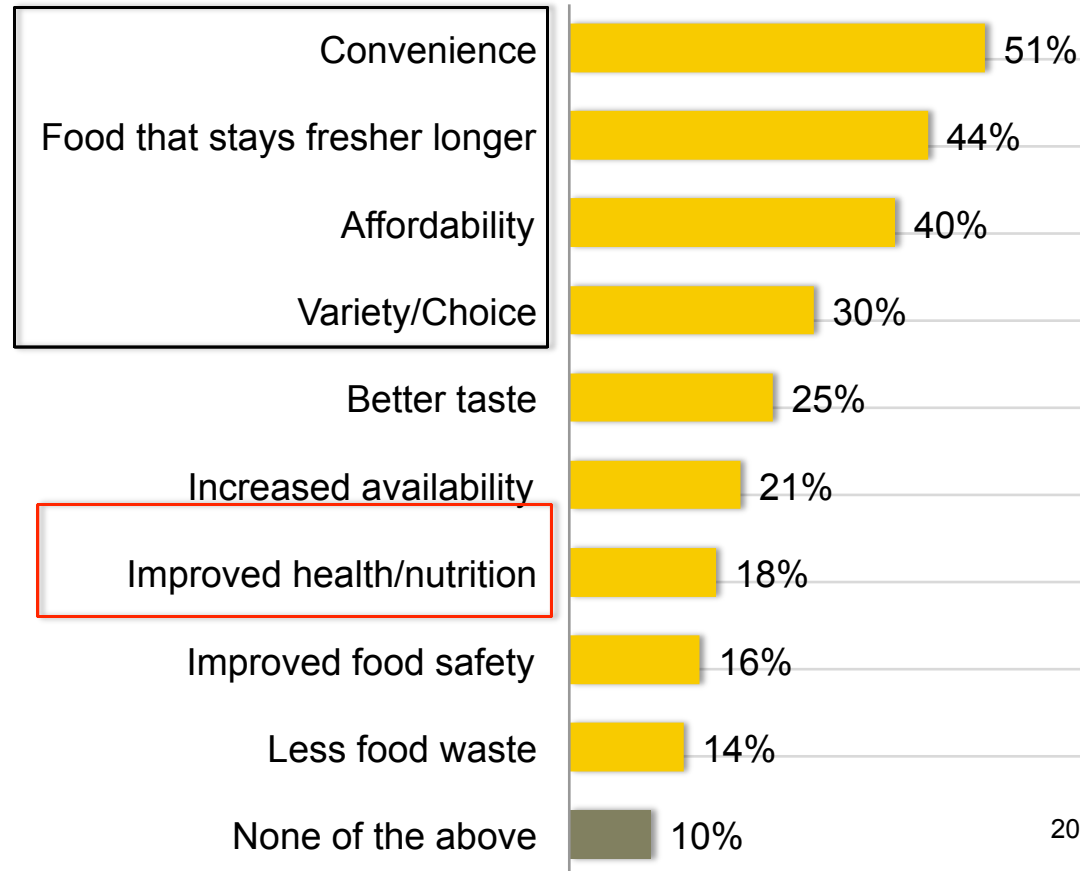
International Food Information Council Foundation 2014 Food & Health Survey

Adapted from Roger7Clemens

CONSUMER PERCEIVED BENEFITS OF PF

Which, if any, of the possible benefits of processed foods do you value most?

(Select up to 4 most important benefits.)



Groups more likely to select:

Women

Younger, Higher income

Older

Older

College degree, In better health

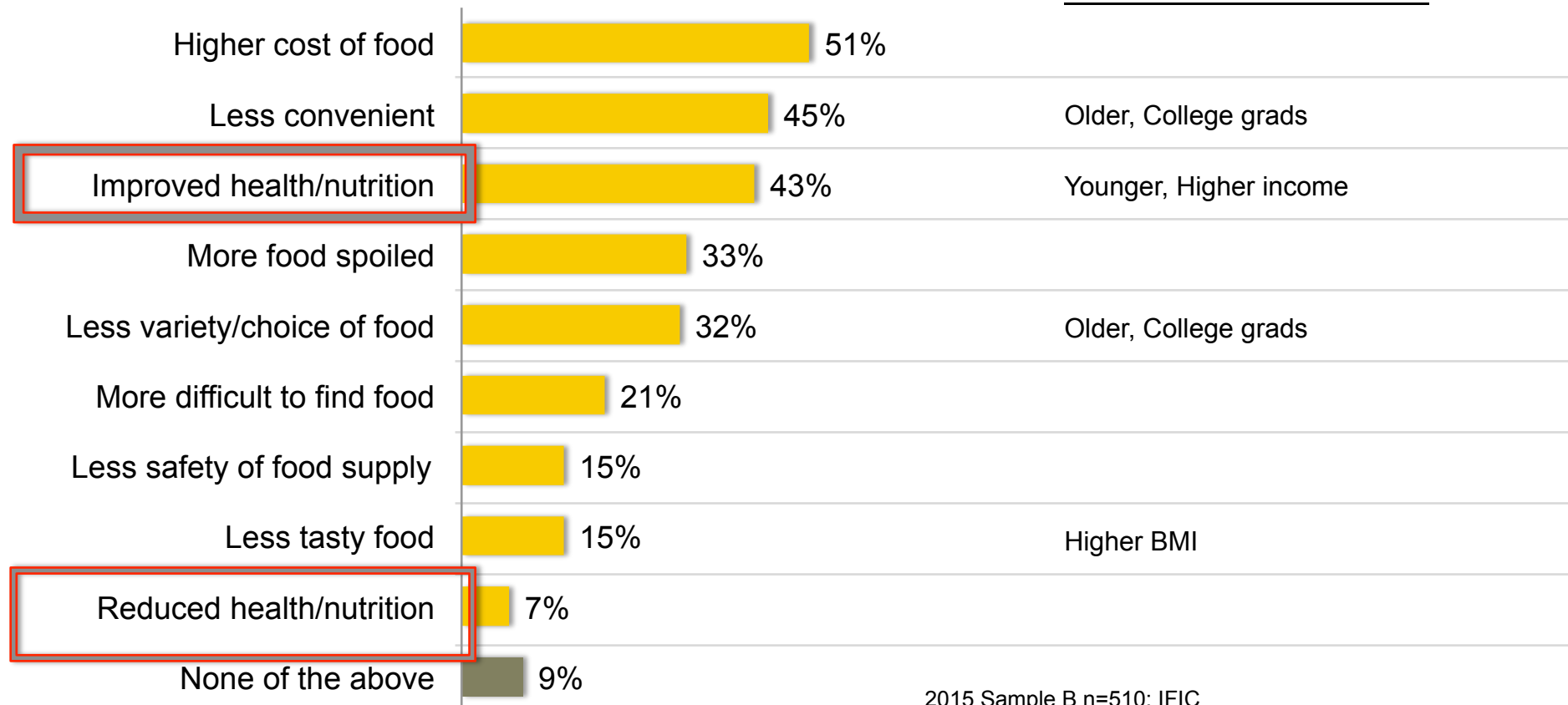
Adapted from Roger Clemens

2015 Sample A n=497; IFIC

CONSUMER THOUGHTS ON REMOVAL OF PROCESSED FOOD

(Select up to 4 most important ways you would be impacted.)

Groups more likely to select:



2015 Sample B n=510; IFIC

PROCESSED FOOD – NO AGREE UPON DEFINITIONS

You can't just take a word and make it mean whatever you want it to mean. When we use a word, it means just what we choose it to mean – neither more nor less. “The question is,” said Alice, “whether you can cause simple words to have such convoluted meanings .”

Lewis Carroll



UK & USDA DEFINITIONS OF PF /MPF

- ▶ **Processed food (PF) – UK National Health Service (NHS)**
- ▶ Food processing applies to any food that has been **altered from its natural state** in some way, either for **safety** or **convenience**.
- ▶ **USDA** - *any raw agricultural commodity that has been subject to washing, cleaning, milling, cutting, chopping, heating, pasteurizing, blanching, cooking, canning, freezing, drying, dehydrating, mixing, packaging, or other procedures that alter the food from its natural state*
 - ▶ *may include the addition of other ingredients such as additives, salt, sugars, and fats*
 - ▶ **may reduce, increase, or leave unaffected nutrition of the food**
- ▶ **Minimally processed food (MPF)**
 - ▶ retains most of its inherent physical, chemical, sensory and nutritional properties
 - ▶ **Many** minimally processed foods are as nutritious as the food in its unprocessed form
 - ▶ Some may be **less nutritious as** nutrients may be less available or foods contain anti-nutrients or toxic factors



FOOD PROCESSING: A CONTINUUM

24-hour recall interview National Health and Nutrition Examination Survey (NHANES) 2003-2008




Weaver et al ASN Statement on Processed Food. AJCN,
Eicher-Miller, et al. J Nutr 2012; 112: 1S-8S



IFIC MINIMALLY PROCESSED FOODS

- Traditional Technologies
- Washing
- Chopping, grinding,
 - blending, milling
- Cooling, freezing
- Heating, roasting, blanching
- Pasteurizing, homogenizing
- Enriching and fortifying

The Shelf Life of Milk			
			
10-Day Shelf Life Raw Milk	21-Day Shelf Life HTST Pasteurized Milk (Traditional)	63-Day Shelf Life LTST Pasteurized Milk (New Process)	71-Day Shelf Life Ultra-Pasteurized Milk



IFIC CONTINUUM OF PROCESSED FOODS

Type of Food	Examples
Foods that require little processing or production at the plant but may or may not require much preparation before eating (also called “minimally processed”)	<ul style="list-style-type: none"> • Washed/ packaged fruit, vegetables & bagged salads • Roasted, chopped nuts; whole & cracked cereals; coffee beans; pasteurized milks
Foods processed to help preserve and enhance nutrients and freshness of foods at the peak	<ul style="list-style-type: none"> • Frozen, canned, or cooked & vacuum-packed & refrigerated fish, meat, fruits, & vegetables, and baby foods; UHT dairy
Foods that combine ingredients and additives such as spices, oils, flavors, preservatives, and nutrients to ensure safety and sensory appeal. (these usually require further preparation and does not include “ready-to-eat foods” (RTE) listed below)	Packaged foods, such as rice or potato side dishes, cake mix, jarred tomato sauce, spice mixes, dressings, sauces, and condiments, gelatin
“Ready-to-eat” foods that may have many ingredients and processes but need little or no preparation	Breads & flat breads, RTE & instant cereals & granolas, nutrition bars, biscuits, jams & jellies, nut butters, ice cream, yogurt, cookies, fruit chews, rotisserie chicken, luncheon meats, cooked hams, cheeses, spreads, fruit drinks, salted condiments such as olives, carbonated beverages
Foods packaged to stay fresh and save time	Prepared refrigerated & deli foods: Frozen meals, entrées, sides, pot pies, and pizzas

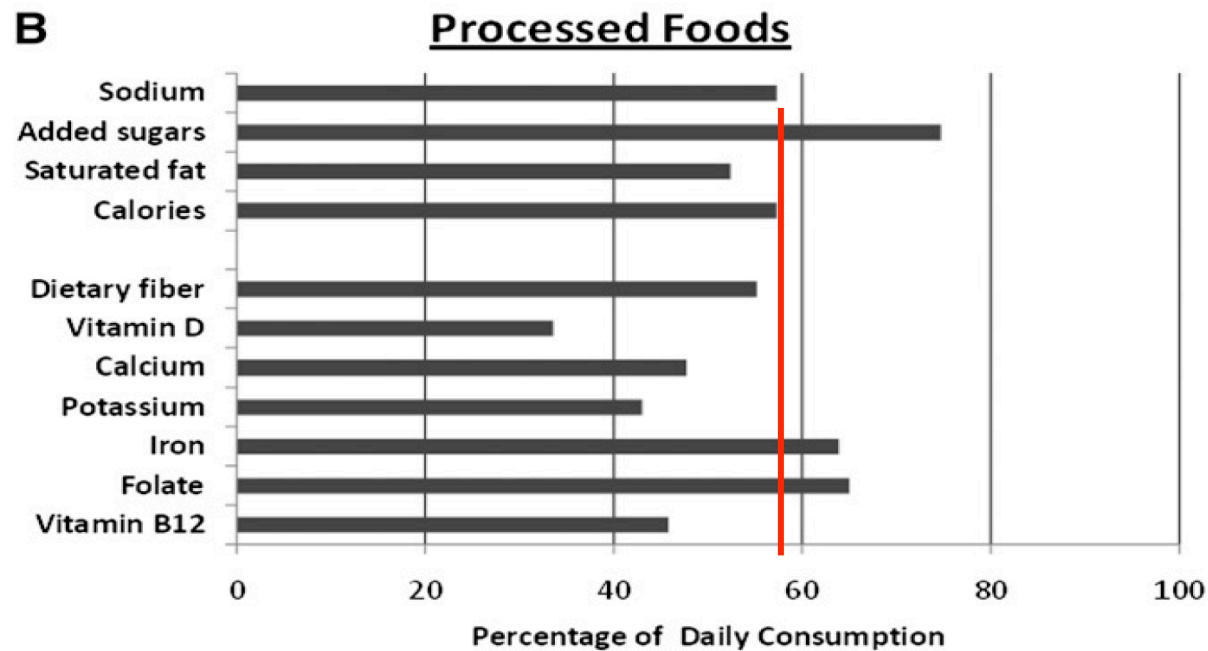
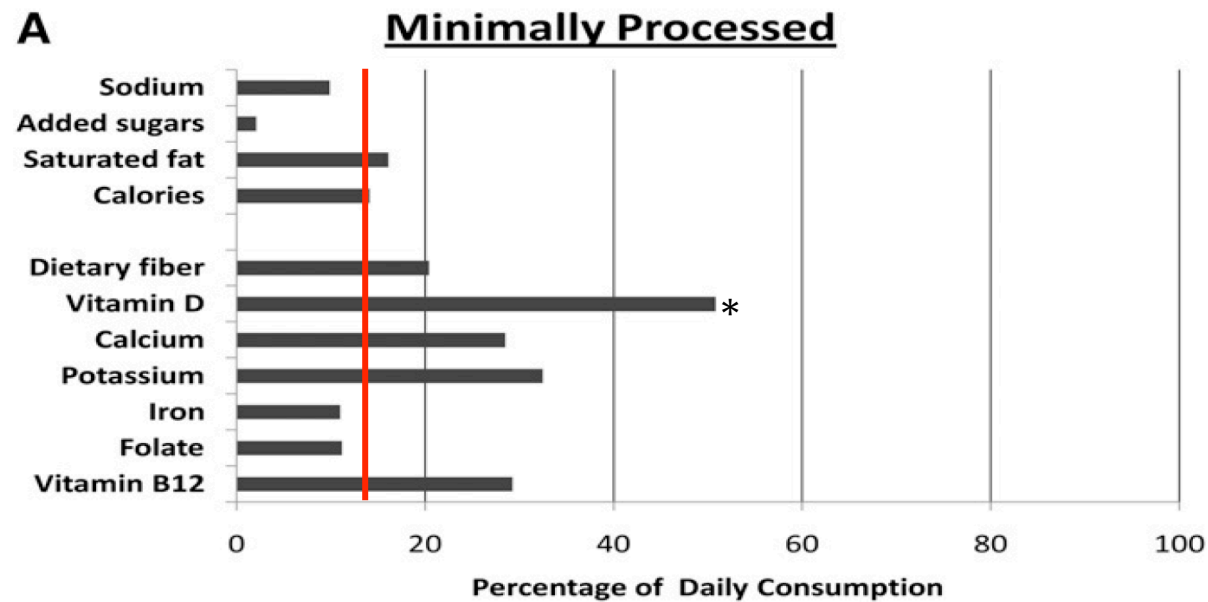
Contribution of Foods Processed for **Preservation***



Spring tonic recipes of yore are not needed. Neither are long hours in a hot kitchen or overcooked vegetables to kill the botulism toxin.

**IFIC Classification*

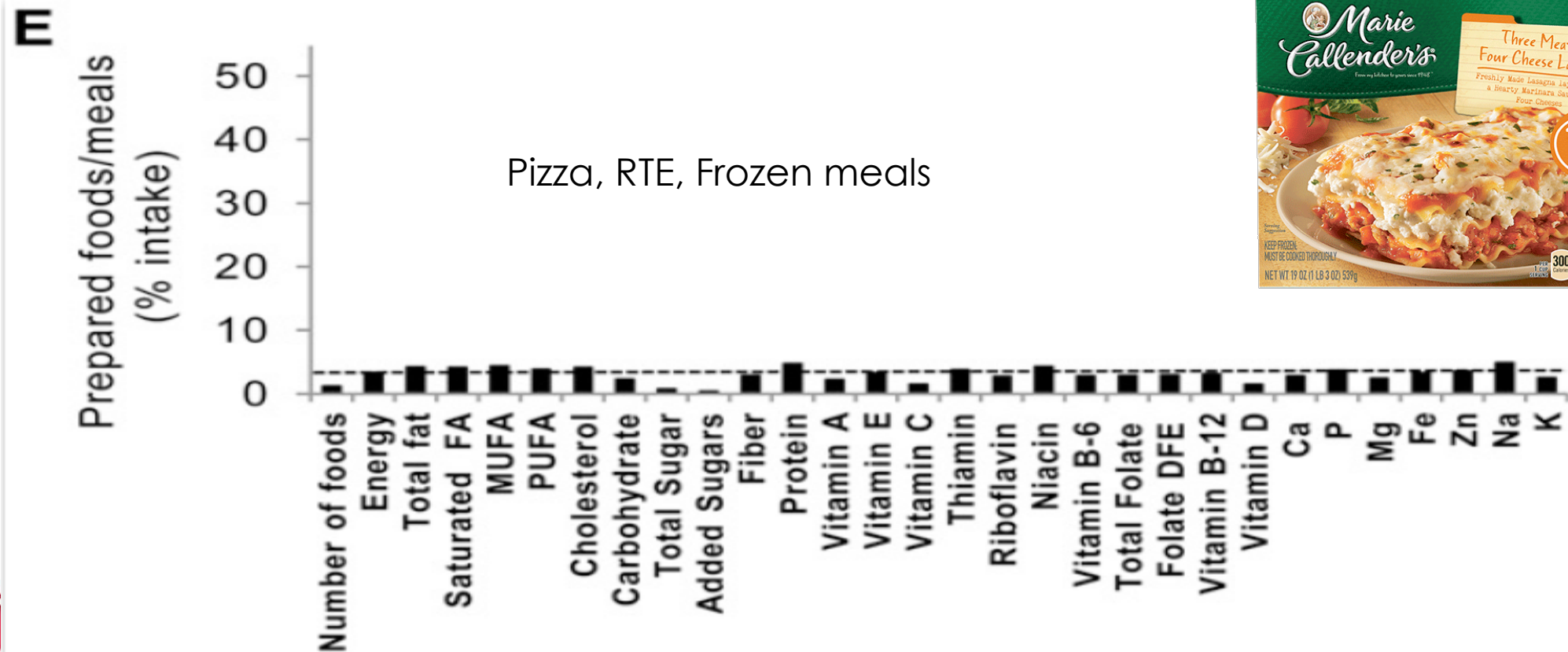
NUTRIENTS FROM MPF AND ALLIFIC PFS



* Vitamin D fortified dairy

Weaver et al AJCN

ENERGY & NUTRIENT CONTRIBUTION OF PREPARED FOODS AND MEALS



PFS DELIVER SHORTFALL NUTRIENTS

IFIC CATEGORIZATION (NHANES STUDY 2013)

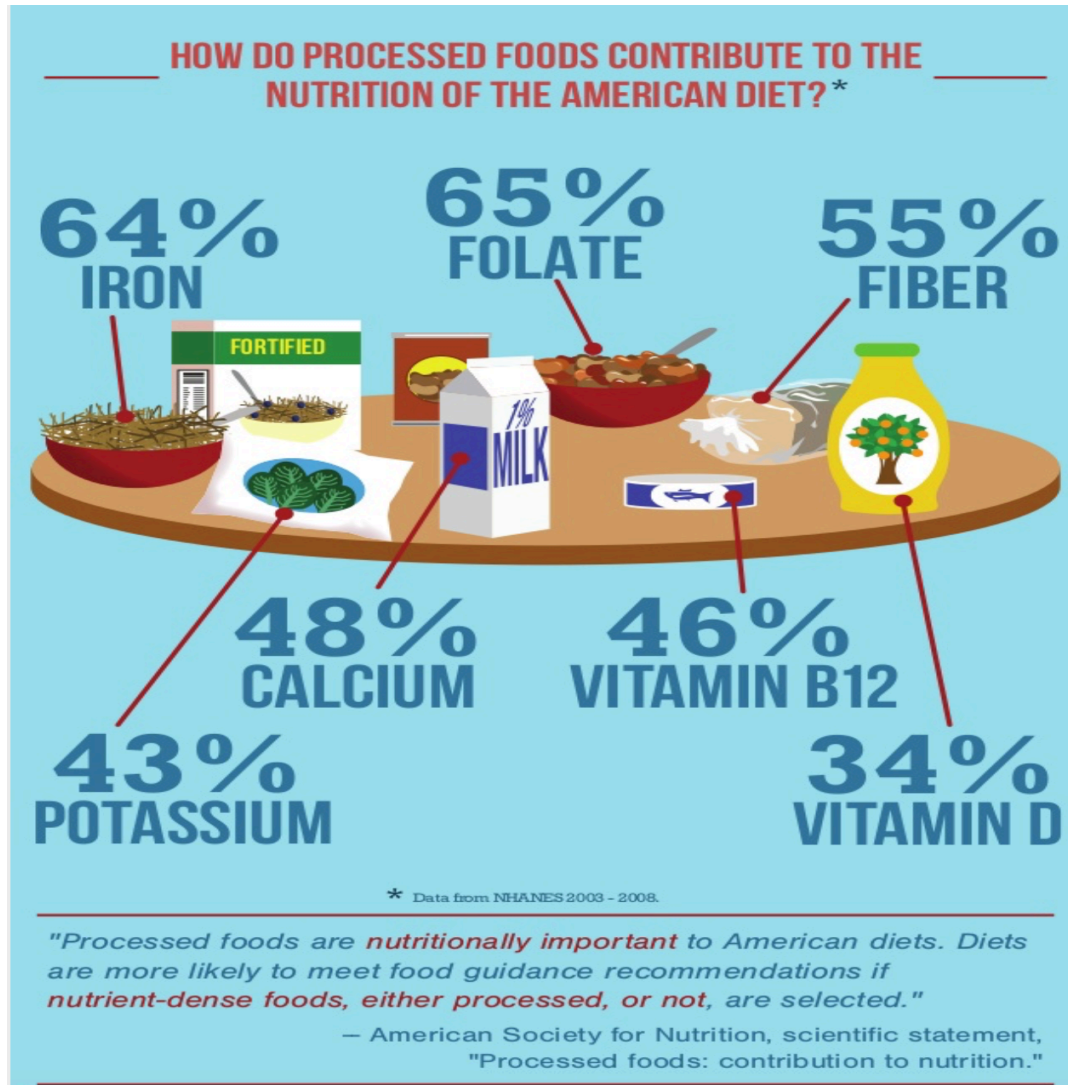
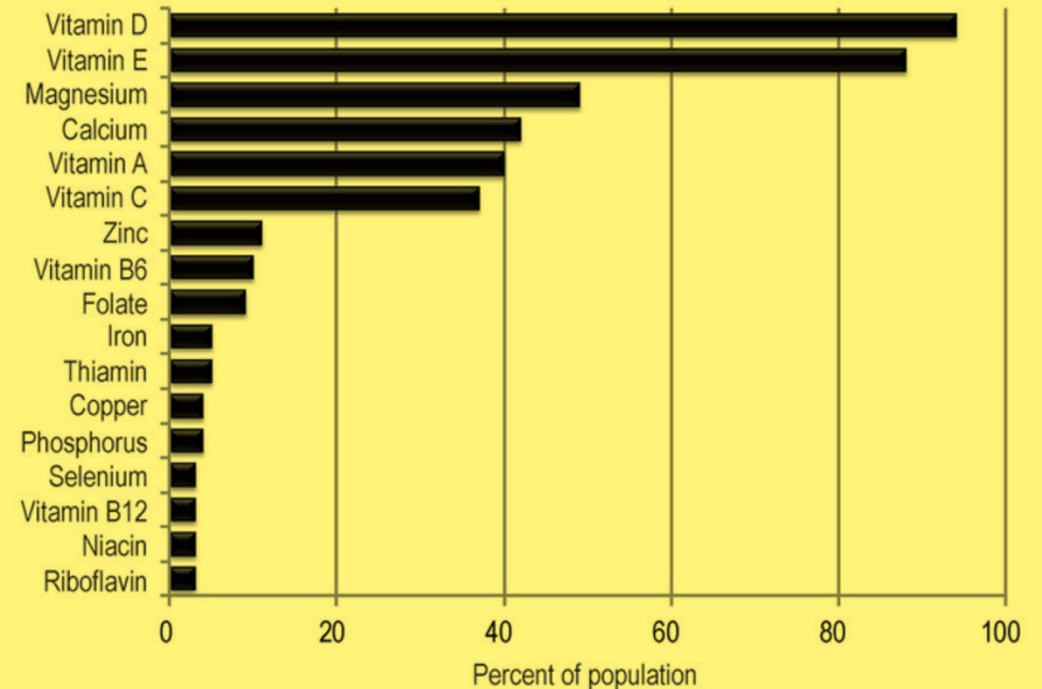
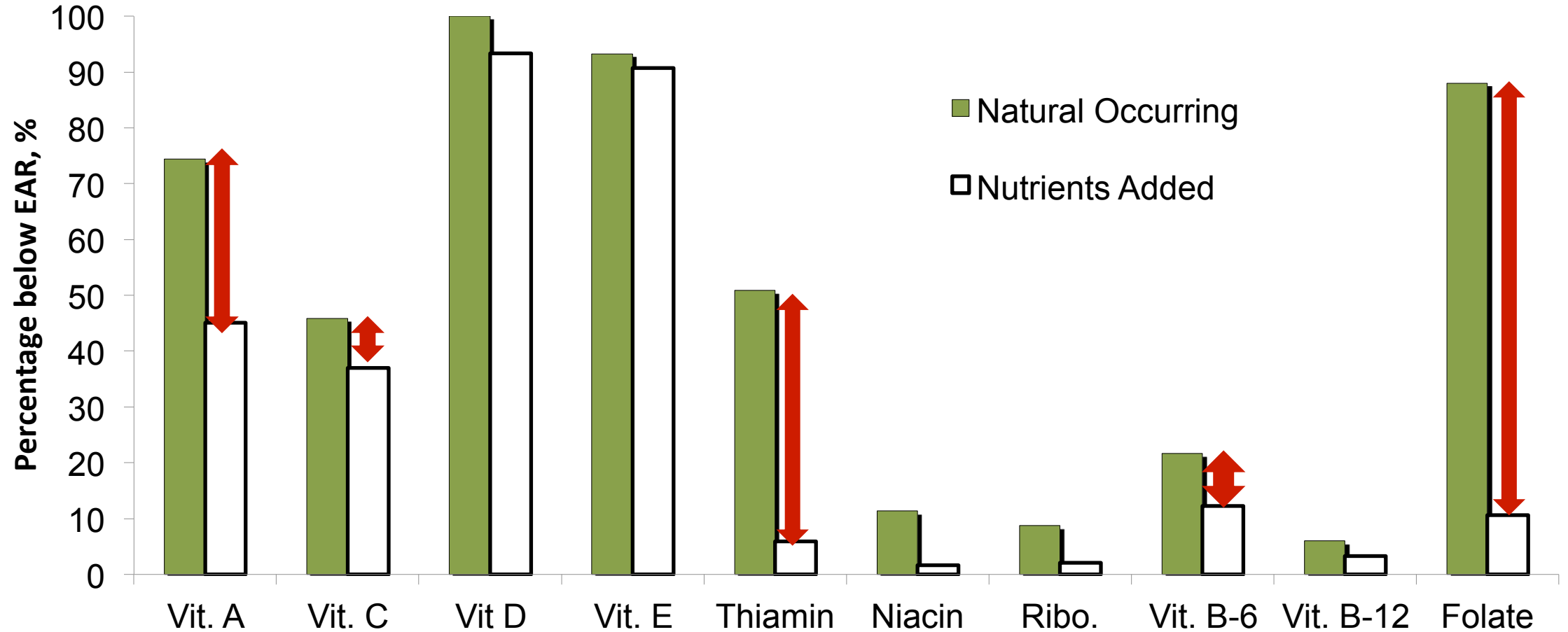


Figure D1.1 Percent of population with usual intakes below EAR



Eicher-Miller HA et al. Nutrients. 2015;7:10076-88.

EFFECT OF ENRICHMENT AND FORTIFICATION - US



Fulgoni et al, J Nutr 2011;141:1847-54 NHANES

Modified and courtesy of Johanna Dryer

PROCESSED FOOD IN THE NOVA CLASSIFICATION

“Many forms of food processing are beneficial. But what is identified and defined here as ultra-processing..... creates attractive, hyper-palatable, cheap, ready-to-consume food products that are characteristically energy-dense, fatty, sugary or salty and generally obesogenic.” Prof. Carlos Monteiro

Monteiro CA, et al Obes Rev. 2013;14 Suppl 2:21-8; Monteiro CA, et al. Public Health Nutr. 2017 21:1-13; Pan American Health Org. http://iris.paho.org/xmlui/bitstream/handle/123456789/7699/9789275118641_eng.pdf.

Ultra-processed food and drink products in Latin America: Trends, impact on obesity, policy implications



WHO IMPRIMATUR

Public Health Nutrition: page 1 of 13

doi:10.1017/S1368980017000234

Commentary

The UN Decade of Nutrition, the NOVA food classification and the trouble with ultra-processing

“For adults A healthy diet contains:

Fruits, vegetables, legumes (e.g. lentils, beans), nuts and whole grains (e.g. unprocessed maize, millet, oats, wheat, brown rice).” WHO **Healthy diet** Fact sheet N°394 Updated September 2015

THREE NOVA CATEGORIES – 2010

MPFs - no sugar, salt or additives

Fresh, frozen, vacuum-packed / refrigerated, dried

Fruit, Veg, Meat, Fish, Nuts, Seed, Grains; 100% juices

Eggs, Milk Fermented milks, Yogurts

Teas, coffee

Processed Culinary ingredients (PCIs)

ingredients used in the preparation and cooking of dishes and meals

Fats and oils (not margarine)

Starches, grits, meals, flours

Pastas noodles, various proteins e.g.soy

Gums; preservatives

Additives, Sweeteners - all types; Salt

UPFs

UPFs Become PFS & UPFs

Convenient; RTE or heat foods; snacks, desserts or prepared dishes

Simple products with addition of sugar, oil, salt or PCI to MPFs

- 2-3 ingredients - Simple procedures, non-alcoholic fermentation

MPFs with sugar (juice) , salt or oil

veg, fruits, legumes, meat and fish; vegetables; nuts/seeds

Salted, cured, or smoked meats/ fish; Cheeses

Unpackaged, freshly-made breads (or breads \leq 5 ingredients)

- Added (May contain additives used to preserve their original properties or to resist microbial contamination.)

Sugared & artificially sweetened beverages - sodas, juices, flavored milks

Infant formulas, follow-on milks, baby food

ULTRA- PROCESSED FOODS

(UPFs)- Industrial formulations 2016

- **Usually 5+ ingredients,**
 - Sugar, oils, fats, salt, anti-oxidants, stabilisers, preservatives; uncommon culinary ingredients
 - Purpose: imitate sensory qualities of foods in other groups, or to disguise undesirable qualities
 - MPFs - small proportion of UPFs

UPFs

- **Mass-produced breads** and buns; **bread** ≥ 5 ingredients
- **Breakfast cereals** with added sugar, nutrition bars; **Savory/ Sweet Snack** Products; Biscuits, Cookies, Cakes, Pastries, **Rice & noodles sides/ mixes**
- **Ice Creams**, dessert mixes and RTE, **Infant Formulas**, Follow-on Milks, Milk/Cocoa Drinks, Sweetened 'Fruit' Yogurts, Margarine/ Spreads
- **Sodas and Confectionery** - Jams, Chocolates, Candies, Carbonated/ Energy & 'fruit' Drinks
- **Sauces** - **Baby Foods**, 'Health' / 'Slimming' Products as meal replacements
- **Many Ready To Heat Products** Pre-prepared Pies/ Pasta/ Pizza Dishes; Poultry / Fish 'Nuggets' / 'Sticks', Sausages, Burgers, Hot Dogs, reconstituted Meat Products, **Soups**, Noodles, **Vegetable and other "recipe" dishes**

OBESITY Correlates UPF Availability Europe

% Energy - 4 NOVA categories- 19 European countries

33% Minimally-processed food (MPF)

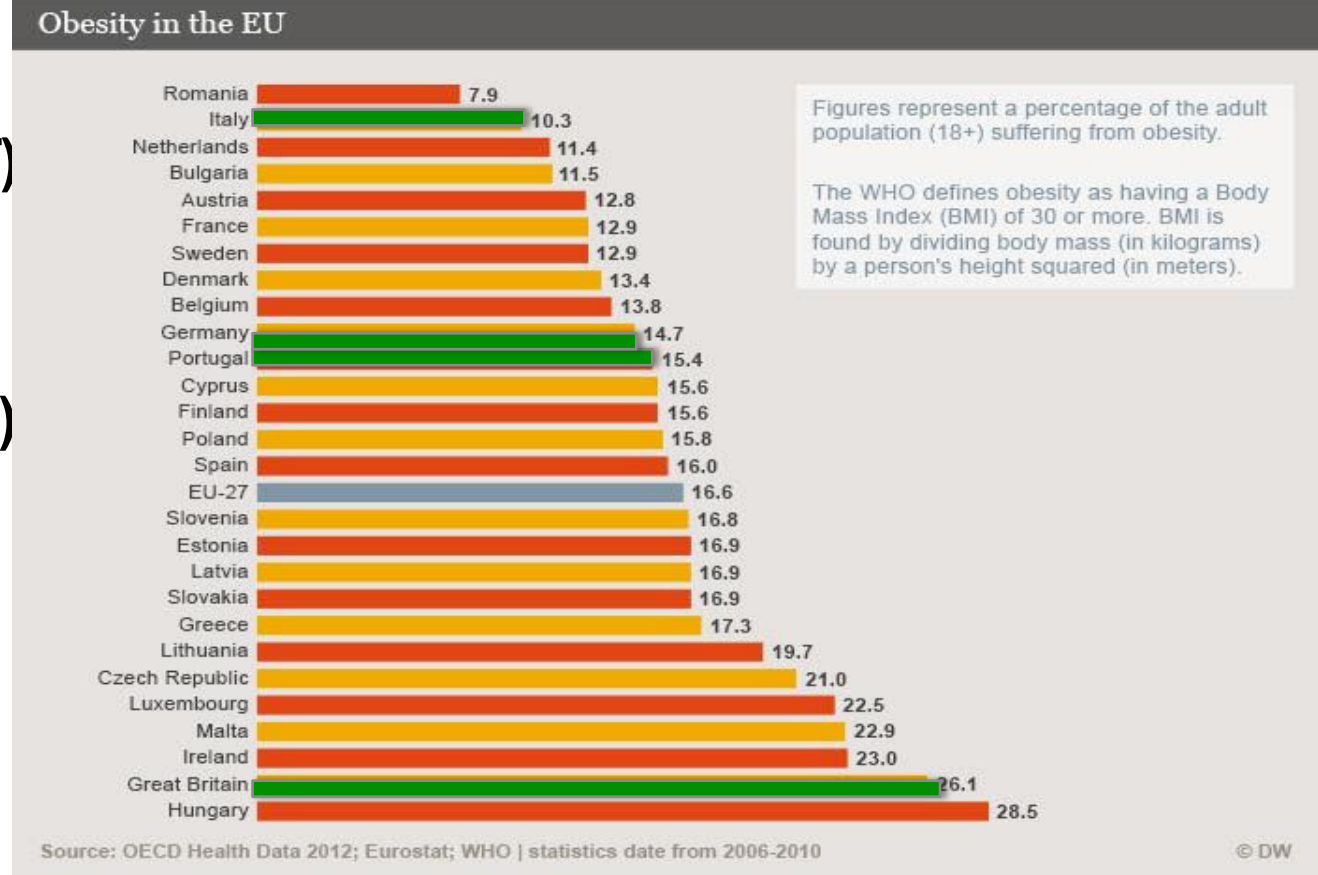
20% Proc. culinary ingredients

20% Processed foods (PF)

26% Ultra-processed food (UPF)

Countries	UPF availability %	obesity rate %
Portugal	10.2	15.4
Italy	13.4	10.3
Germany	46.2	14.7
UK	50.4	26.1

Correlations?



“A significant positive association was found between national household availability of ultra-processed foods and national prevalence of obesity among adults” - Montiero

UPF –OBESITY & DIET QUALITY UK



UK National Diet and Nutrition Survey (2008-12) n >2,147

- **Diets higher in MPFs**

- **Most healthful nutritional profile**

- **Diets higher in UPF**

- The **least healthful** nutritional profile

- **Foods designated as UPF All UPF foods DID NOT have unhealthy nutrition profiles**

- Diets high in 'Processed Ingredients' associated with body weight
- ? homemade
- Adjusted for other obesity factors
 - not associated with weight
 - not linked to obesity

Adams J & White M. Int J Behav Nutr Phys Act. 2015;12:160.

UPF - OBESITY - post hoc analyses

High vs Low UPFs

8451 middle-aged Spanish university graduates ~9 yr: SUN Cohort; 30,243 Brazilian Dietary Survey ≥10 yrs



Obesity

HR

UPF% cal

- Spain

1.26*

13

- Brazil

1.98*

30

- UK

ns

47

* Not adjusted for other obesity causes

Mendonça RD, et al Am J Clin Nutr. 2016;104:1433; Louzada ML et al Prev Med. 2015;81:9-15; Gibney et al AJCN 2017 106: 717 ; Sánchez-Villegas A, et al. Int J Obes (Lond) 2006;30:350-8

OBESITY, CHRONIC DISEASE IN SUN COHORT



High F&V (Mediterranean diet)
Inversely associated :

- Obesity

High Western diet assoc. with
obesity

High sugar sweetened
beverages (SSB) associated
with obesity

Question: Is it consumption
of **UPFs or inadequate
consumption of a balanced
pattern including fruits,
vegetables and whole
grains?** Or too many SSB?

Martínez-González MÁ et al. Public Health Nutr. 2011;14:2309-15; Mendonça RD, et al. Am J Clin Nutr. 2016;104:1433-1440.; Sánchez-Villegas A, et al. Int J Obes (Lond).;30:350-8

UPF - DIET QUALITY – CANADA



2004 Canadian Community Health Survey
CCHS.2 n=33,694 ages >2 years

Post hoc analysis

UPFs 48% of calories

Associated with intakes of

- CHO & Free sugars
- Total & Saturated Fats
- Energy Density

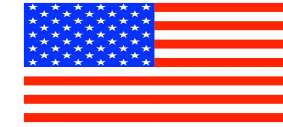
Inversely associated with

- Protein
- Fiber
- Vitamins A, C, D, B₆, B₁₂, niacin, thiamin
- Minerals Fe, Mg, Ca, P, K

Conclusion: *“Lowering the dietary share of ultra-processed foods and raising consumption of hand-made meals from unprocessed or minimally processed foods would substantially improve the diet quality of Canadians.”*

Moubarac JC et al. Appetite. 2017 ;108:512-520.

UPF (NOVA) - ADDED SUGAR



**Post Hoc UPF - 90% of added sugar/ 60% of calories
NHANES 2010**

	%total E
Sugar-sweetened beverage	17.1
Fruit drinks	13.9
Sweet snacks	7.3
Ice cream and ice pops	7.3
Dessert	7.3
Cakes, cookies and pies	5.7
All indulgent foods listed	69.6 % of E

BUT ~70% of E -foods dietary guidance recommends to eat in moderation
(Note: the NOVA treats homemade versions differently)

Martine Steele et al. BMJ Open. 2016;6:e009892; Gibney MJ, et al.AJCN. 2017 ;106:717-724: .
<http://gibneyonfood.blogspot.com/2017/02/lustig-on-processed-food-critical-review.html>



ADDED SUGARS - SPAIN

Households N= 21,012; 33,730; and 22,116

1990, 2000 and 2010

2010 UPFs contained 80.4% of all added sugars

	1990	2010
% Energy from UPF	11.0	31.7
% Energy Added Sugars	8.4	13.0



“Cutting down exceeding added sugars availability in Spain **may** require a reduction in ultra-processed food purchasing.”

Latasa P et al Eur J Clin Nutr. 2017 Dec 26. doi: 10.1038/s41430-017-0039-0. [Epub ahead of print]



UPF- ADDED SUGARS - CHILE

N=4920 (aged ≥ 2 yrs) 2010 dietary survey (Encuesta Nacional de Consumo Alimentario)

UPFs 29% of E

59 % of added sugars intake

“Actions aimed at limiting consumption of ultra-processed foods are being implemented as effective ways to achieve WHO dietary recommendations to limit added sugars and processed foods, especially for children and adolescents.”

Cediel G et al Public Health Nutr. 2018 ;21:125-133.

ADDED SUGAR ANALYSIS: A TAUTOLOGY

Tautology in research

A statement or conclusion that involves **circular reasoning**. This might involve, for example, taking the presence of an effect to argue for the presence of a cause.

Tautologies cannot be tested with empirical data.

Tautology In: Dictionary of Statistics & Methodology. Edited by: W. Paul Vogt
Published: 2005 | 3rd Edition DOI: <http://dx.doi.org/10.4135/9781412983907.n1956>

MODELING - PROCESSED FOODS THAT RECOMMENDATIONS MEXICO

N= 2,164 Mexican adults

Replaced processed foods commonly consumed in their diet with those that meet the MCNE nutrition criteria for FOP labeling in a simulation.

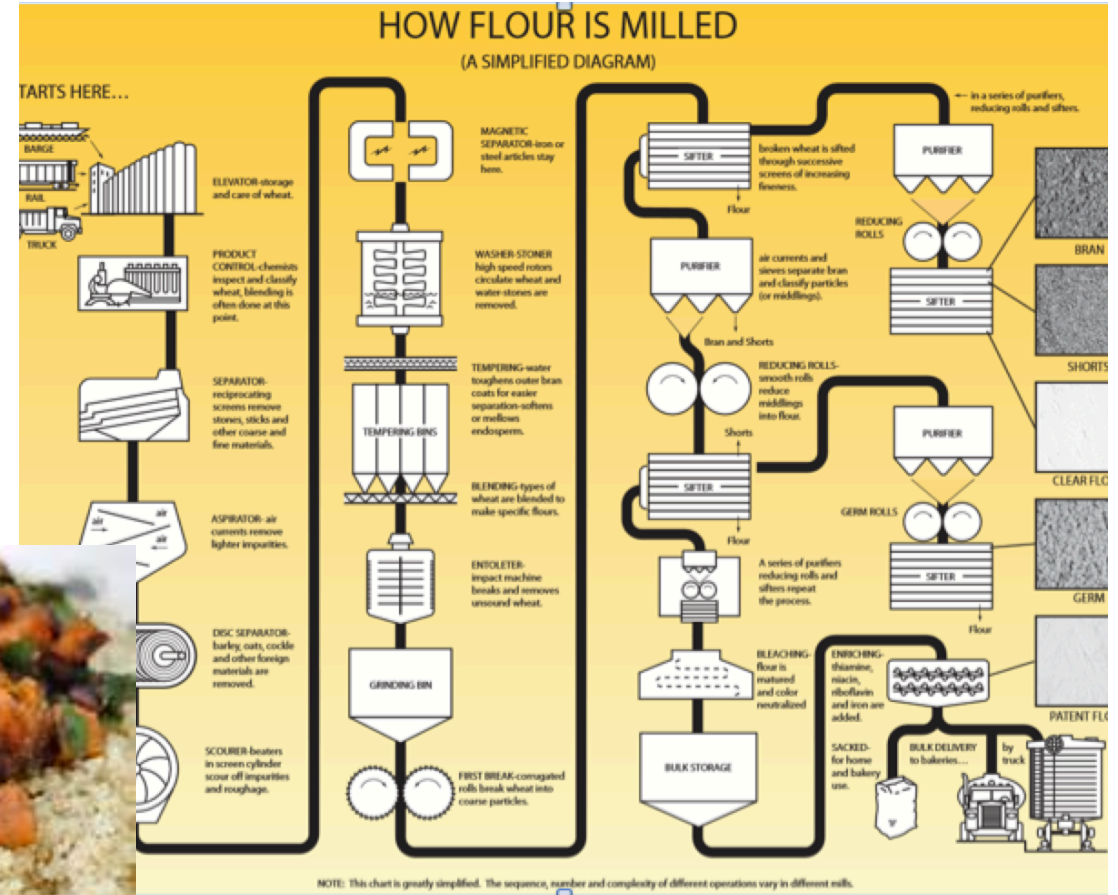
Decreased

Energy	5.4%
Trans-fatty acids	20%
Total sugar	36.8%
Sodium	10.7%
Increase in fiber intake	15.5%



*“After testing the replacement of some food categories separately, **only the replacement of sugar-sweetened beverages**, using the MCNE criteria, produced a significant reduction in the sugar intake of the Mexican adult population (–28.3%). No significant differences in the rest of the nutrient and energy intakes were observed...” Mendoza et al Nutrients. 2018 Jan 19;10(1).*

GRAINS, LEGUMES AND PROCESSING



GRAIN-BASED FOODS - PF/UPF IN NOVA

Minimally processed grains

Wheat and rye berries, bulgurs or cracked wheat, whole dried corn

- Oat groats & oatmeal
- Brown, colored and wild rices
- Pot barley
- Whole quinoa, Buckwheat
- **Processed culinary grain ingredients**
 - Pasta, flours, meals
- **Processed grain foods**
 - Bread ≤ 5 or fewer ingredients



• Ultraprocessed grain foods

- Bread with >5 ingredients
- Crackers, cookies, biscuits
- Read-to-eat cereals with added sugar or salt
- Health / nutrition/cereal bars
- Grain side dishes
- Frozen pasta, pizza, rice entrees and sides

NOVA makes no statement about whole grain, high fiber and eschews enriched & fortified grains foods in its recommendations

HOW CAN THE CONSUMER IDENTIFY UPF BULGUR

Whole Wheat



Whole Kernel Bulgur



Coarse #3 Bulgur



Medium #2 Bulgur



#1 Fine Brown Bulgur



Fine #1 Bulgur



Traditionally –durum
can be soft, hard red
and hard white.

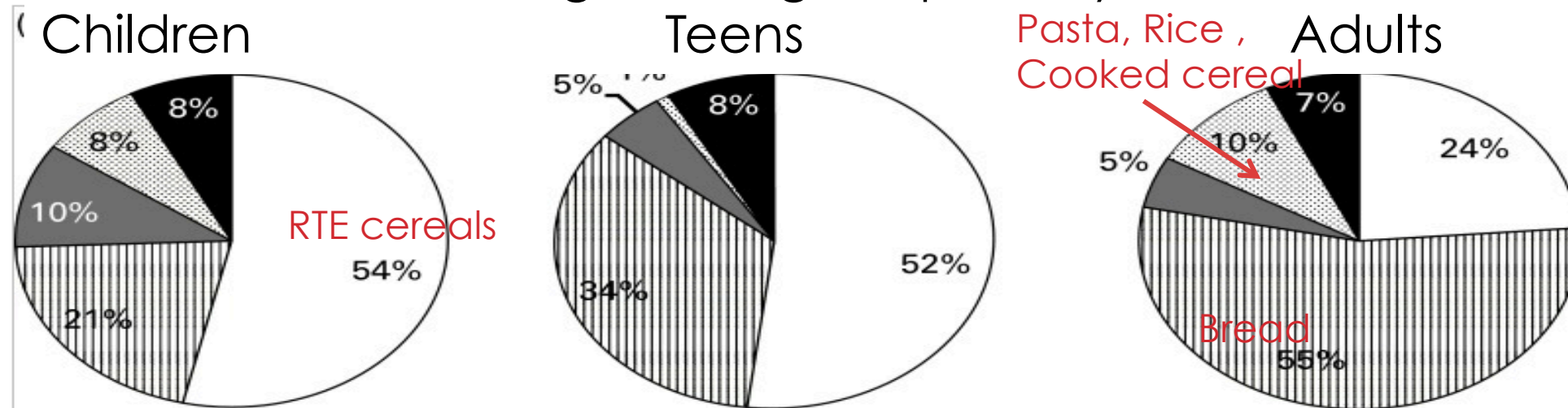
Can be cooked by - boiling,
par-boiling, steaming
or steeped (with or
without heat).

Can be peeled (**debranned**)
by polishing, pearling,
abraded, debranning.

Ground or milled into various
granular products.

CURRENT INTAKE OF MPF GRAINS - FRANCE

F Ave intake adults 14 g whole grain per day



Contribution (%) of different whole grain food groups to total whole grain intake in (a) children (3–12 years, n 403), (b) teenagers (13–17 years, n 129) and (c) adults (18+ years, n 460) (only consumers). □, Ready-to-eat breakfast cereals; ▨, breads and toasts; ▩, sweet crackers and biscuits; ▤, pastas, rice and cooked cereals; ■, cereal bars, popcorn and other products.

Similar data – Italy except whole grain intake is low and US but intake is higher

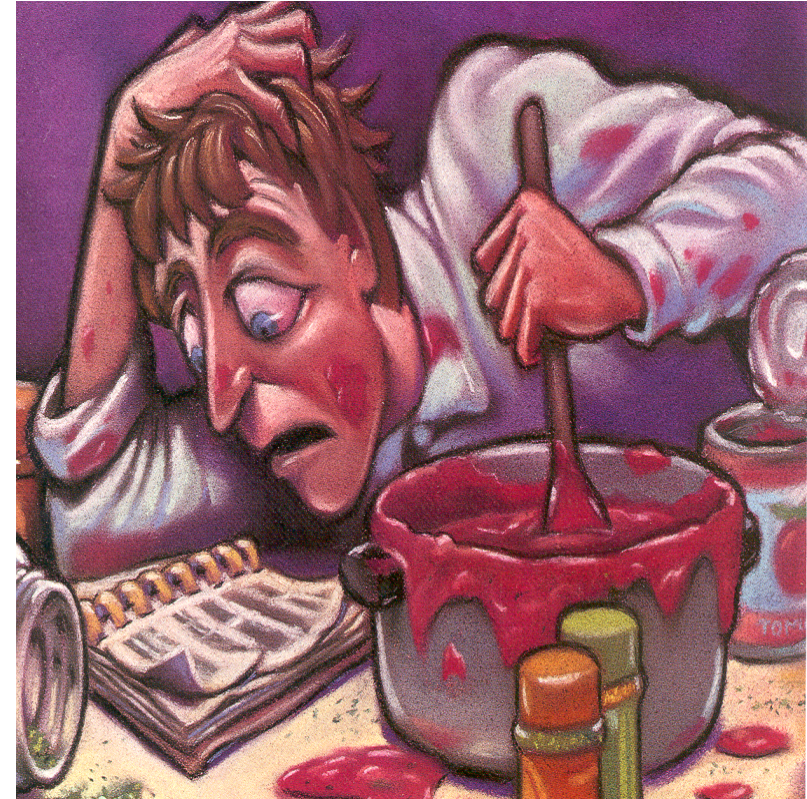
Bellisle et al Br J Nutr. 2014 ; 112(10): 1674–1684; <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4722728/table/Tab3/>

Albertson AM et al. *Nutrition Journal* 15 (2015): 8. PMC. Web. 17 Mar. 2017

DIETARY RECOMMENDATIONS THAT ENABLE DIETARY CHANGE

- **Understood**
- **Practical**
- **Actionable**
- **Affordable**
- **Provide safe options**
- **Fit into many lifestyles**
- **Maintained over the long term**

Rowe, S., et al. (2011). Translating the Dietary Guidelines for Americans 2010 to Bring about Real Behavior Change. *Journal of the American Dietetic Association*, 111(1), 28-39; Evert, Alison B. et al. "Nutrition Therapy Recommendations for the Management of Adults With Diabetes." *Diabetes Care* 36.11 (2013): 3821–3842. PMC. Web. 17 Mar. 2017.



RECOMMENDATIONS NEED TO BE CLEAR AND UNDERSTOOD

Be understood by health professionals and consumers

- Terms need careful definition
- Provide clear guidance

Document that they improve health outcomes

- Be vetted in controlled trials

Be equal to or better than vetted plans such as Mediterranean/Dash diets

- Post- hoc data is not enough
- Needs β -testing of consumers using the guidance



ADVICE TO AVOID PROCESSED FOODS



https://www.com/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=0ahUKEwizilCxpYAhWn4IMKHSyxBRkQjhwIBQ&url=https%3A%2F%2Fwww.wikihow.com%2FEliminate-Processed-Foods-From-Your-Diet&psig=AOvVaw0dTutR3cj4v_ubLRU4Z&ust=1517070024465531

RECOMMENDATIONS MUST BE PRACTICAL

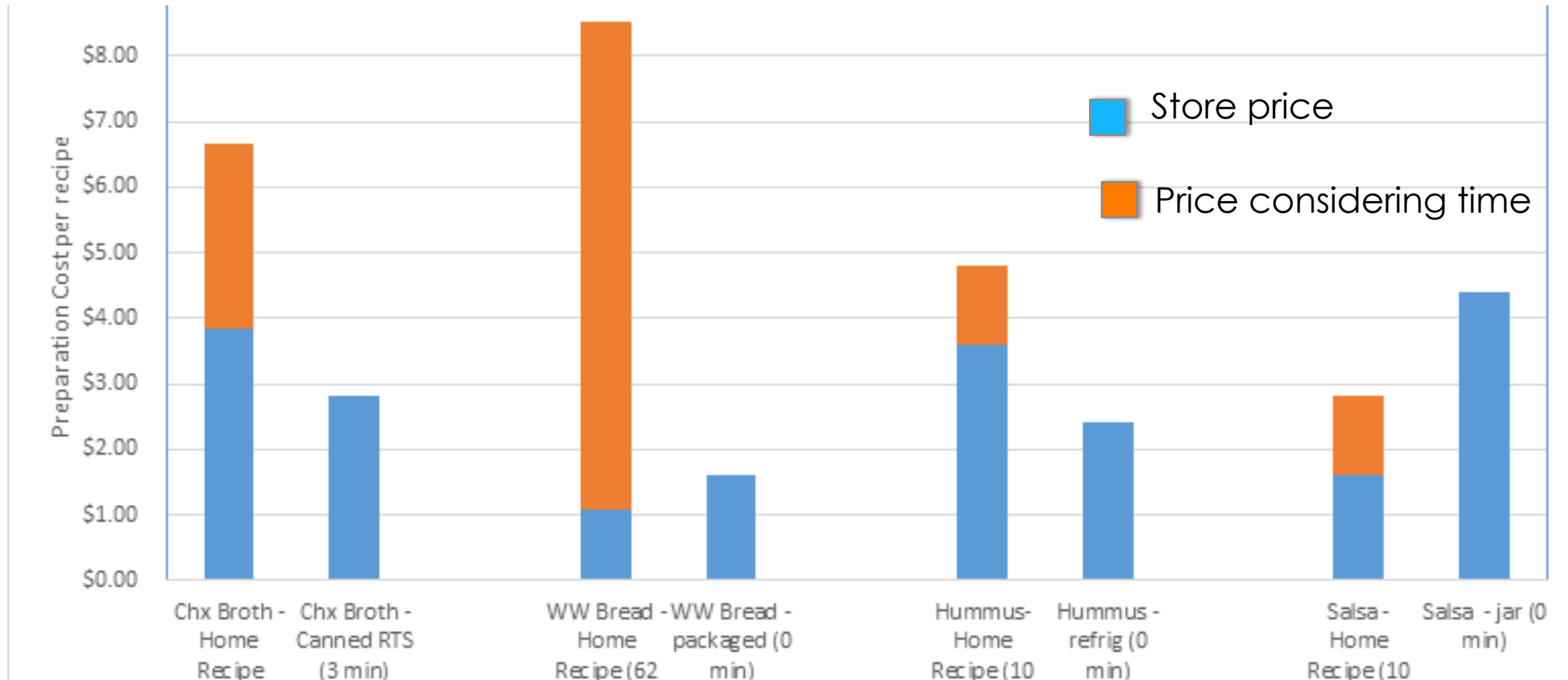
- Affordable and actionable
- Applicable to all lifestyles / consumer segments
 - Must not require 6 hrs/d for food preparation as in 1900
 - Must fit time, skill, budget and other resources



GRINDING OUR ENTIRE MEAL OAXACA, MEX



COST OF PF / UPF WITH TIME VALUE



Time is active time (not total time) but both are important, especially those employed outside the home.

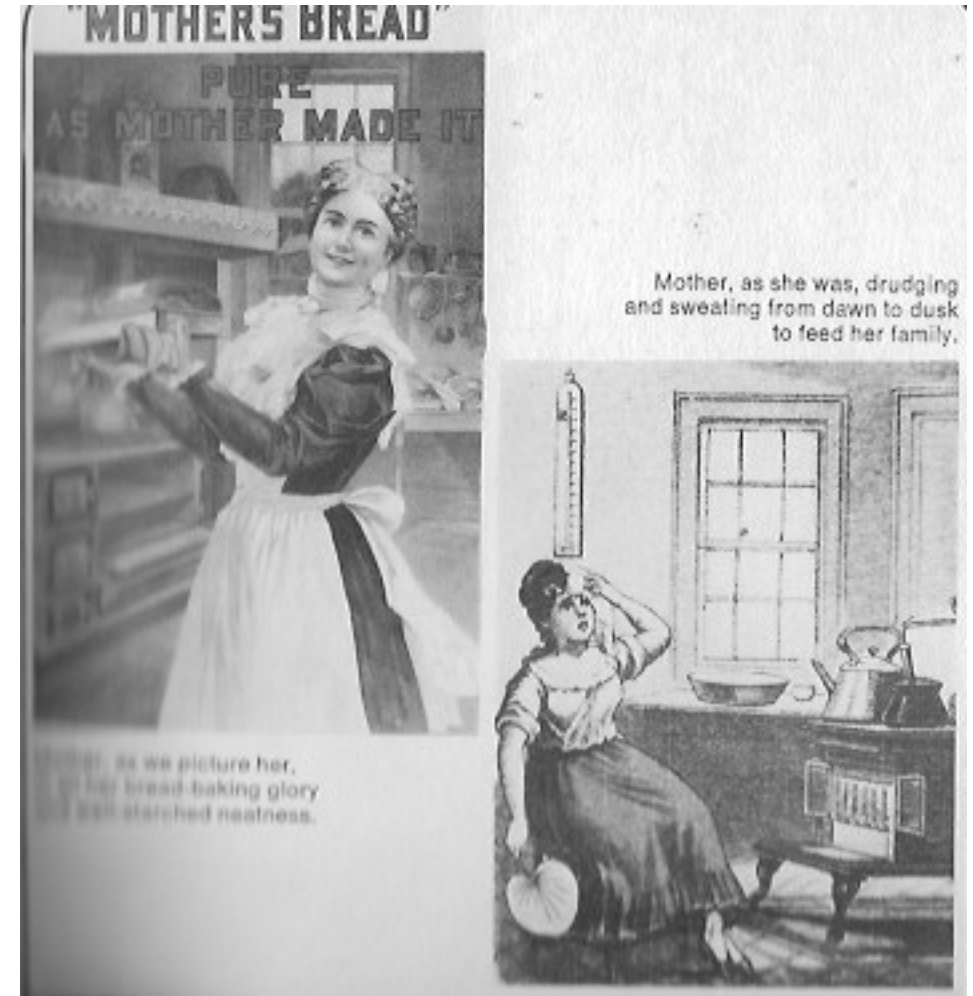
Courtesy Barbara Ivens

Yang Y, Davis GC, Muth MK. Beyond the sticker price: including and excluding time in comparing food prices. Am J Clin Nutr. 2015 Jul;102(1):165-71.

n=32/group

DIETARY RECOMMENDATIONS WORK IF THEY ARE:

- Affordable and actionable
- Applicable to all lifestyles / consumer segments
- Must not require 6 hrs/d for food preparation as in 1900
- Must fit time, skill, budget and other resources



CONCLUSIONS

- **Healthy (and unhealthy) diets can be constructed from foods with all levels of processing**
- **Processing as a code word for poor dietary choices is unlikely to improve nutrition and address obesity and chronic disease**
- **Focus on portion size, dietary balance, and choosing nutrient-rich grain foods with fiber, folate and whole grains**

Merci beaucoup
Thank You
お疲れ様
Danke
Gracias
Grazie
谢谢你
Thanks
Dank u
Obrigado