University College Dublin
An Coláiste Ollscoile,
Baile Átha Cliath

Addressing nutrient adequacy and supporting dietary behaviour change - two fundamental challenges in achieving sustainable healthy diets.

Associate Professor Aifric O'Sullivan
Vice Principal International
UCD College of Health and Agricultural Sciences

Fundamental Challenges..

...for Sustainable Healthy Diets

- What is a Sustainable Healthy Diet and what needs to change?
- Can we change to more sustainable diets? Evidence from **MyPlanetDiet**
- Was **MyPlanetDiet** *adequate* and *acceptable* and what was the biggest challenge?
- How might we overcome challenges? Evidence from **PLAN'EAT**

Research team…

Dr Katie Davies
Dr Ursula Leonard
Dr Leona Lindberg
Dr Marie Conway
Prof Eileen Gibney
Prof Mairead Kiely
Dr Anne Nugent
Prof Jayne Woodside
Dr Sinead McCarthy
SuHeGuide Team

SuHeGuide

Patrick Elliott
Dr Lauren Devine
Plan'Eat Team

PLAN'EAT

What is a Sustainable Healthy Diet?

UN FAO Sustainable Healthy Diet

- *low environmental impacts*
- *nutrition security and to healthy life*
- *culturally acceptable, accessible*
- *economically fair and affordable*

How do we compare in Ireland?

EAT LANCET Protein: 25% animal 75% plant-based

Ireland Protein: 66% animal 34% plant-based

"Local interpretation and adaptation of the universally-applicable planetary health diet is necessary…"

MyPlanetDiet 12-Week RCT

The American Journal of Clinical Nutrition 122 (2025) 962–971

The American Journal of CLINICAL NUTRITION

journal homepage: https://ajcn.nutrition.org/

Original Research Article

Sustainable diets reduce diet-related greenhouse gas emissions and improve diet quality: results from the MyPlanetDiet randomized controlled trial

Katie P Davies [1], Eileen R Gibney [1], Ursula M Leonard [2], Leona Lindberg [3], Jayne V Woodside [3,4], Mairead E Kiely [2], Anne P Nugent [1,4], Elena Arranz [2,5], Marie C Conway [6], Sinead N McCarthy [6], Aifric M O'Sullivan [1,*]

[1] *Institute of Food and Health, School of Agriculture and Food Science, University College Dublin, Dublin, Ireland;* [2] *Cork Centre for Vitamin D and Nutrition Research, School of Food and Nutritional Sciences, University College Cork, Cork, Ireland;* [3] *Centre for Public Health, School of Medicine, Dentistry and Biomedical Sciences, Queen's University Belfast, Belfast, Northern Ireland, United Kingdom;* [4] *Institute for Global Food Security, School of Biological Sciences, Queen's University Belfast, Belfast, United Kingdom;* [5] *Instituto de Investigación en Ciencias de la Alimentación, CIAL (CSIC-UAM, CEI UAM+CSIC), Universidad Autónoma de Madrid, Madrid, Spain;* [6] *Department of Agrifood Business and Spatial Analysis, Teagasc Food Research Centre, Ashtown, Dublin, Ireland*

The American Journal of Clinical Nutrition 122 (2025) 1275–1288

The American Journal of CLINICAL NUTRITION

journal homepage: https://ajcn.nutrition.org/

Original Research Article

Impact of sustainable diets on micronutrient intakes and status: outcomes of the MyPlanetDiet randomized controlled trial

Ursula M Leonard [1], Katie P Davies [2], Leona Lindberg [3], Jayne V Woodside [3,4], Anne P Nugent [2,4], Aifric M O'Sullivan [2], Eileen R Gibney [2], Sinead N McCarthy [5], Elena Arranz [1,6], Mairead E Kiely [1,*]

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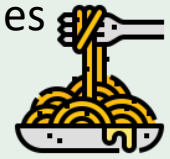
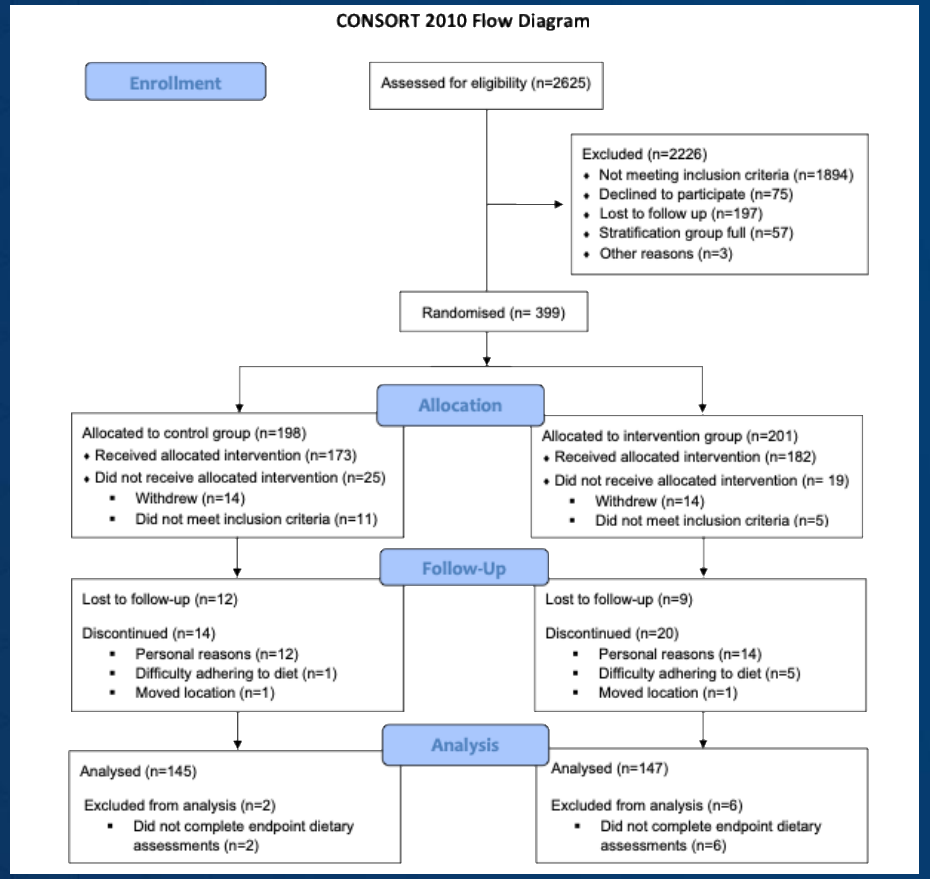
MyPlanetDiet Intervention and Control Diet

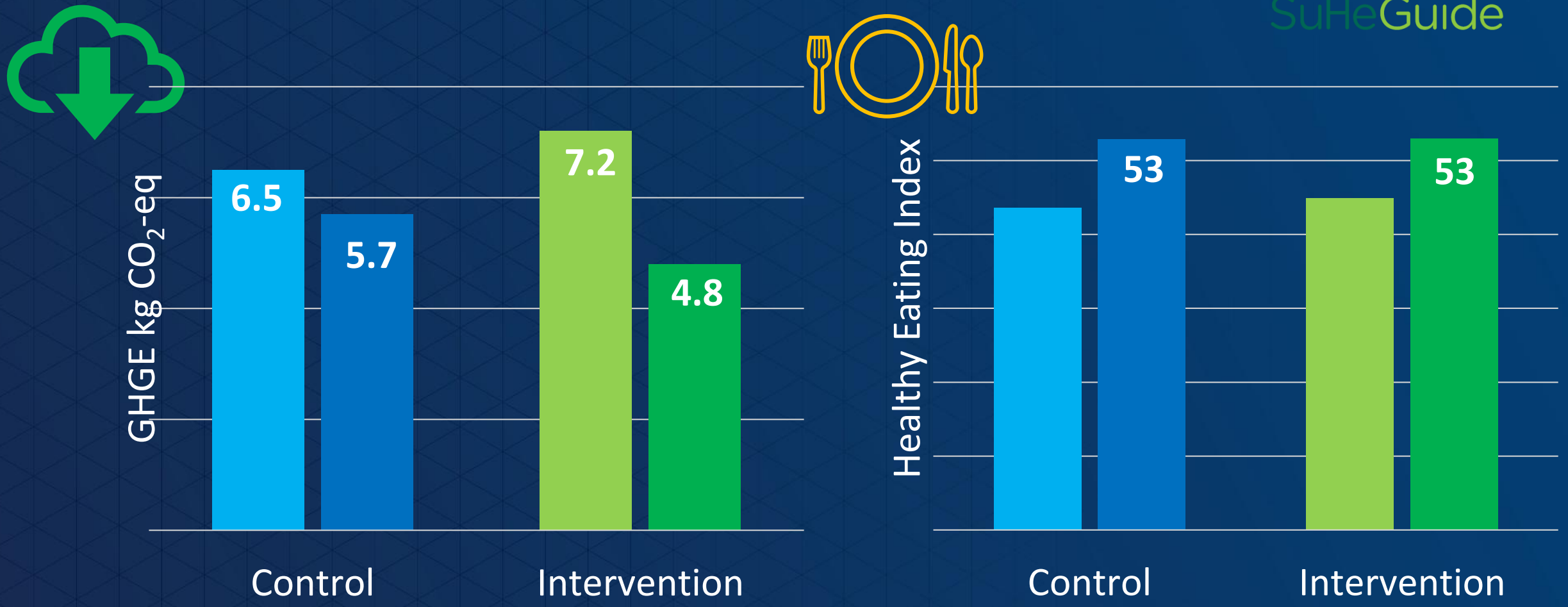
	Intervention 	Control 
Meat 	• 3 servings per week • Red meat to no more than 1 serving (140g)	• 2 servings per day • Meat serving = 50-75g • Red meat ≤1 per day
Plant protein 	• 1 serving plant protein per day • Have nuts and seeds every day	
Fish 	• 2 servings fish per week • Including 1 serving oily fish per week	
Dairy 	• ~2 servings per day • No more than 1 serving of cheese per day	• 3 servings per day
Fruit + Veg 	• At least 2 servings fruit and 3 servings veg per day • 1 dark green vegetables and 1 red/orange	
Starches 	• Dependent on energy requirements • Switch to whole grains all the time • Starchy vegetables 2-3 servings per week	

MyPlanetDiet Participants

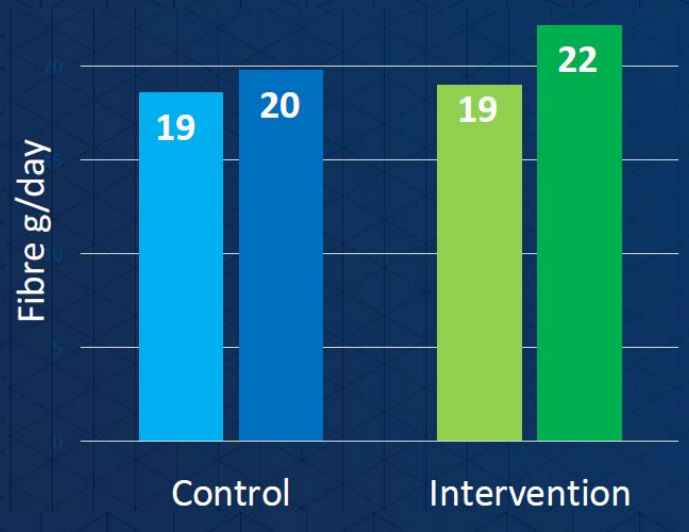
- 355 participants began the study
- 58% female, 42% male
- 44% aged 18-40, 56% aged 41-64
- Mean BMI 28.1 ± 5.4
- 51% living with partner and children
- 45% living in a city
- 43% postgraduate level education

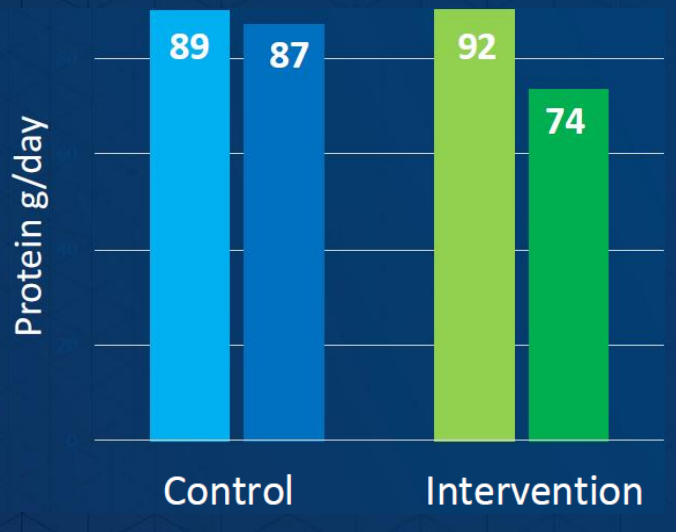


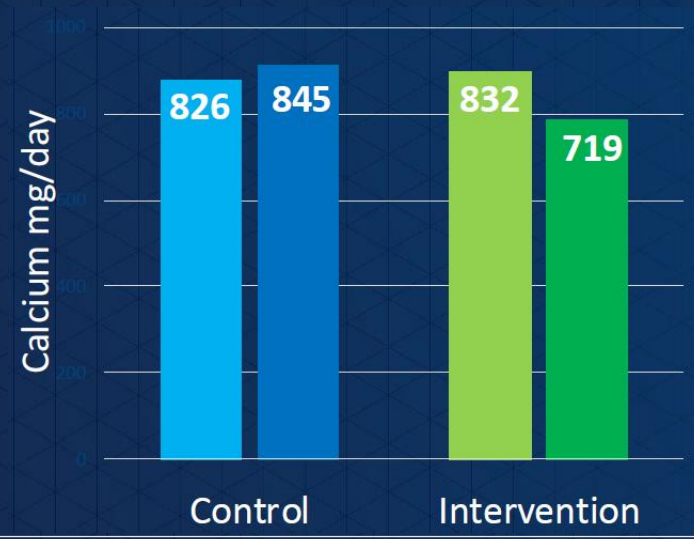
MyPlanetDiet Environment and Diet

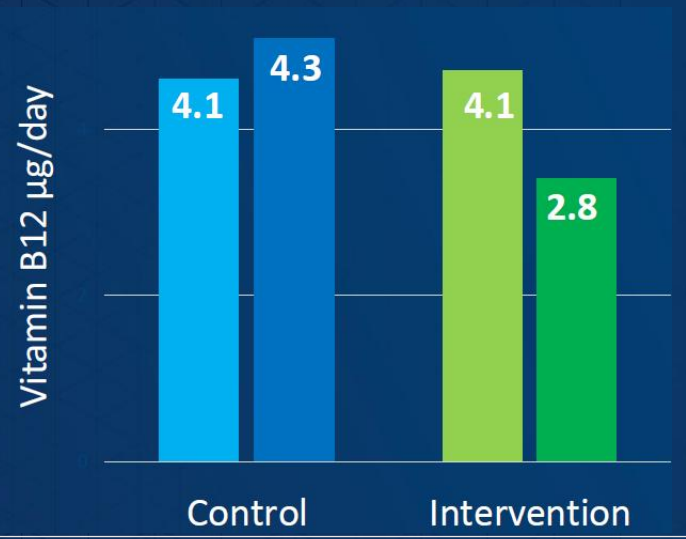


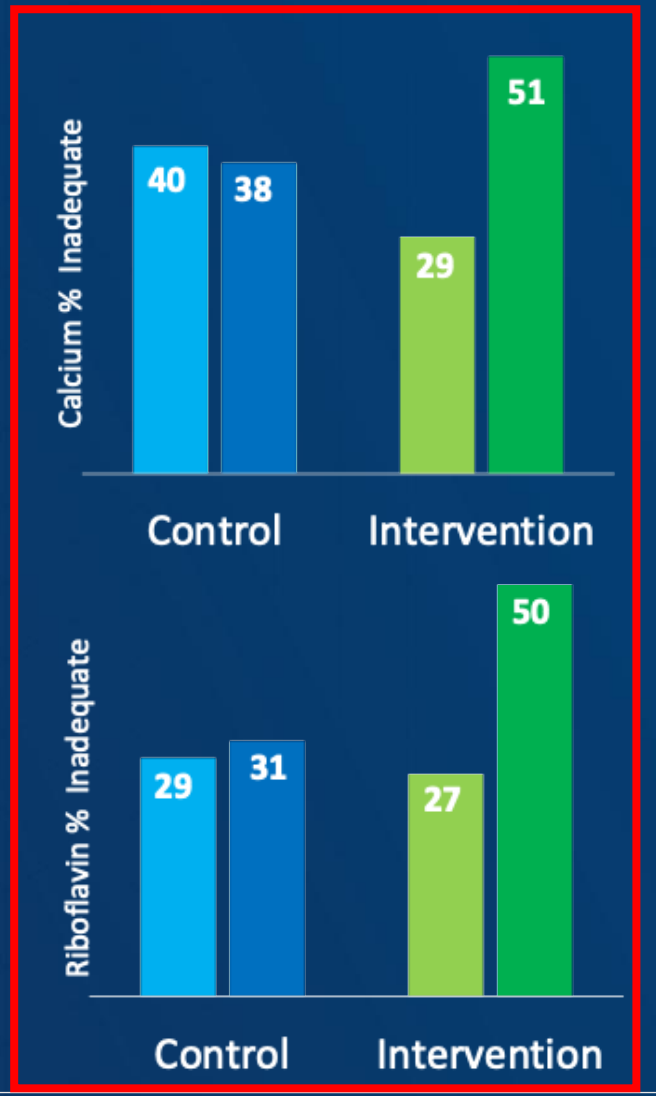
MyPlanetDiet Nutrients









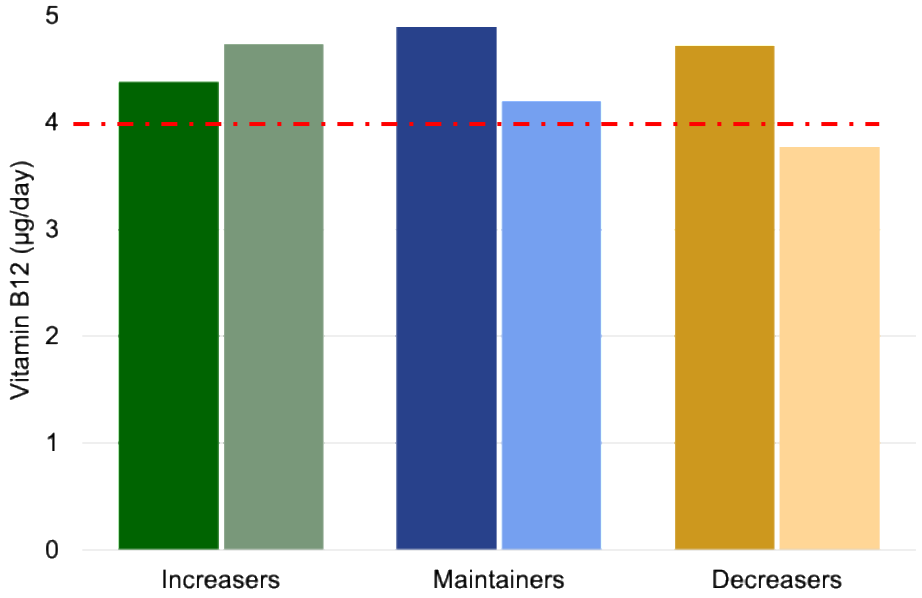


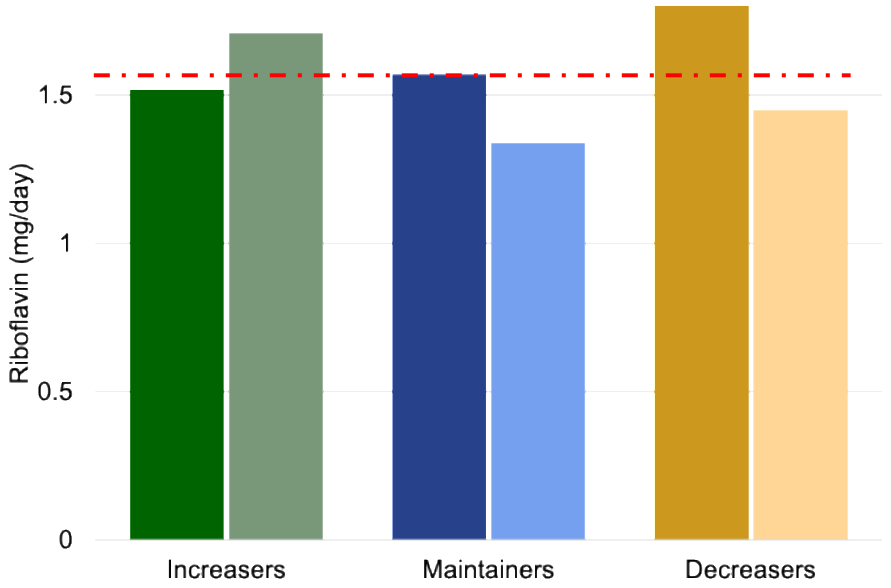
MyPlanetDiet Adherence

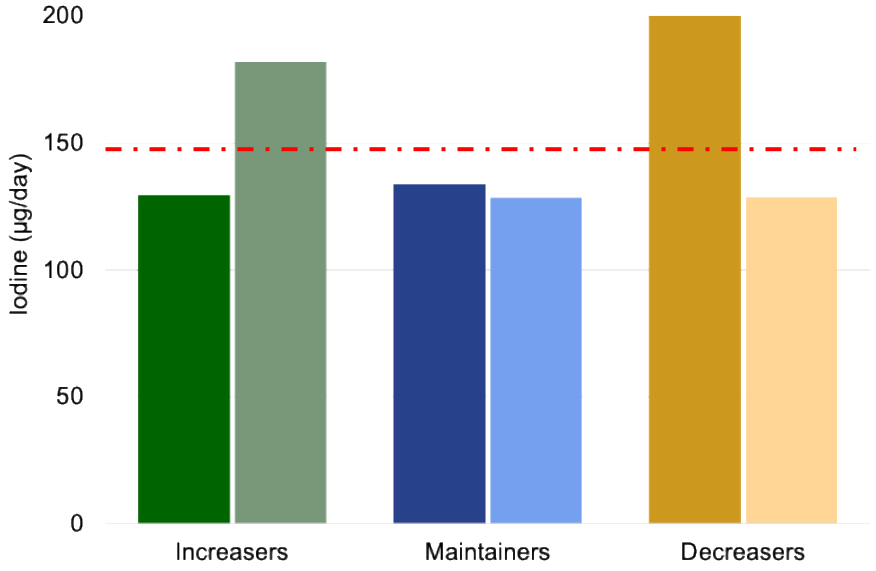
	Control	Intervention
Fruit + Veg	+115	+85
Wholegrains	+10	+16
Dairy	+62	-52
Fish	+20	+9
Total meat	-36	-96
Plant protein	+8	+47

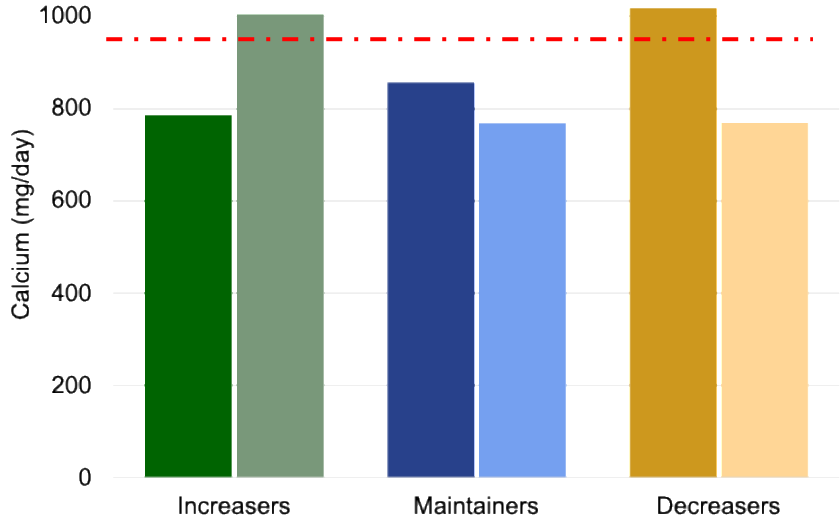
MyPlanetDiet Dairy Foods

	Q1	Q2	Q3	Q4	Q5	p-value
Change (g)	<-100	-100 to -25	-25 to 25	25 to 125	>125	
	n=55	n=57	n=65	n=57	n=58	
Baseline (g)	396 ± 169	239 ± 130	196 ± 115	135 ± 99	188 ± 170	<0.001
Endpoint (g)	145 ± 112	184 ± 127	196 ± 115	203 ± 98	441 ± 239	<0.001
Change (g)	-251 ± 126	-55 ± 20	0 ± 16	68.4 ± 27	253 ± 135	<0.001

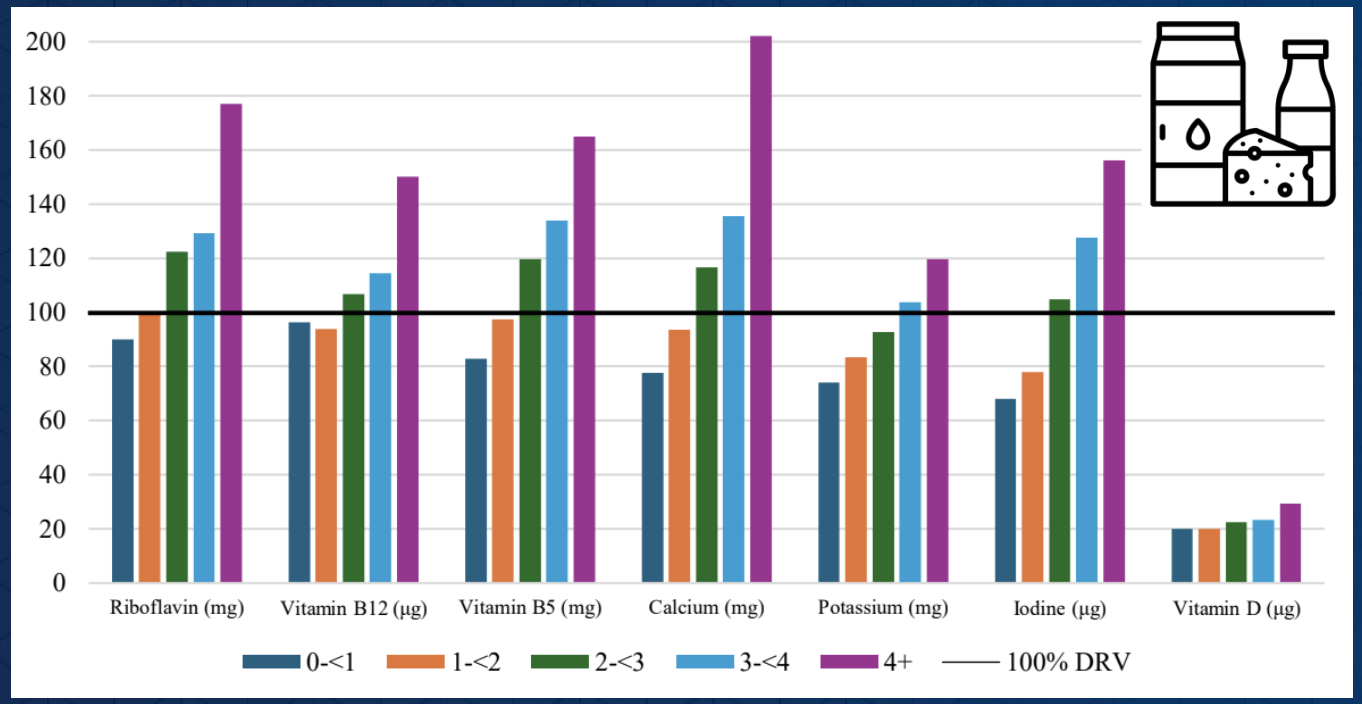

Vitamin B12 (µg/day)
5
4
3
2
1
0
Increasers
Maintainers
Decreasers

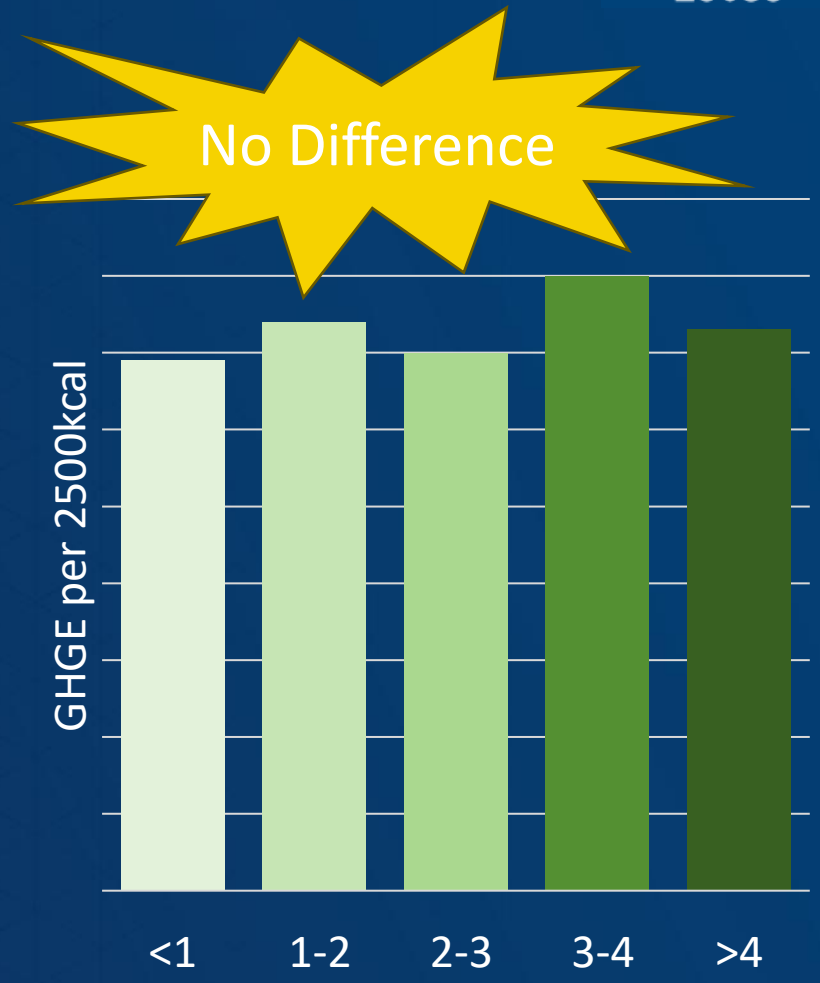

Riboflavin (mg/day)
1.5
1
0.5
0
Increasers
Maintainers
Decreasers


Iodine (µg/day)
200
150
100
50
0
Increasers
Maintainers
Decreasers


Calcium (mg/day)
1000
800
600
400
200
0
Increasers
Maintainers
Decreasers

MyPlanetDiet Dairy Foods





Grouped by servings of dairy foods at endpoint.

MyPlanetDiet Adherence

	Control	Intervention
Fruit + Veg	+115	+85
Wholegrains	+10	+16
Dairy	+62	-52
Fish	+20	+9
Total meat	-36	-96
Plant protein	+8	+47

Most adhered to food group

Least adhered to intervention

The Behaviour Change Barrier!

Can we integrate behaviour-based phenotypes within our personalised nutrition approach to address life stage, environmental and socio-cultural contexts?

PLAN'EAT

- To better understand how environmental, social, cultural and individual factors affect people's food choices.
- To design tools and interventions to transform food systems and food environments towards healthy and sustainable dietary behavior.

Food Quality and Preference 144 (2026) 105990

Contents lists available at ScienceDirect

Food Quality and Preference

journal homepage: www.elsevier.com/locate/foodqual

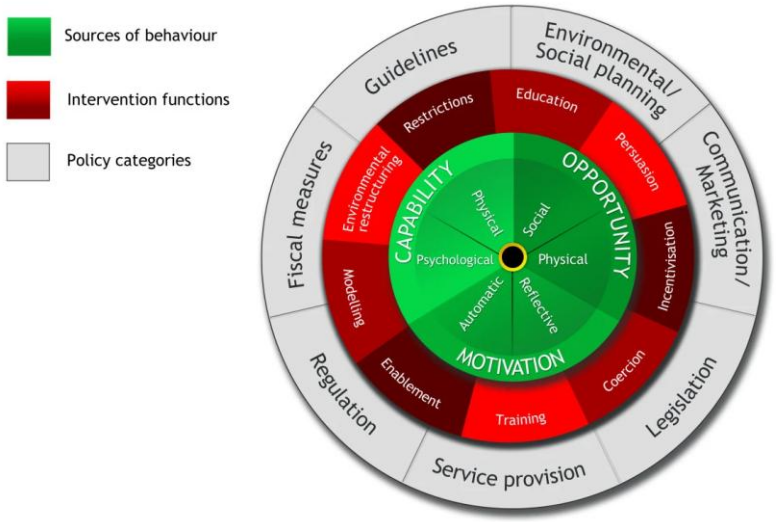
A novel dietary intervention with tailored behavioural support to increase legume consumption in university students: a pilot trial

Patrick S. Elliott, Lauren D. Devine, Eileen R. Gibney, Aifric M. O'Sullivan *

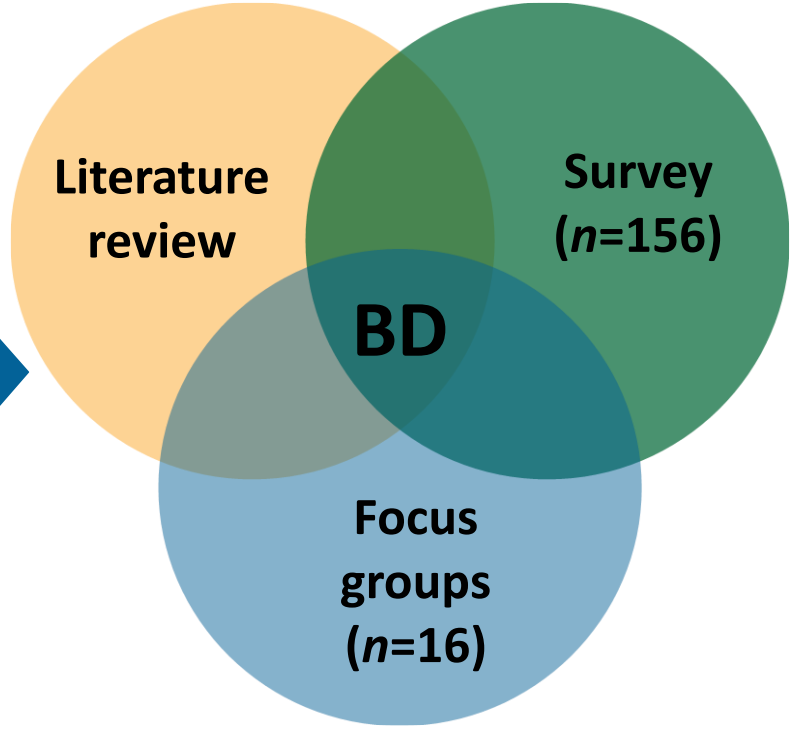
Institute of Food and Health, School of Agriculture and Food Science, University College Dublin, Dublin 4, Ireland

Tailored Behaviour Support

Behaviour Change Wheel

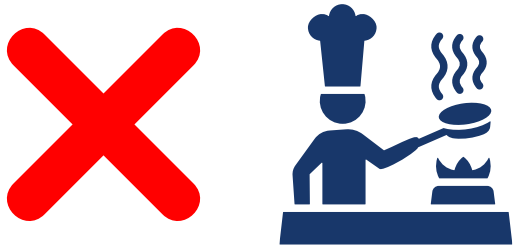


Behavioural Diagnosis (BD)

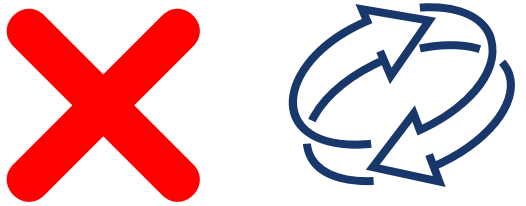


Lack of convenience

Lack of cooking skills



Lack of habit

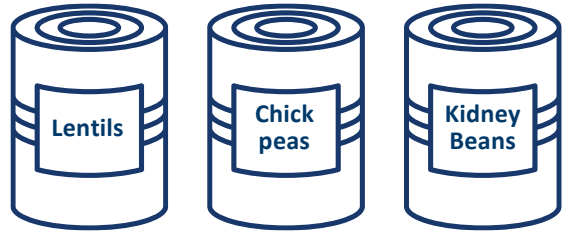


Michie et al. *The Behaviour Change Wheel: A Guide to Designing Interventions*. 2014.
Elliott et al. *Nutr Res*. 2024;126:23–45.

Tailored Behaviour Support

Lack of convenience

Physical opportunity



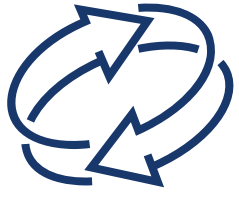
OR

Lack of cooking skills

Psychological capability

OR

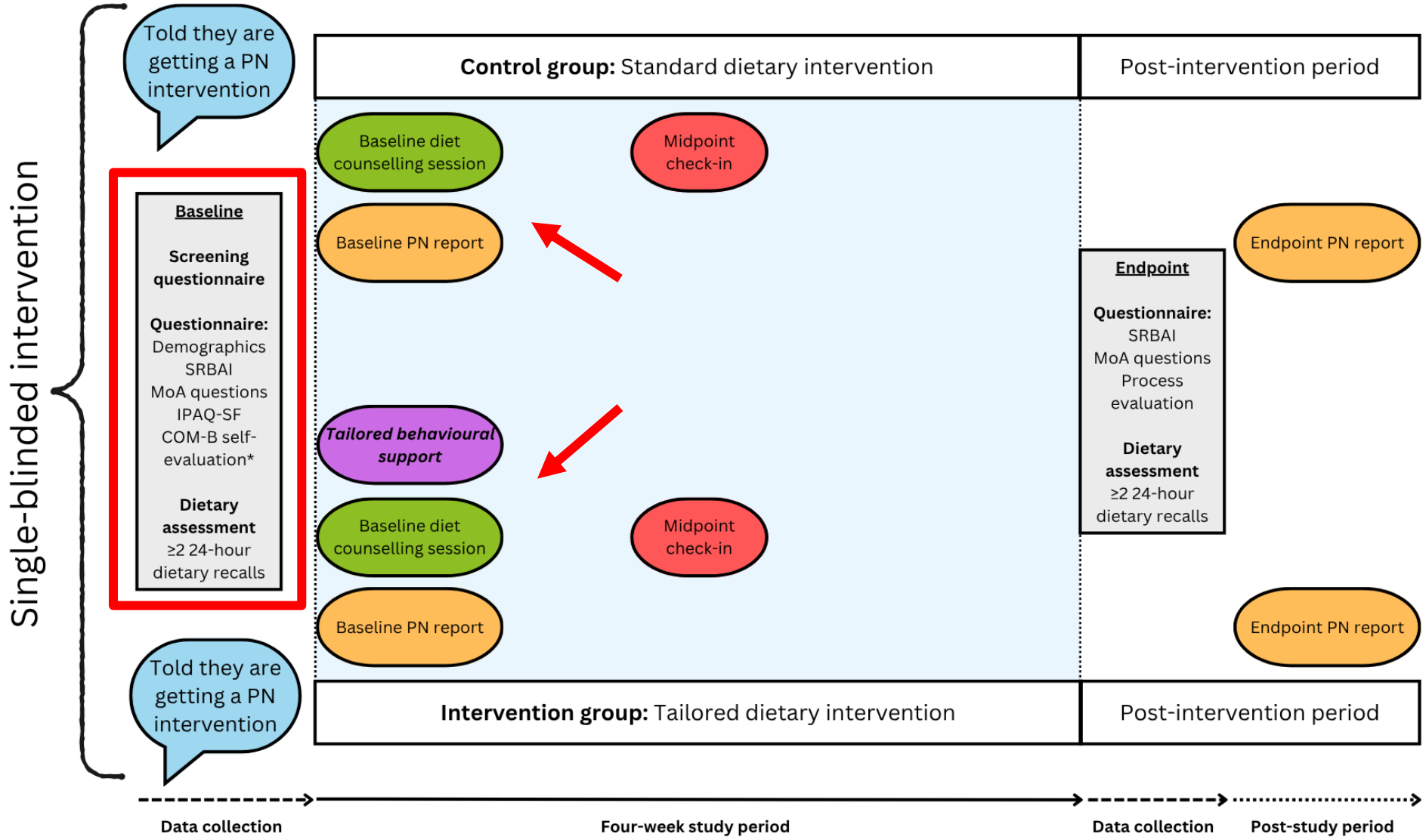
Lack of habit



Psychological capability

COM-B Model – Capability, Opportunity, Motivation

Pilot Trial Study Design



Population

University students
(*n*=59; 73% female)

Study design

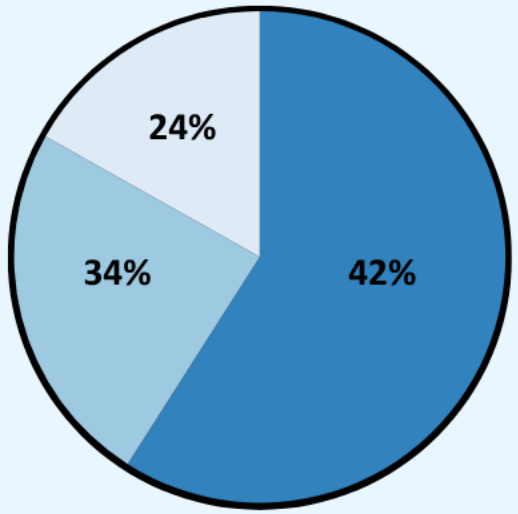
Control group received a standard dietary intervention to increase legume consumption.

Intervention group received a standard dietary intervention with **additional tailored behavioural support** to increase legume consumption.

Four-week pilot trial

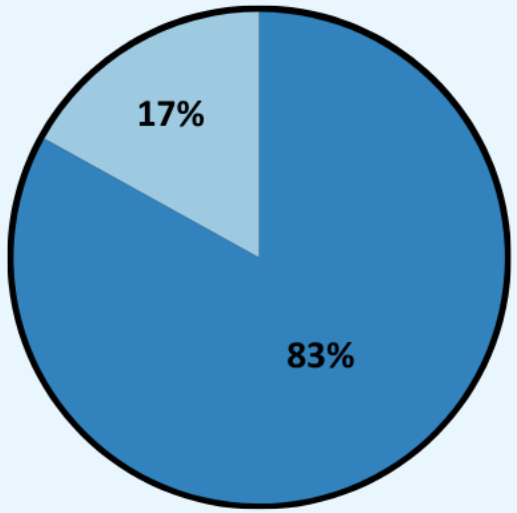
Results

Primary self-selected barrier to eating legumes

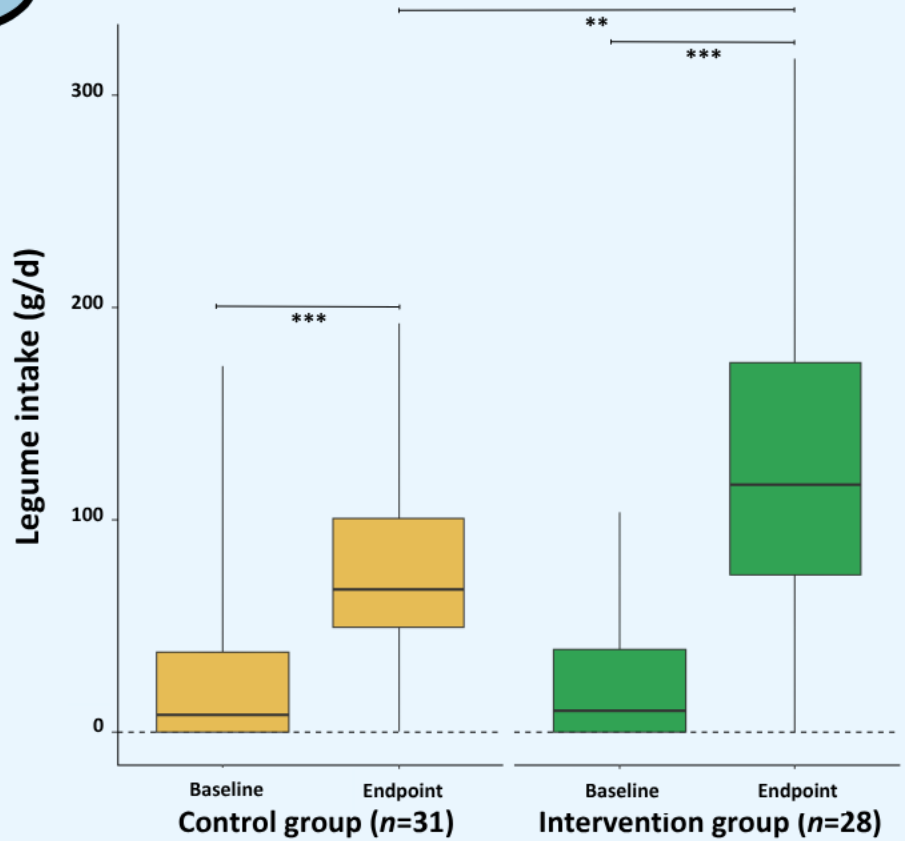


- Lack of habit (*n*=14)
- Lack of cooking skills (*n*=20)
- Lack of convenience (*n*=25)

Retention and attrition rates



- Dropped out (*n*=10)
- Completed study (*n*=49)



Personalised Nutrition with Tailored Behaviour Support (P-NUTS)

Lack of convenience

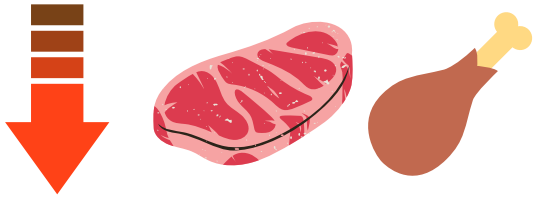
Lack of cooking skills

Lack of habit

Lack of opportunity

Lack of motivation

Lack of habit



Lack of social support

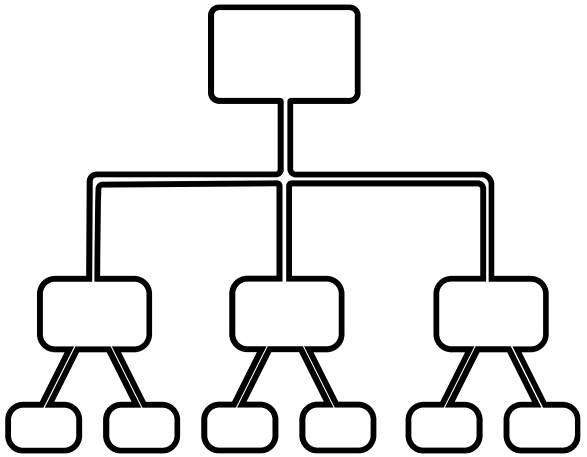
Enjoyment of eating

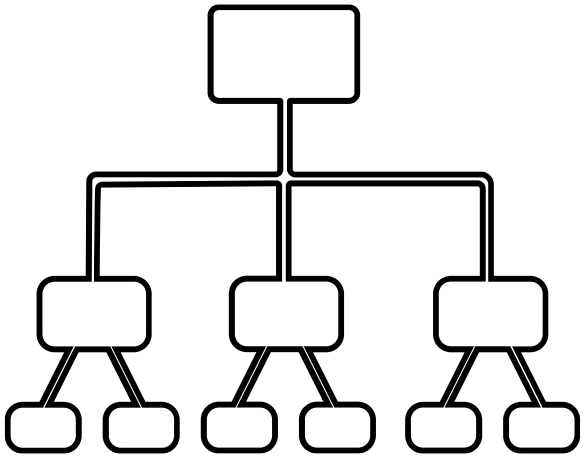
Habit of eating

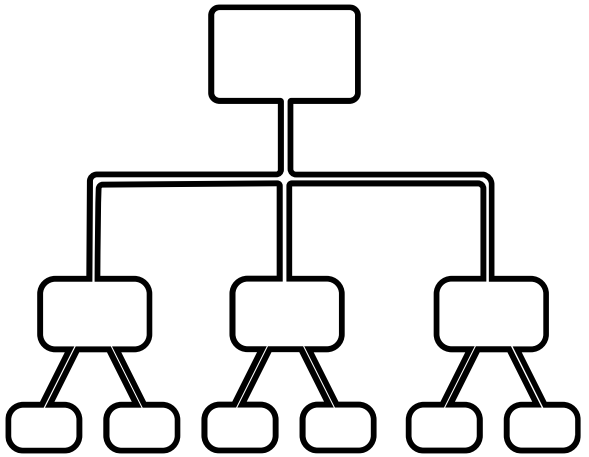
Lack of social support

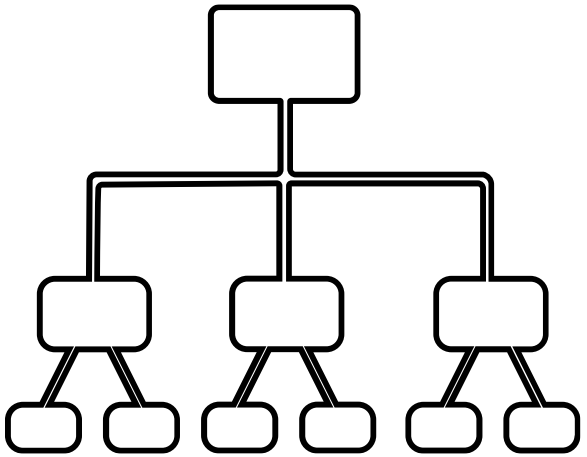
Enjoyment of eating

Habit of eating









Personalising Behaviour Change Support …for Sustainable Healthy Diets

- Moving to a more Sustainable Healthy Diet means changing diet.
- We can change to a more environmentally friendly diet, but some changes are more difficult.
- Micronutrient adequacy is a concern for certain micronutrients but we have opportunities to manipulate recommendations to support adequacy.
- A behaviourally informed personalised approach is effective in supporting dietary change even when we target whole-diet.

Research team…

Dr Katie Davies

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Dr Leona Lindberg

Dr Marie Conway

Prof Eileen Gibney

Prof Mairead Kiely

Dr Anne Nugent

Prof Jayne Woodside

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SuHeGuide Team

Patrick Elliott

Dr Lauren Devine

Plan'Eat Team

SuHeGuide

An Roinn Talmhaíochta, Bia agus Mara
Department of Agriculture, Food and the Marine

Department of Agriculture, Environment and Rural Affairs
Sustainability at the heart of a living, working, active landscape valued by everyone

UCD DUBLIN

UCC University College Cork, Ireland
School of Food and Nutritional Sciences

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Funded by European Union