



Association between degree of processing, glycaemic impact and satiety potential of 279 ready-to-eat foods commonly consumed by French elderly population

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Association between degree of processing, glycaemic impact, satiety potential and nutrient profile of 279 ready-to-eat foods commonly consumed by French elderly population



Anthony FARDET

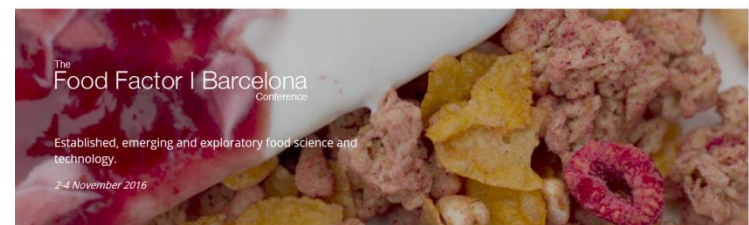
Senior Researcher in Preventive Nutrition

INRA - Unit of Human Nutrition

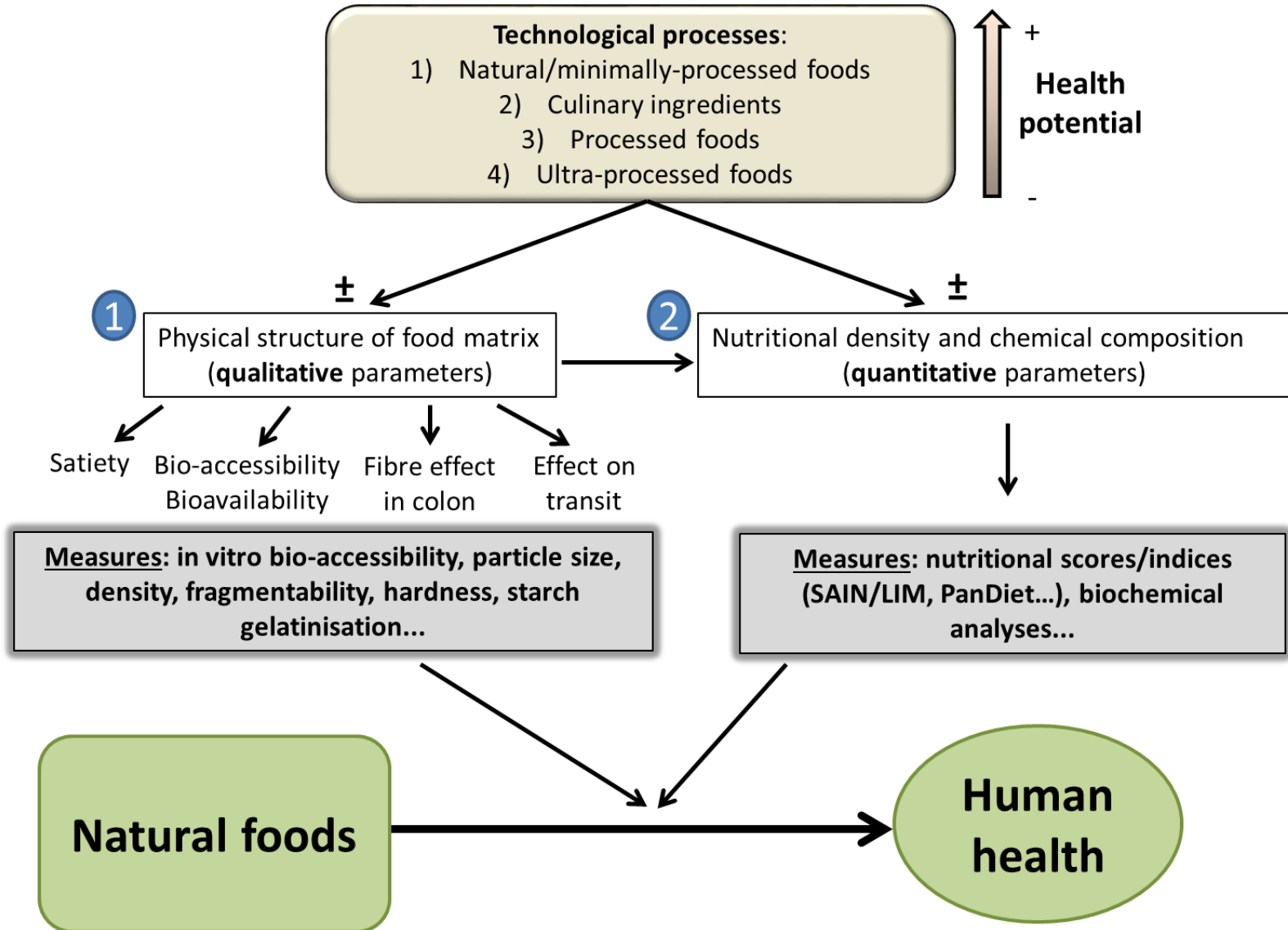
Clermont-Ferrand, France

With C. Mejean, H. Labouré, V. Andreeva et G. Féron

***Food Factor I Barcelona Conference
(2-4 November 2016)***



What is food health potential?



Processing & health

Impacts :

1) Food composition

2) Food structure

High intake of ultra-processed foods (> 15% of energy) is associated with increased risk of diet-related chronic diseases

Monteiro, C. A., R. B. Levy, et al. (2011). "Increasing consumption of ultra-processed foods and likely impact on human health: evidence from Brazil." Public Health Nutrition 14(1): 5-13.



A new food classification based on degree of processing: the international NOVA classification

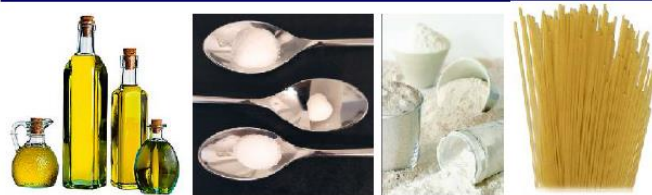
Group 1 Foods



Group 1
Un- or minimally-processed foods

Group 2
Culinary ingredients

Group 2 Culinary Ingredients



Group 3
Processed foods

Group 3
Processed foods

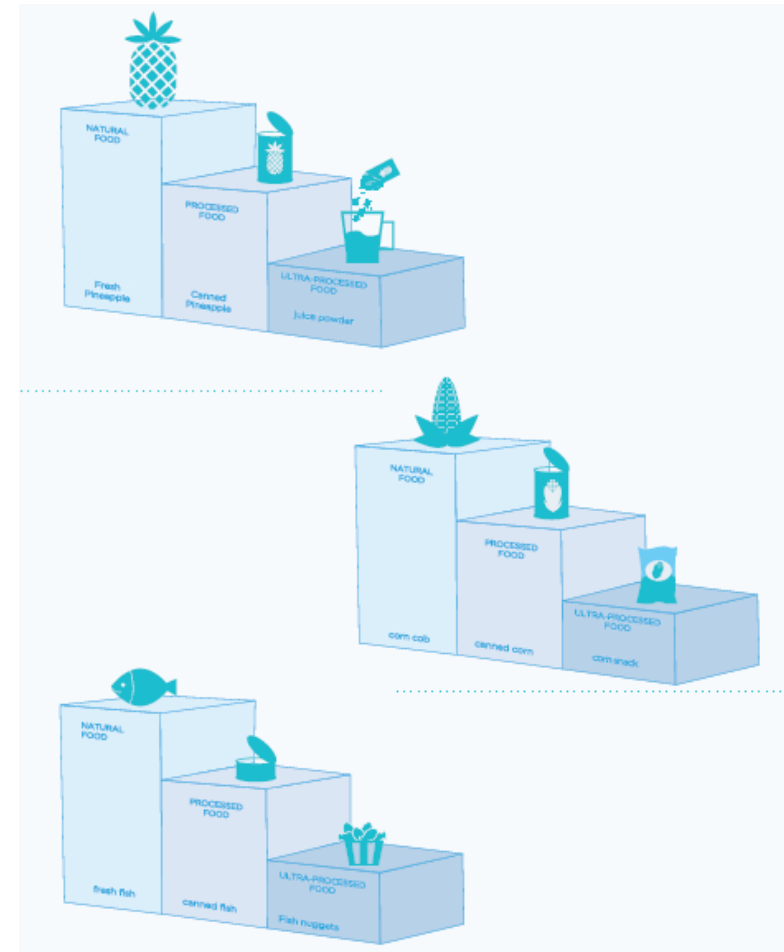


Carlos Monteiro
Sao Paulo University

Ultra-processed products



The international NOVA classification: the processing pyramid



- 1) Monteiro CA, Cannon G, Moubarac JC, Martins AP, Martins CA, Garzillo J, Canella DS, Baraldi LG, Barciotte M, et al. Dietary guidelines to nourish humanity and the planet in the twenty-first century. A blueprint from Brazil. *Public Health Nutr* 2015;18:2311-22.
- 2) Fardet A, Rock E, Bassama J, Bohuon P, Prabhasankar P, Monteiro C, Moubarac J-C, Achir N. Current food classifications in epidemiological studies do not enable solid nutritional recommendations to prevent diet-related chronic diseases: the impact of food processing. *Advances in Nutrition* 2015;6:629-38.
- 3) Moubarac J-C, Parra DC, Cannon G, Monteiro CA. Food Classification Systems Based on Food Processing: Significance and Implications for Policies and Actions: A Systematic Literature Review and Assessment. *Current Obesity Reports* 2014;3:256-72..

The « matrix effect »

Impacts:

1) Satiety potential

2) Glycaemic impact

At identical composition but with different structure two foods will give different health effect

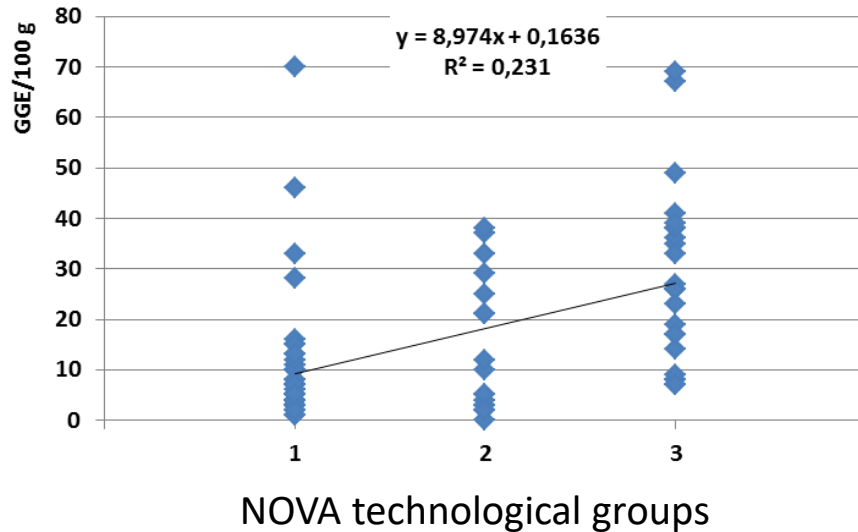


1 calorie (food A) \neq 1 calorie (food B)

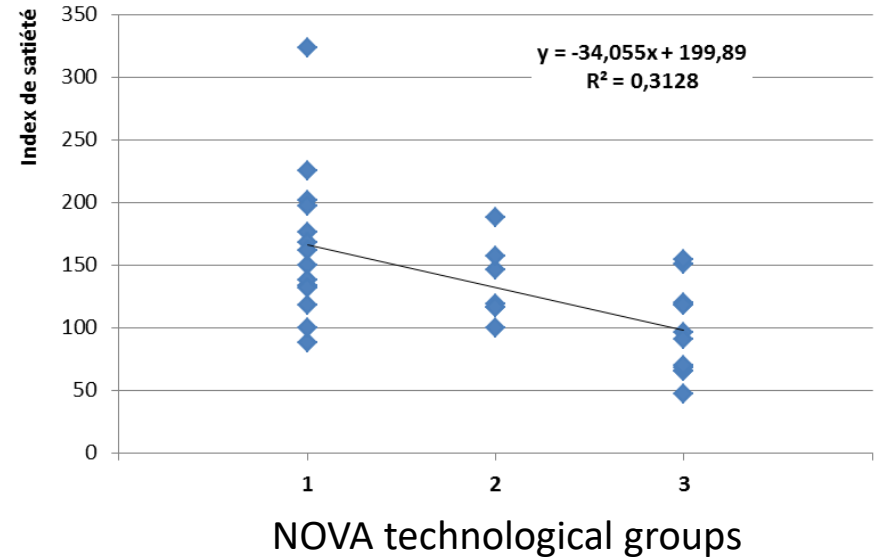
A preliminary study

Fardet, A. (2016). "Minimally processed foods are more satiating and less hyperglycemic than ultra-processed foods: a preliminary study with 98 ready-to-eat foods." Food & Function 7(5): 2338–2346.

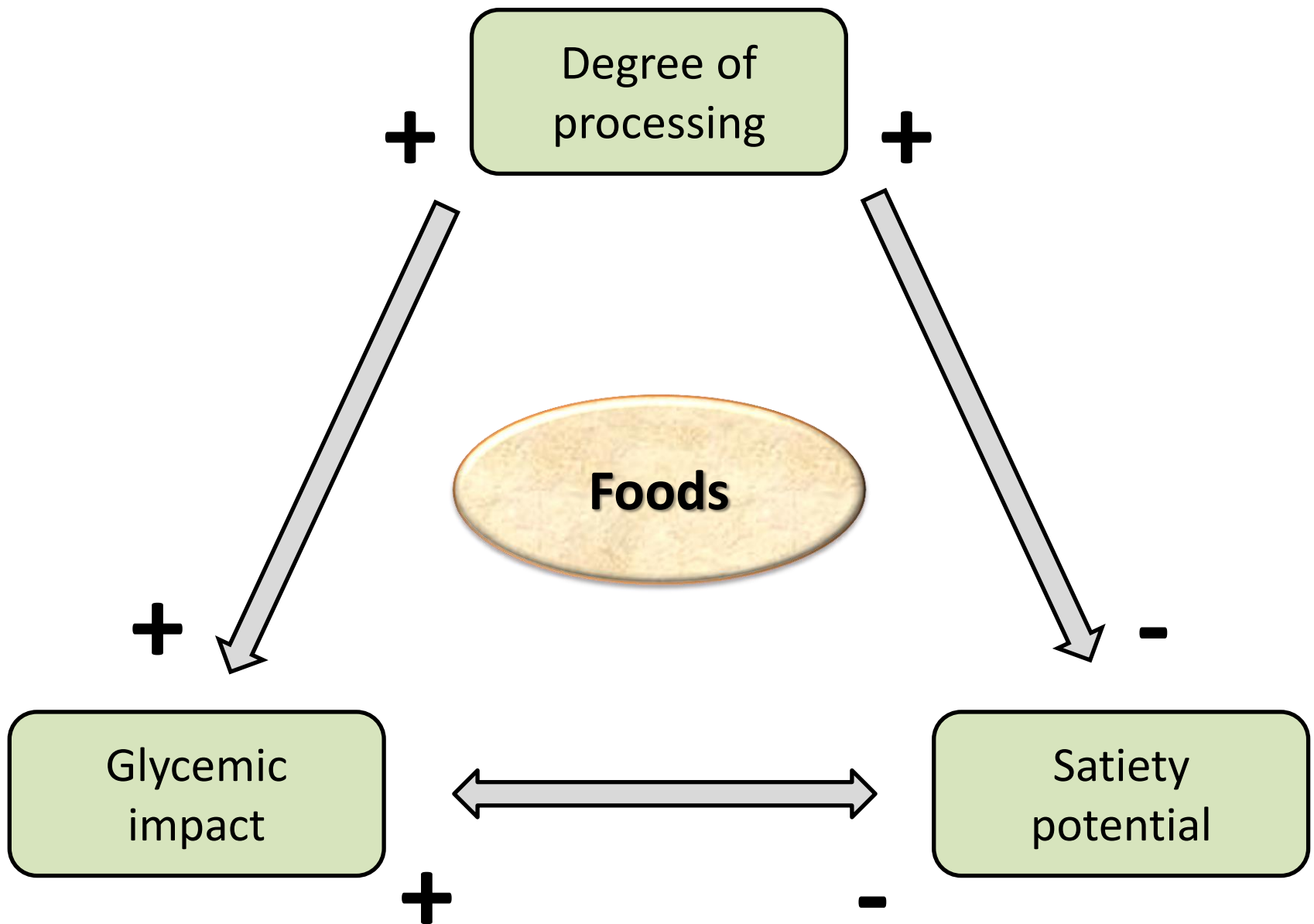
Glycaemic impact



Satiety potential



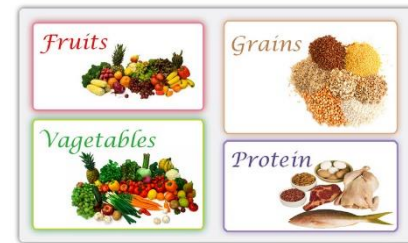
Increased degree of processing



The more foods are processed, the higher the glycemic impact and the less the satiety potential

Objectives of the second study

Funding: French AlimaSSenS ANR Project
« Towards an healthy diet adapted for elderly »



Objective: “Exploring relations between level of food processing and consumption and nutrient profiles, and satiety and glycemic potentials among 6,686 French elderly people (> 65 years)”
(Nutrinet-Santé Study)

Methods

2688 foods: 280 generic foods were aggregated (cluster analysis) **based on a consumption threshold of at least 5% by the population**

Satiety potential was calculated by using the Fullness Factor equation:

$$FF^{TM} = MAX(0.5, MIN(5.0, 41.7/CAL0.7 + 0.05*PR + 6.17E-4*DF3 - 7.25E-6*TF3 + 0.617))$$

Glycemic impact:

- glycemic index
- glucose glycemic equivalent (g/100 g food)

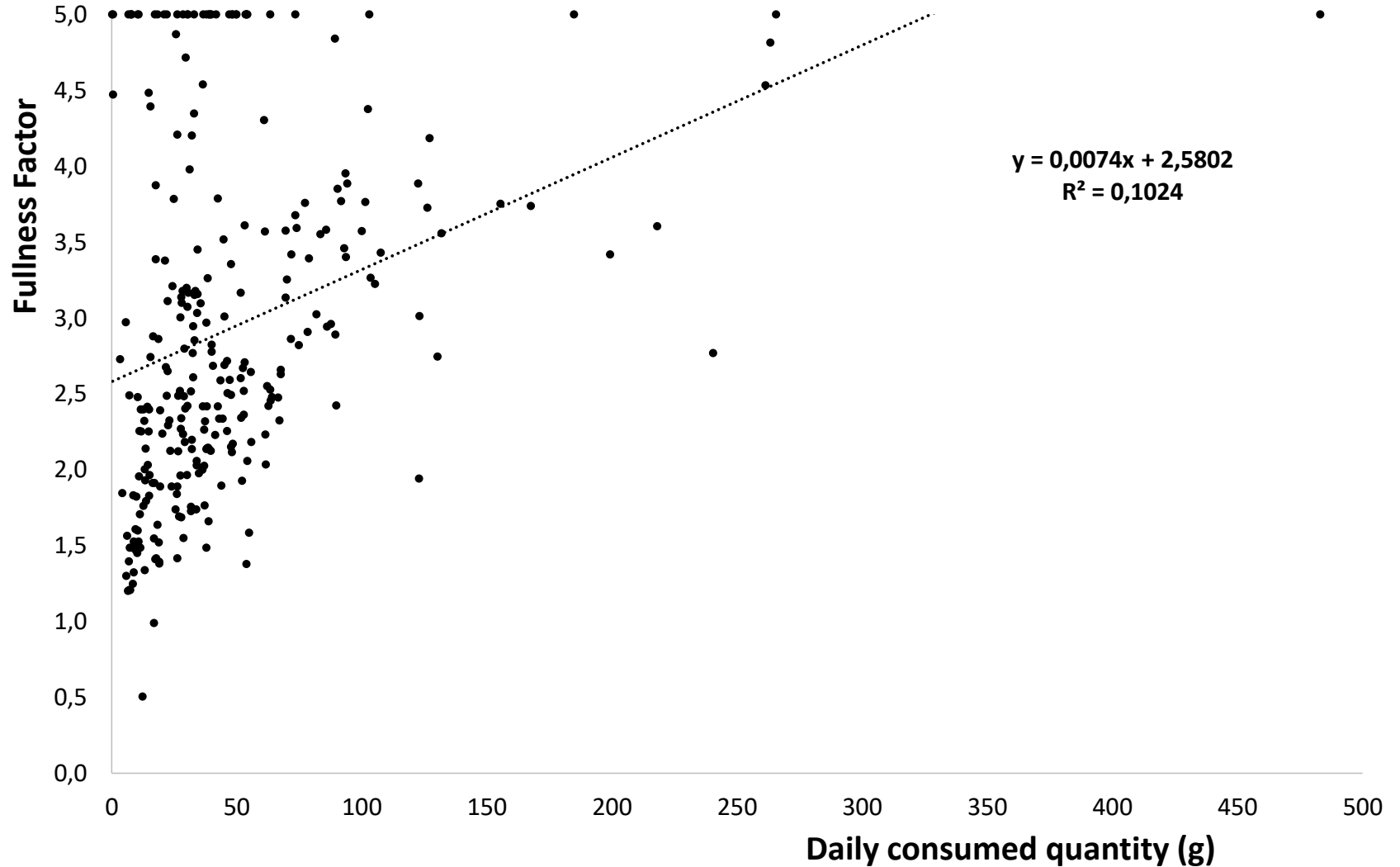
Foods/dishes were ranked according to adapted international **NOVA classification:**

- Raw/minimally-processed (**G1**)
- Processed (**G2**)
- Ultra-processed (**G3**).

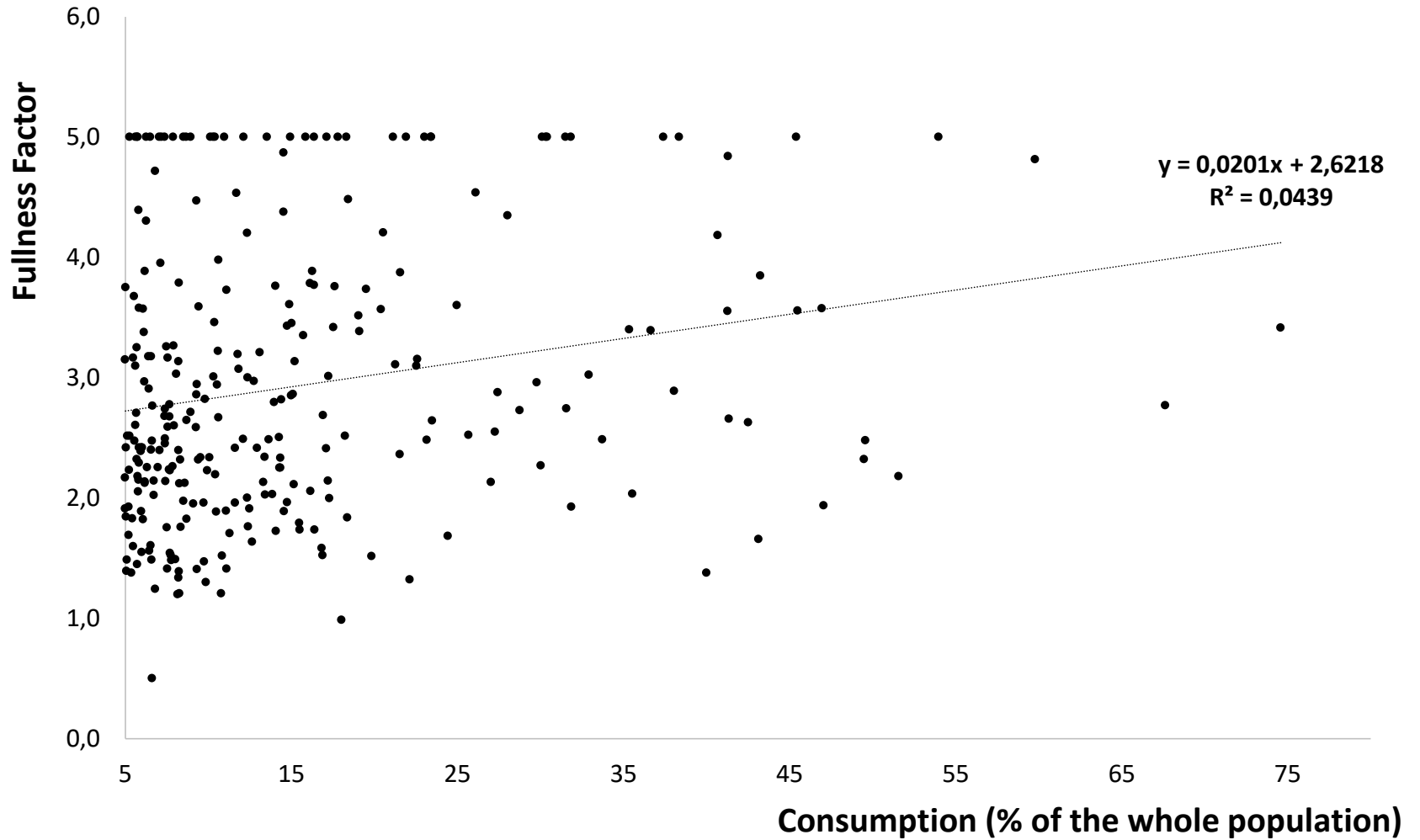
Nutrient profile: SAIN/LIM

ANOVA and correlation analyses

Results



Results



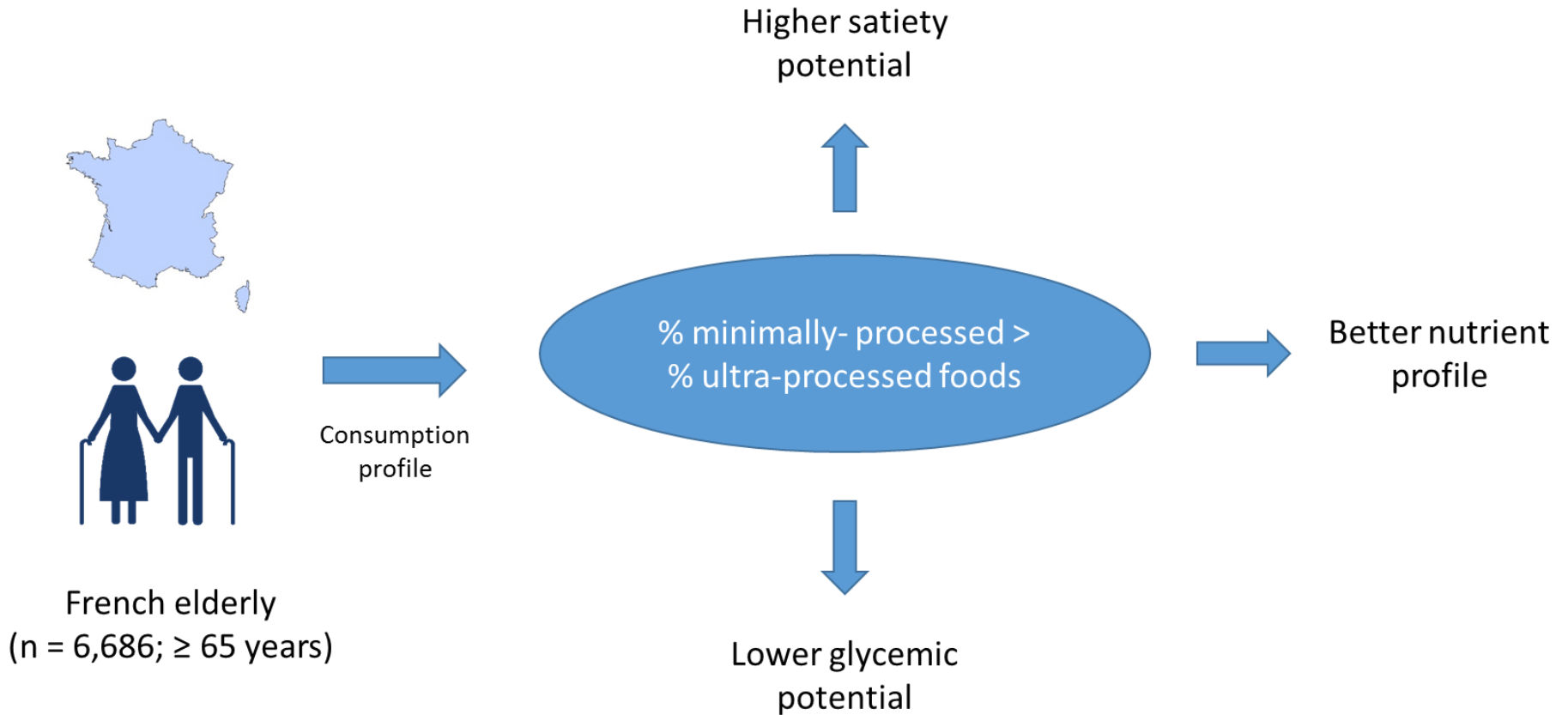
Results

	Consumption (%)	Quantity consumed (g/day)
G1	$18.02 \pm 13.37^*$	$57.68 \pm 62.86^*$
G2	$15.22 \pm 11.86^*$	$47.75 \pm 42.12^{*,**}$
G3	$9.45 \pm 5.61^{**}$	$27.18 \pm 21.40^{**}$
<i>P value</i>	4.1×10^{-6}	0.0003

Results

	Fullness Factor	Nutrient Density Score (SAIN)	LIM	Glycemic Glucose Equivalents (g/100 g)	Glycemic Index
G1	3.55 ±1.10*	19.72 ±37.33*	3.57 ±6.47*	9 ±9*	47 ±12*
G2	2.45 ±0.66**	5.84 ±4.48**	13.97 ±15.17**	19 ±9*,**	72 ±19**
G3	1.98 ±0.70***	3.83 ±3.00**	24.58 ±15.53***	23 ±20**	58 ±20**
<i>P value</i>	<i>1.1 x 10⁻¹⁶</i>	<i>0.00005</i>	<i>1.1 x 10⁻¹⁶</i>	<i>0.0003</i>	<i>0.00003</i>

Main conclusions



Perspectives

- To include food structure and degree of processing in food health potential
- Current nutritional indices: only based on nutritional composition (too reductionist)
- A lack of physico-chemical parameters to characterize foods
- To develop more integrative Food Indices:

Index = Composition X Structure

