



Ultra-Processed Diets Cause Excess Calorie Intake and Weight Gain: An Inpatient Randomized Controlled Trial of Ad Libitum Food Intake

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Intramural Research Program

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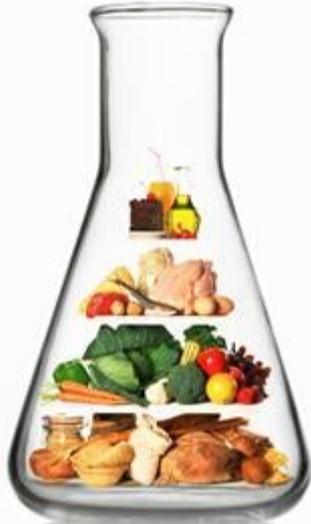
one program
many people
infinite possibilities



Diet Quality & “Nutritionism”

NUTRITIONISM

The Science and Politics
of Dietary Advice



Gyorgy Scrinis

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.

Diet Quality & “Nutritionism”

#1 NEW YORK TIMES BESTSELLER

IN DEFENSE OF FOOD

AN EATER'S MANIFESTO



MICHAEL POLLAN

AUTHOR OF THE OMNIVORE'S DILEMMA
AND COOKED

In the case of nutritionism, the widely shared but unexamined assumption is that the key to understanding food is indeed the nutrient. Put another way: Foods are essentially the sum of their nutrient parts.



The NOVA star is born



Top: fruits; grains and legumes; meat stew with beans and vegetables; water.

Then: fruit flavour popsicles; breakfast 'cereals'; reconstituted meat product; soft drinks.

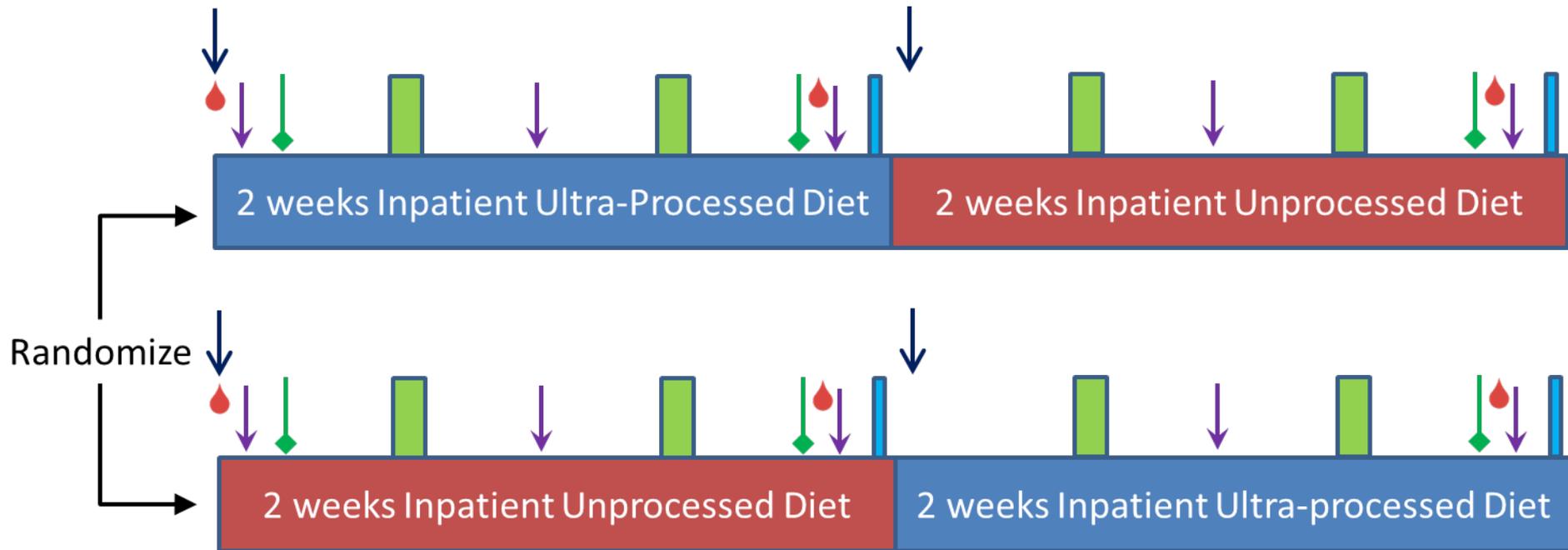
The ultra-processed products below are not variants of the foods and meal above. They are formulated from industrial ingredients and contain little or no intact foods. By their nature they are unhealthy, and should be grouped together, and avoided



THE GOLDEN RULE

*ALWAYS PREFER NATURAL OR MINIMALLY
PROCESSED FOODS AND FRESHLY MADE
DISHERS AND MEALS TO ULTRA-PROCESSED
FOODS*

Ultra-processed vs Unprocessed Diet Study



↓ DLW ● Fasted Blood ↓ DXA ↓ MRI MRS ■ 24hr Chamber ■ OGTT

KD Hall et al. *Cell Metabolism* 30:1-11 (2019).

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.

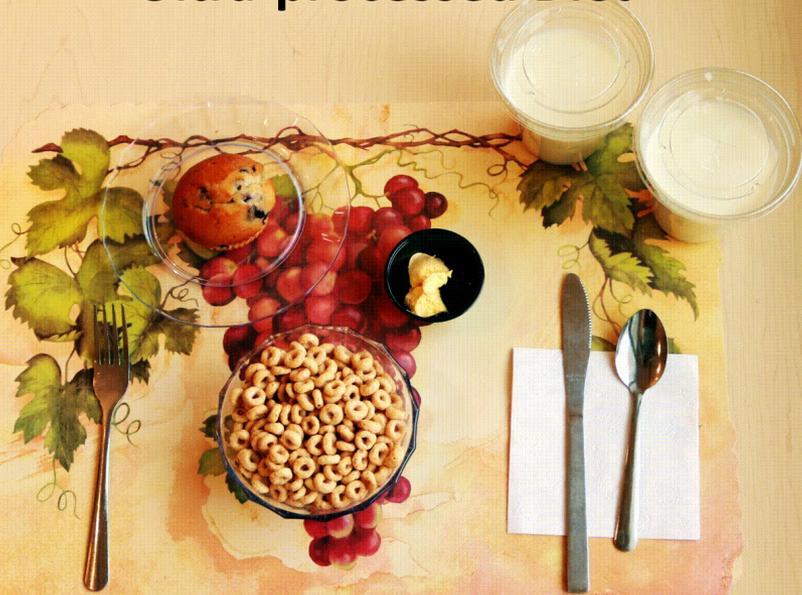
Ultra-processed foods include fast food, sugary drinks, snacks, chips, candies, cookies, sweetened milk products, sweetened cereals, and sauce and dressings. They are nutritionally poor.



	Ultra-Processed Diet	Unprocessed Diet
Three Daily Meals		
Energy (kcal/day)	3,905	3,871
Carbohydrate (%)	49.2	46.3
Fat (%)	34.7	35.0
Protein (%)	16.1	18.7
Energy density (kcal/g)	1.024	1.028
Non-beverage energy density (kcal/g)	1.957	1.057
Sodium (mg/1,000 kcal)	1,997	1,981
Fiber (g/1,000 kcal)	21.3	20.7
Sugars (g/1,000 kcal)	34.6	32.7
Saturated fat (g/1,000 kcal)	13.1	7.6
Omega-3 fatty acids (g/1,000 kcal)	0.7	1.4
Omega-6 fatty acids (g/1,000 kcal)	7.6	7.2
Energy from unprocessed (%) ^a	6.4	83.3
Energy from ultra-processed (%) ^a	83.5	0

Ultra-processed vs Unprocessed Diets

Ultra-processed Diet



Unprocessed Diet



The meals had similar amounts of:

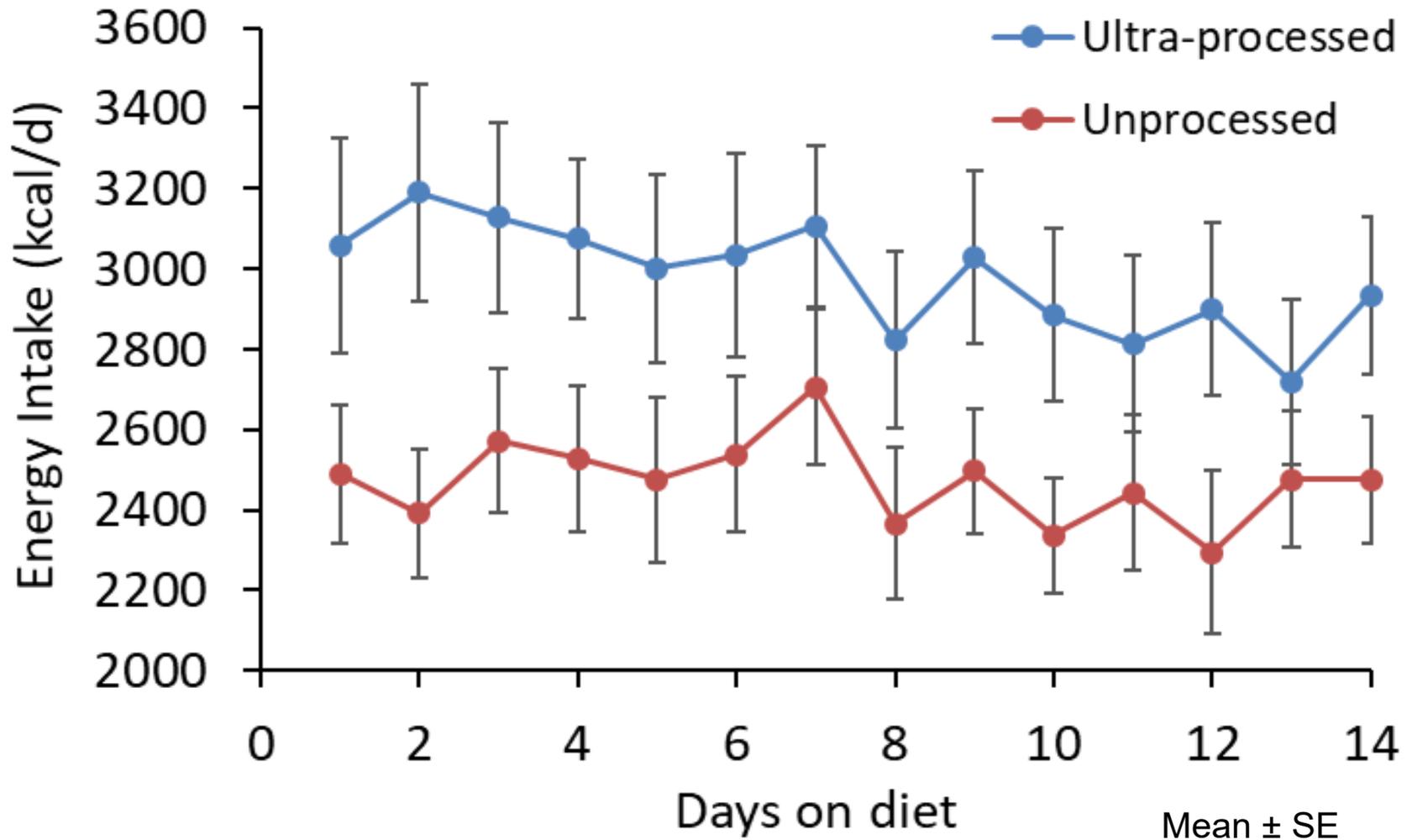
Calories, Carbs, Fat, Protein, Sugar, Sodium, Fiber

20 Adults were instructed to eat as much or as little as desired

Primary Outcome: Energy Intake Differences

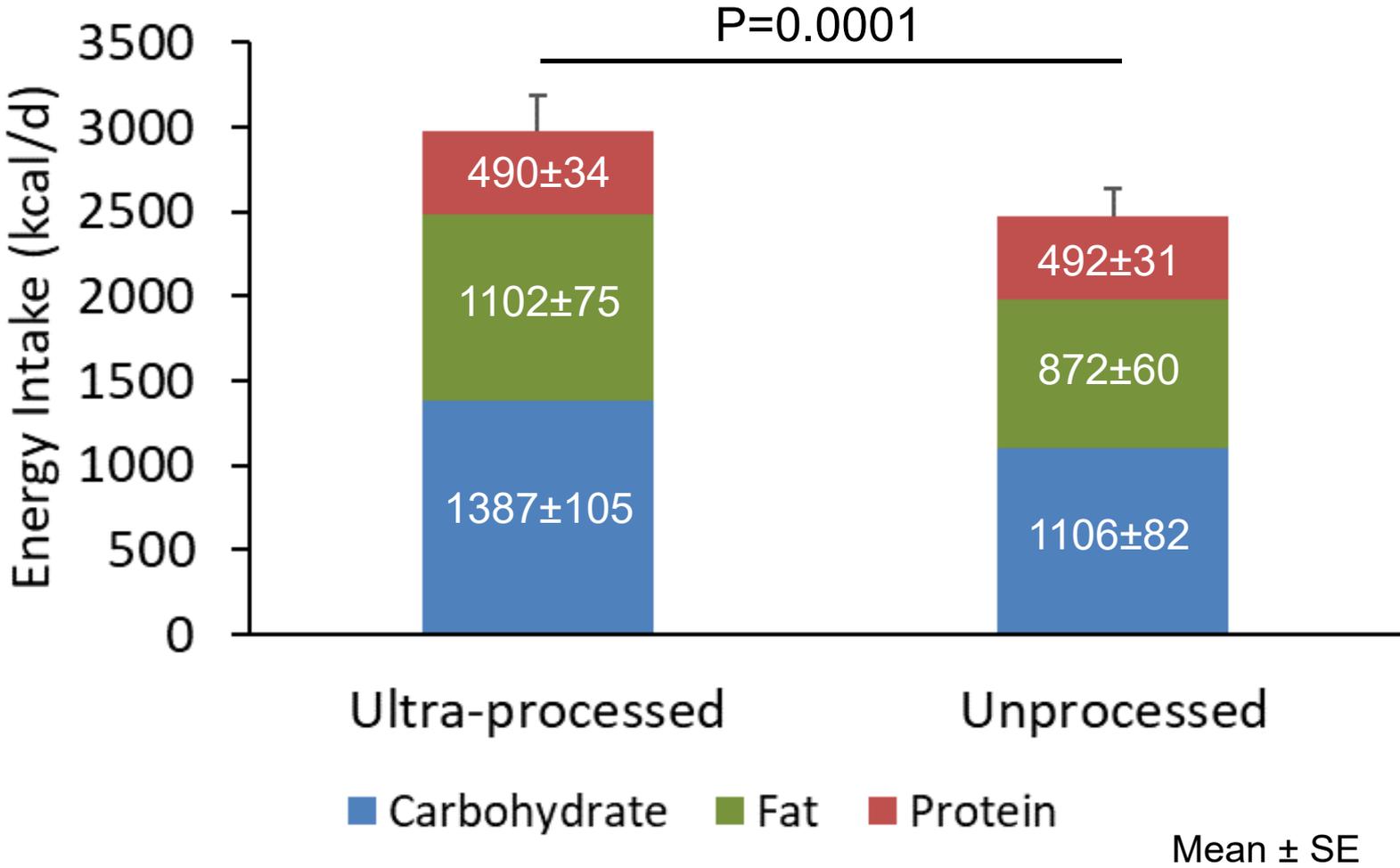
KD Hall et al. *Cell Metabolism* 30:1-11 (2019).

Ultra-processed Diets Cause Increased Intake



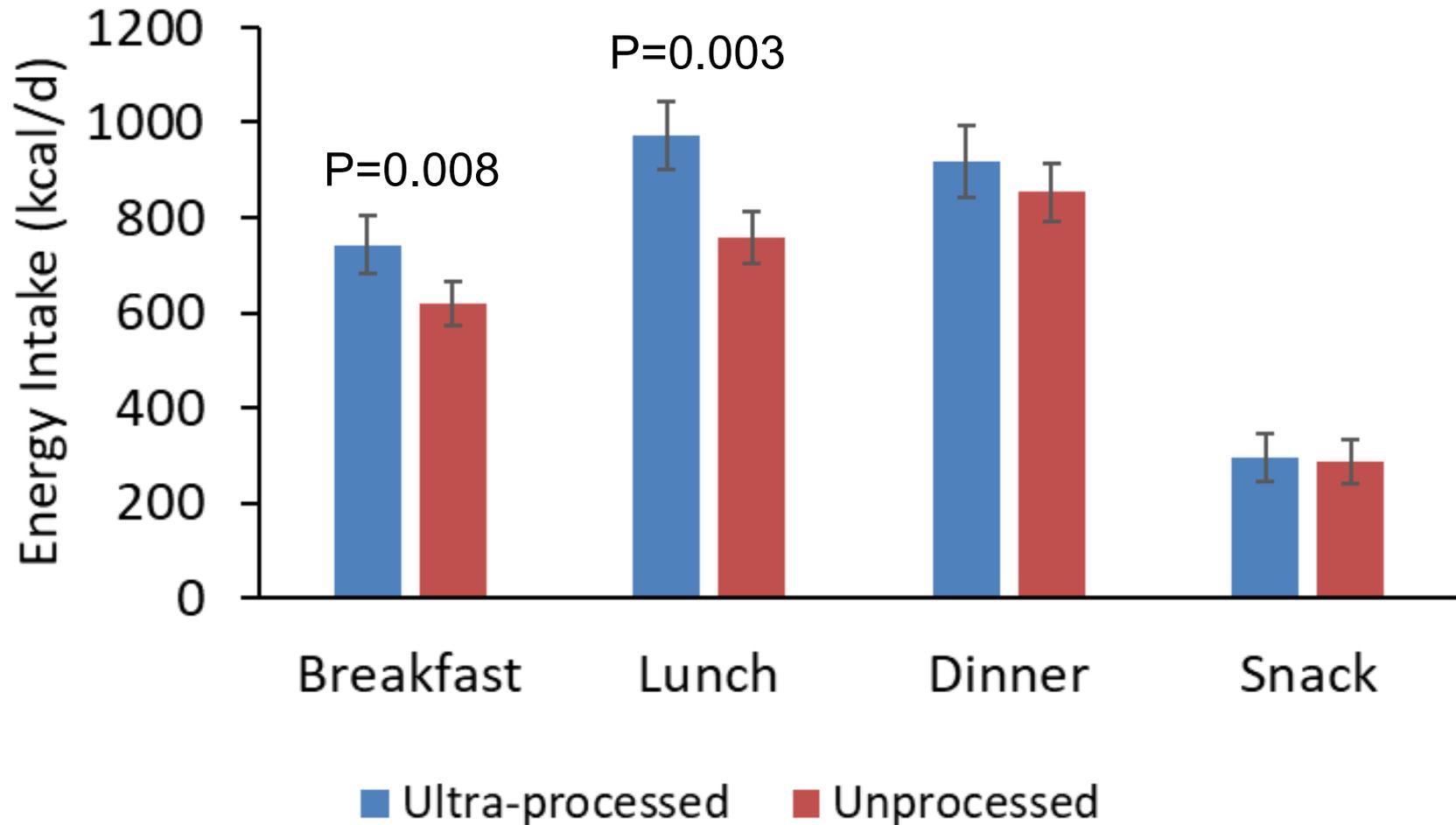
KD Hall et al. *Cell Metabolism* 30:1-11 (2019).

More Carbs & Fat with Ultra-processed Diets



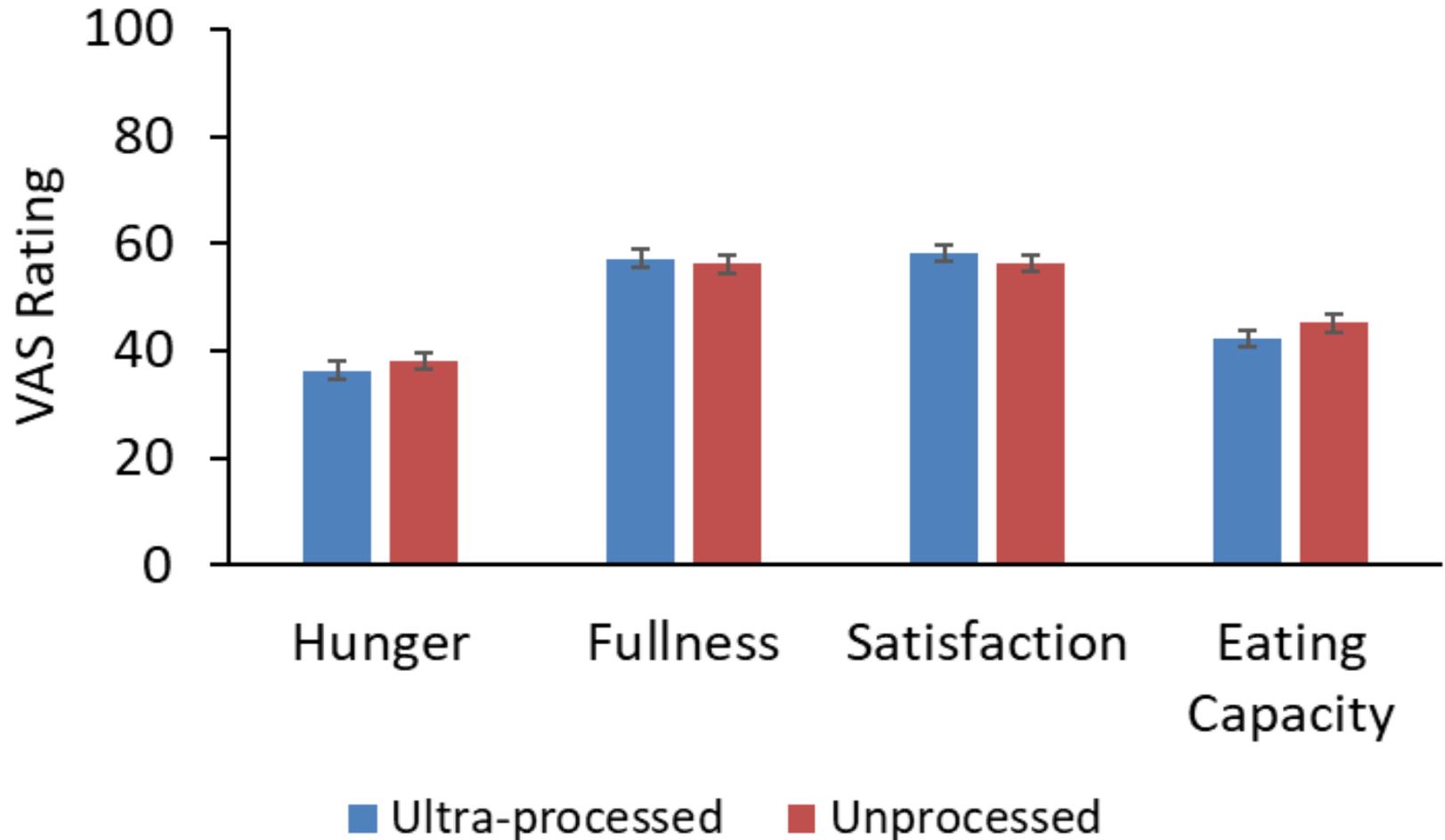
KD Hall et al. *Cell Metabolism* 30:1-11 (2019).

Larger Meals with Ultra-processed Diets



KD Hall et al. *Cell Metabolism* 30:1-11 (2019).

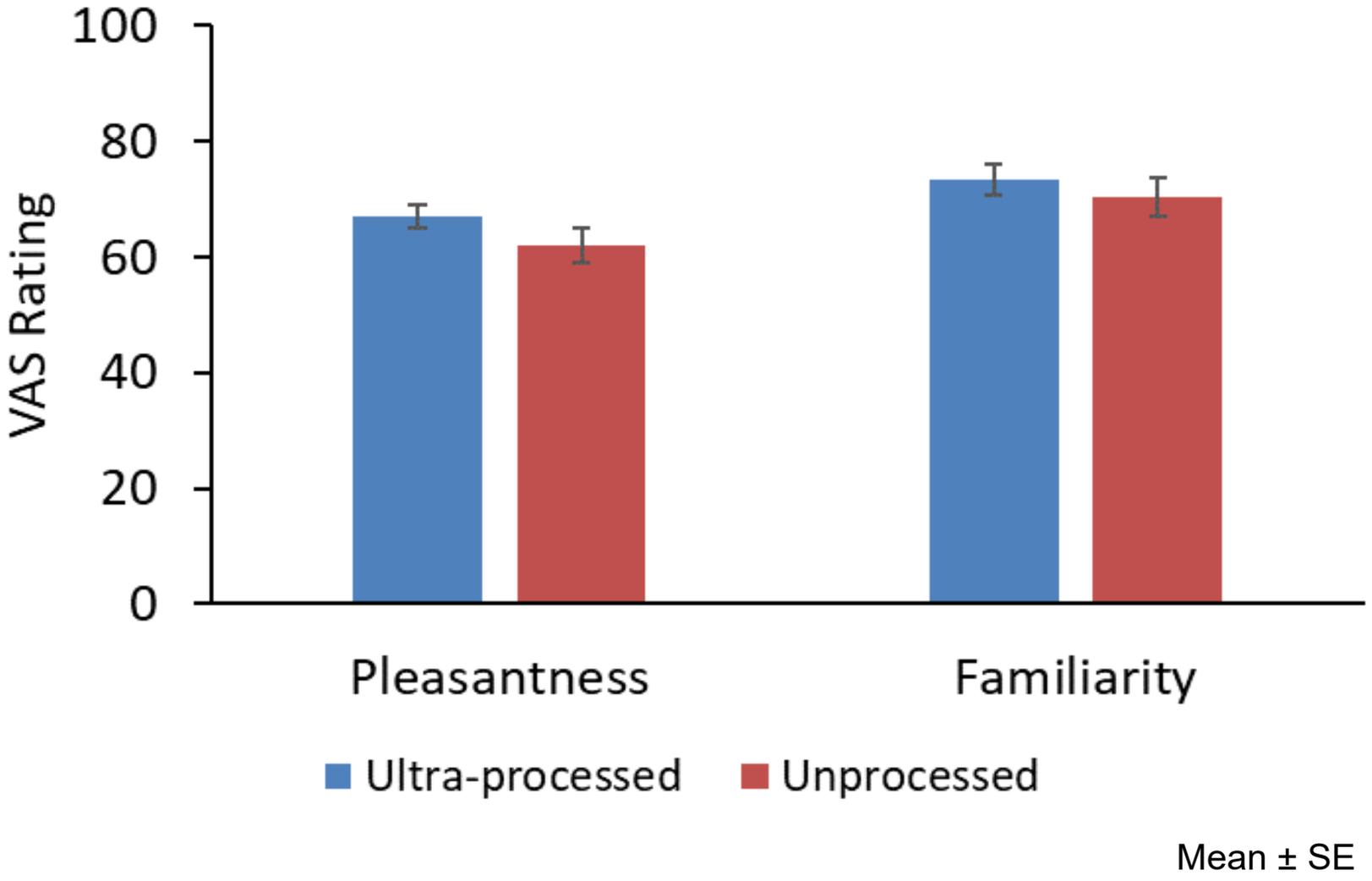
No Differences in Self-Reported Appetite



Mean ± SE

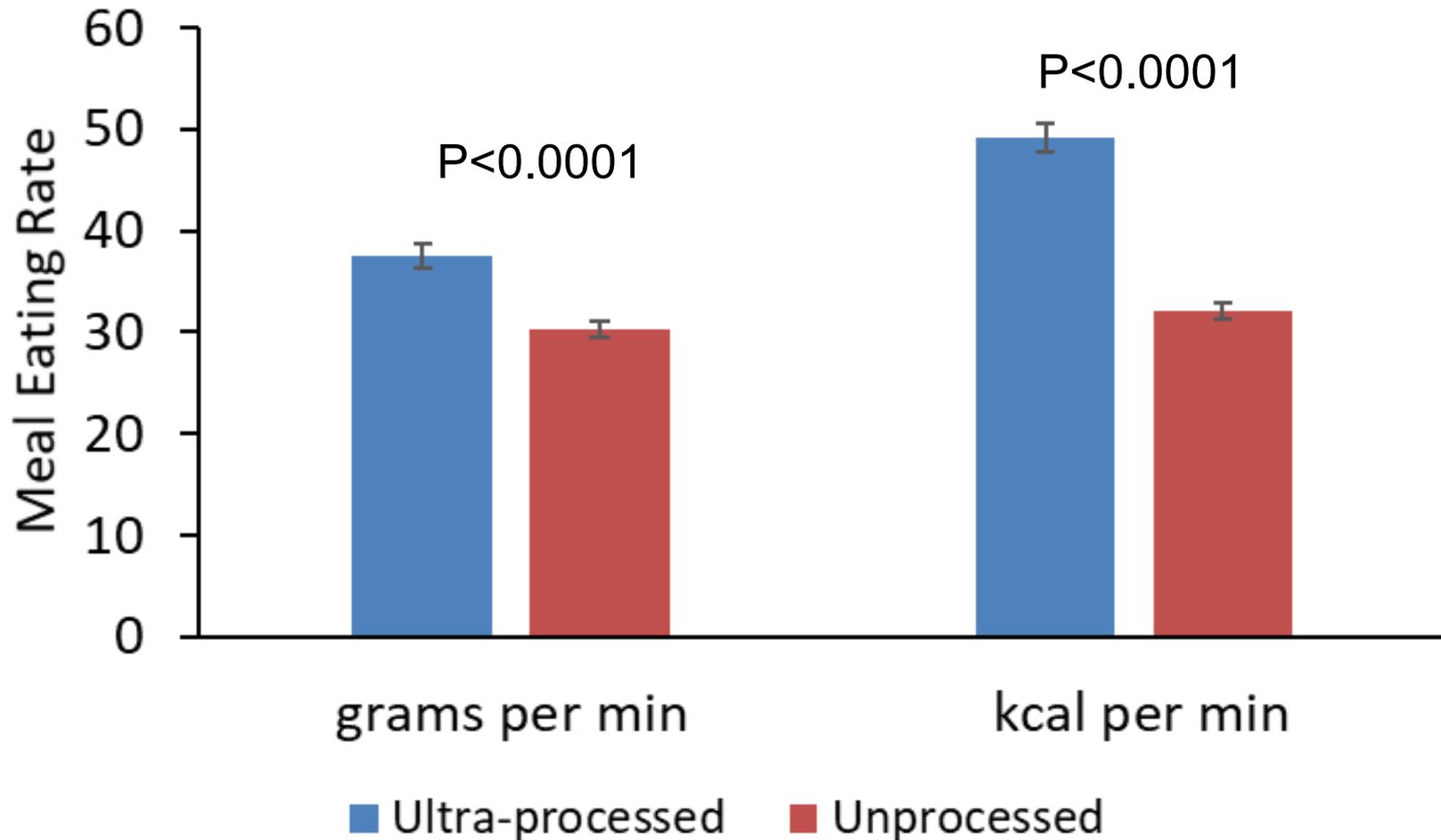
KD Hall et al. *Cell Metabolism* 30:1-11 (2019).

No Differences in Pleasantness or Familiarity



KD Hall et al. *Cell Metabolism* 30:1-11 (2019).

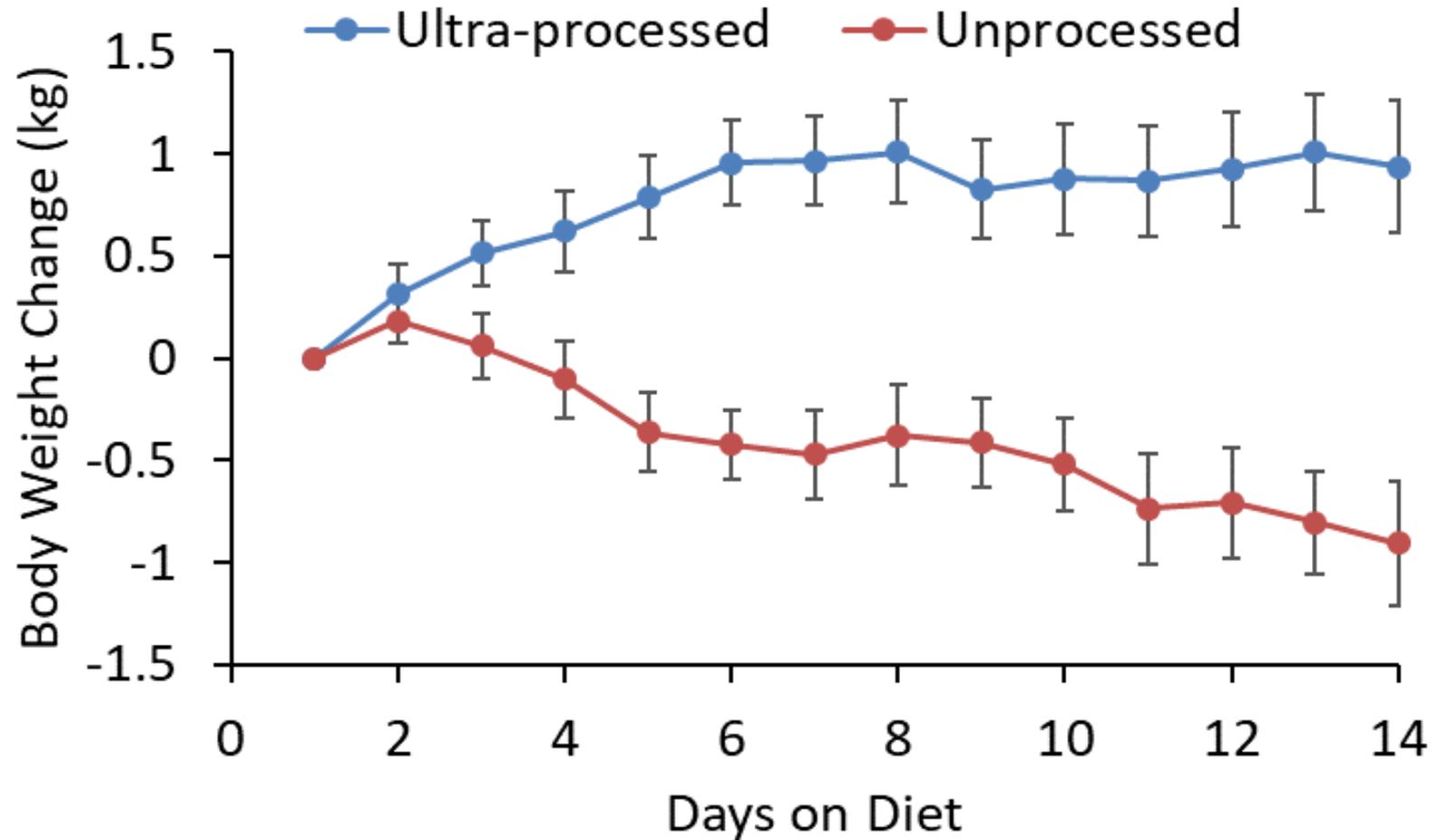
Faster Eating Rate for Ultra-processed Meals



Mean ± SE

KD Hall et al. *Cell Metabolism* 30:1-11 (2019).

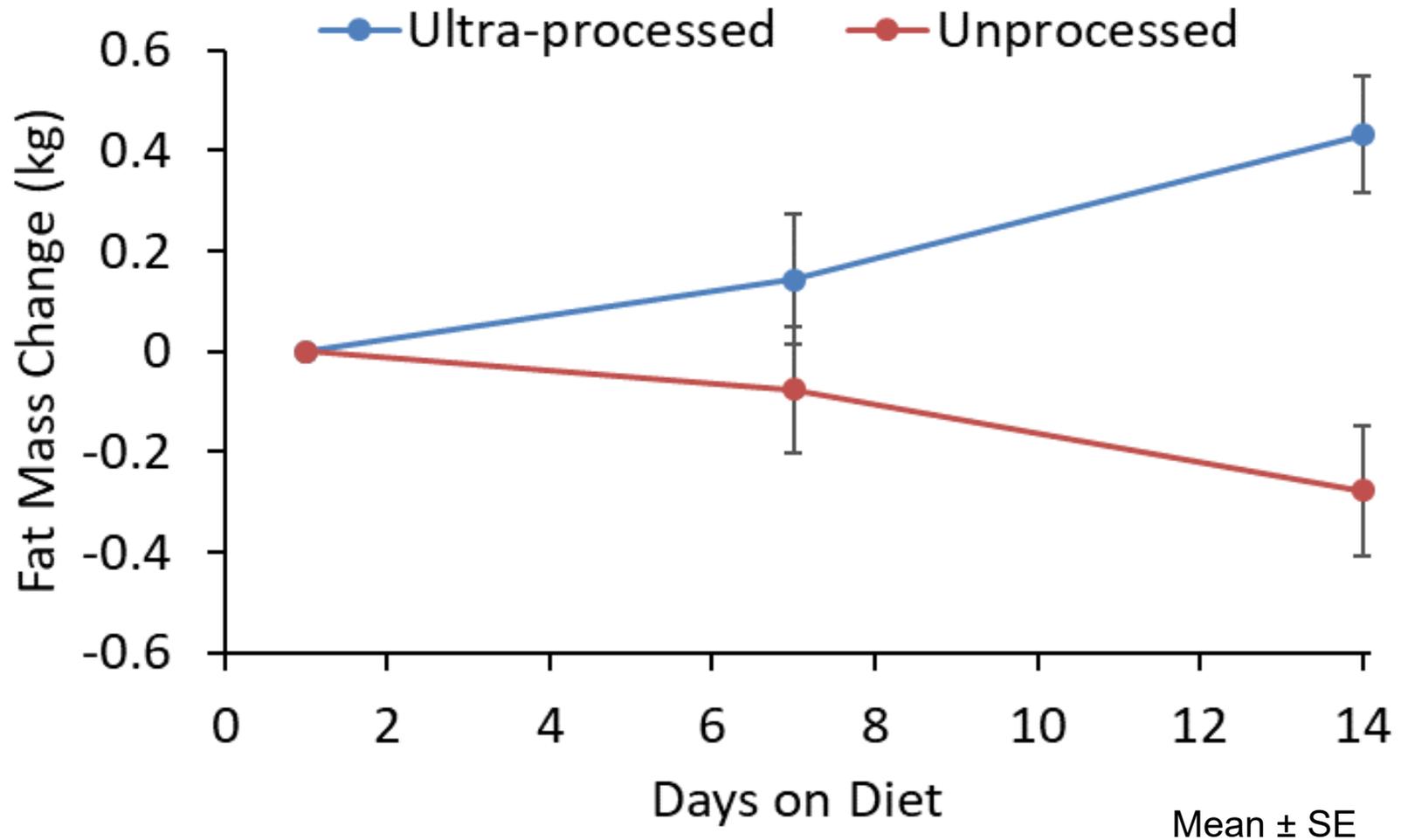
Ultra-processed Diets Cause Weight Gain



Mean \pm SE

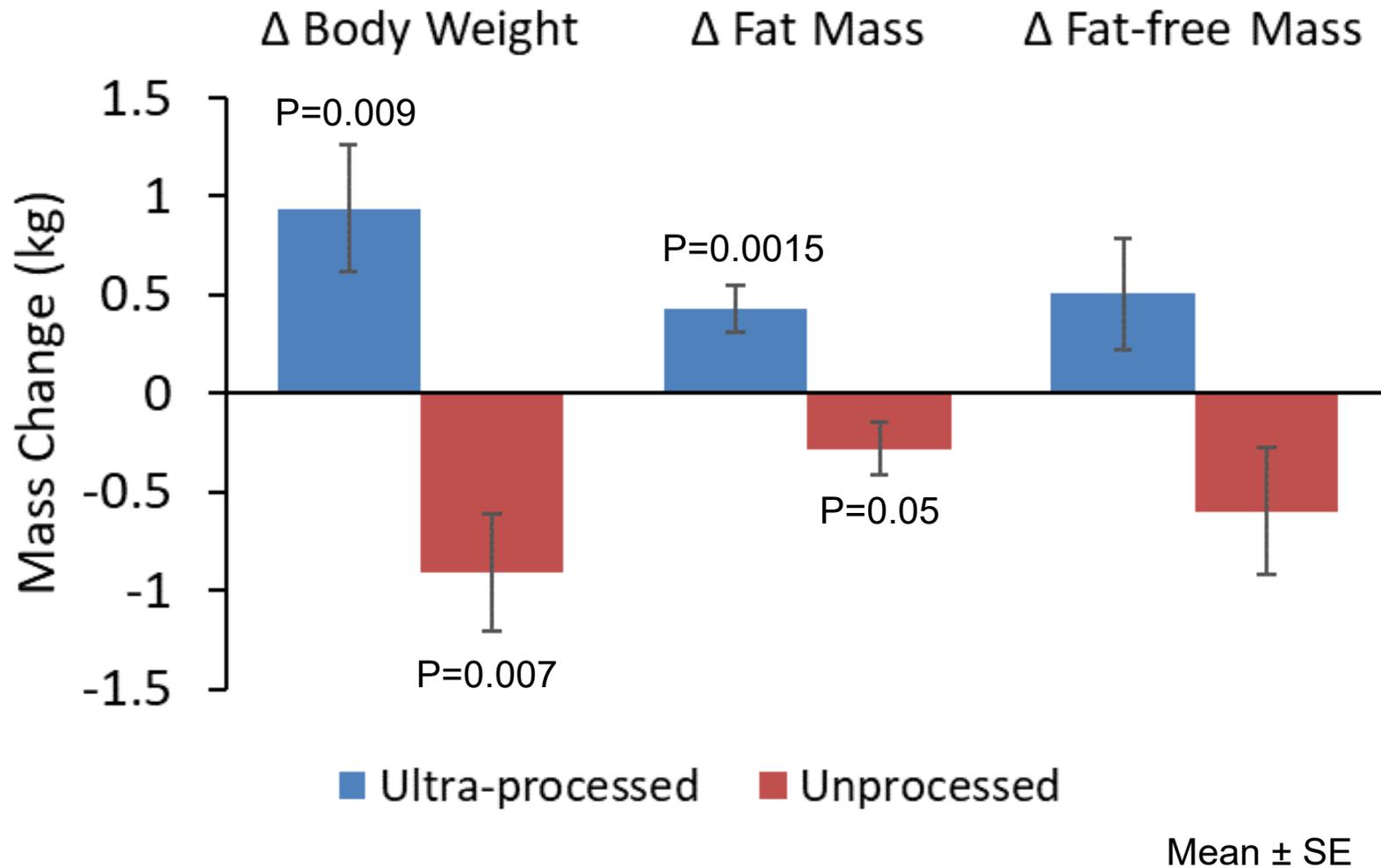
KD Hall et al. *Cell Metabolism* 30:1-11 (2019).

Ultra-processed Diets Cause Fat Gain



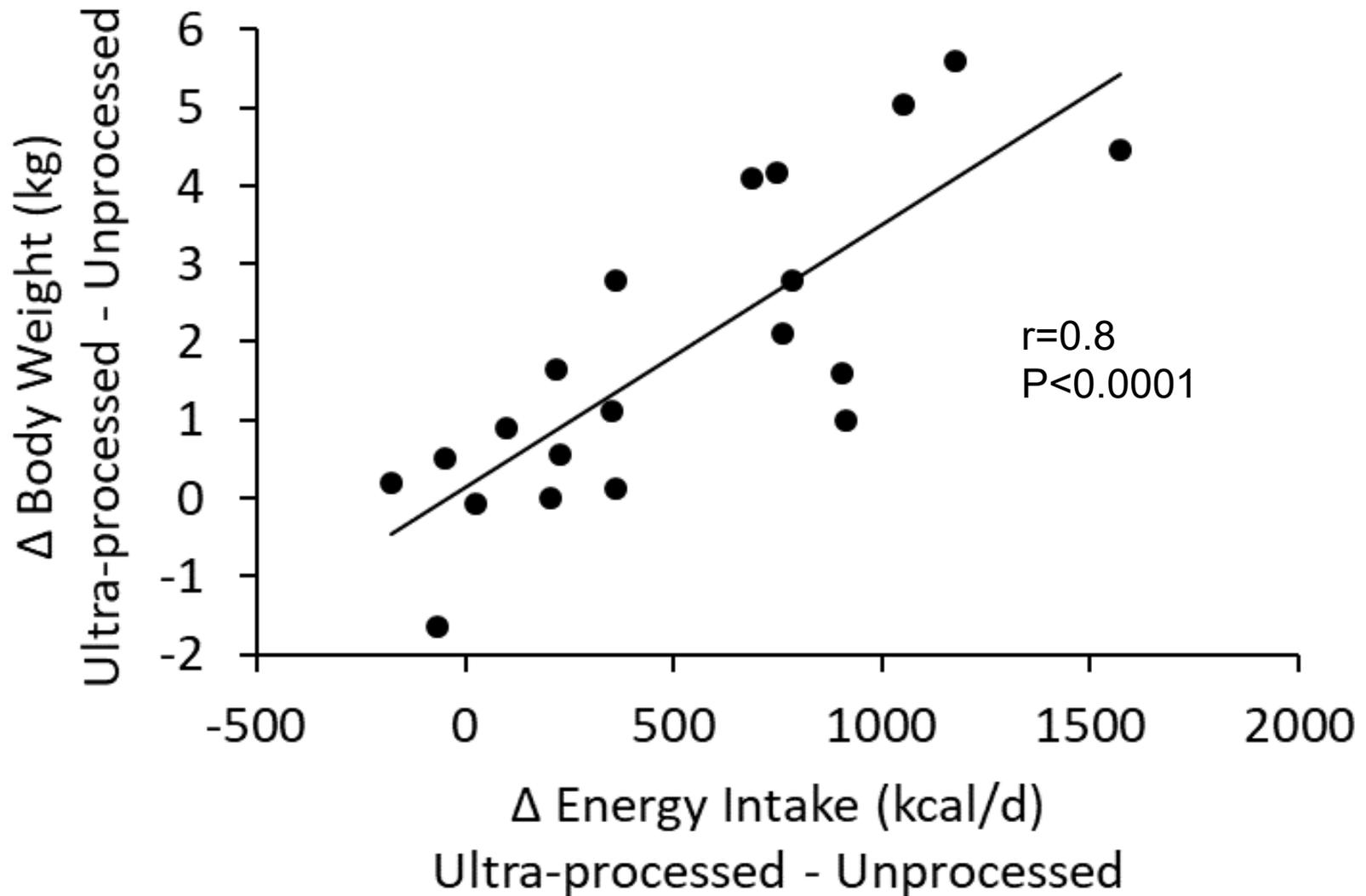
KD Hall et al. *Cell Metabolism* 30:1-11 (2019).

Weight & Fat Gain with Ultra-processed Diets



KD Hall et al. *Cell Metabolism* 30:1-11 (2019).

Substantial Individual Variability



KD Hall et al. *Cell Metabolism* 30:1-11 (2019).



Key Questions:

- What are the mechanisms by which ultra-processed versus unprocessed diets influence calorie intake?
 - Not Salt, Sugar, Fat, or Fiber?
 - Not Palatability?
 - Hormones? PYY? Ghrelin?
 - Energy Density of Non-Beverage Foods?
 - Oro-sensory properties & Eating Rate?
 - Protein Leverage? X Leverage?
 - Artificial Flavors, other ingredients, or lack thereof?
 - Role of the Microbiome?

Key Questions:

- Can ultra-processed foods be reformulated to avoid their effects on calorie intake and weight gain?
 - Perhaps, but we first need to better understand mechanisms
 - Our study suggests that a focus on Salt, Sugar, & Fat may not necessarily be effective
- Is it a feature or a flaw of NOVA that product reformulation can't turn an ultra-processed product into another NOVA category?
 - Can't turn a “bad food” into a “good food” by changing its nutrient profile

Key Questions:

- Policy implications are not necessarily clear
 - Ultra-processed foods are convenient, tasty, inexpensive, and safe from a microbiological perspective
 - Ultra-processed foods contribute a large fraction of habitual dietary calories and nutrients in the USA and elsewhere

Key Questions:

- Policy implications are not necessarily clear
 - Ultra-processed foods are convenient, tasty, inexpensive, and safe from a microbiological perspective
 - Ultra-processed foods contribute a large fraction of habitual dietary calories and nutrients in the USA and elsewhere
 - Preparing meals from unprocessed foods and culinary ingredients takes more time, money, skill, and equipment to do safely and effectively
 - A tax on ultra-processed foods would likely be regressive and disproportionately affect those in lower SES

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one program
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infinite possibilities

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