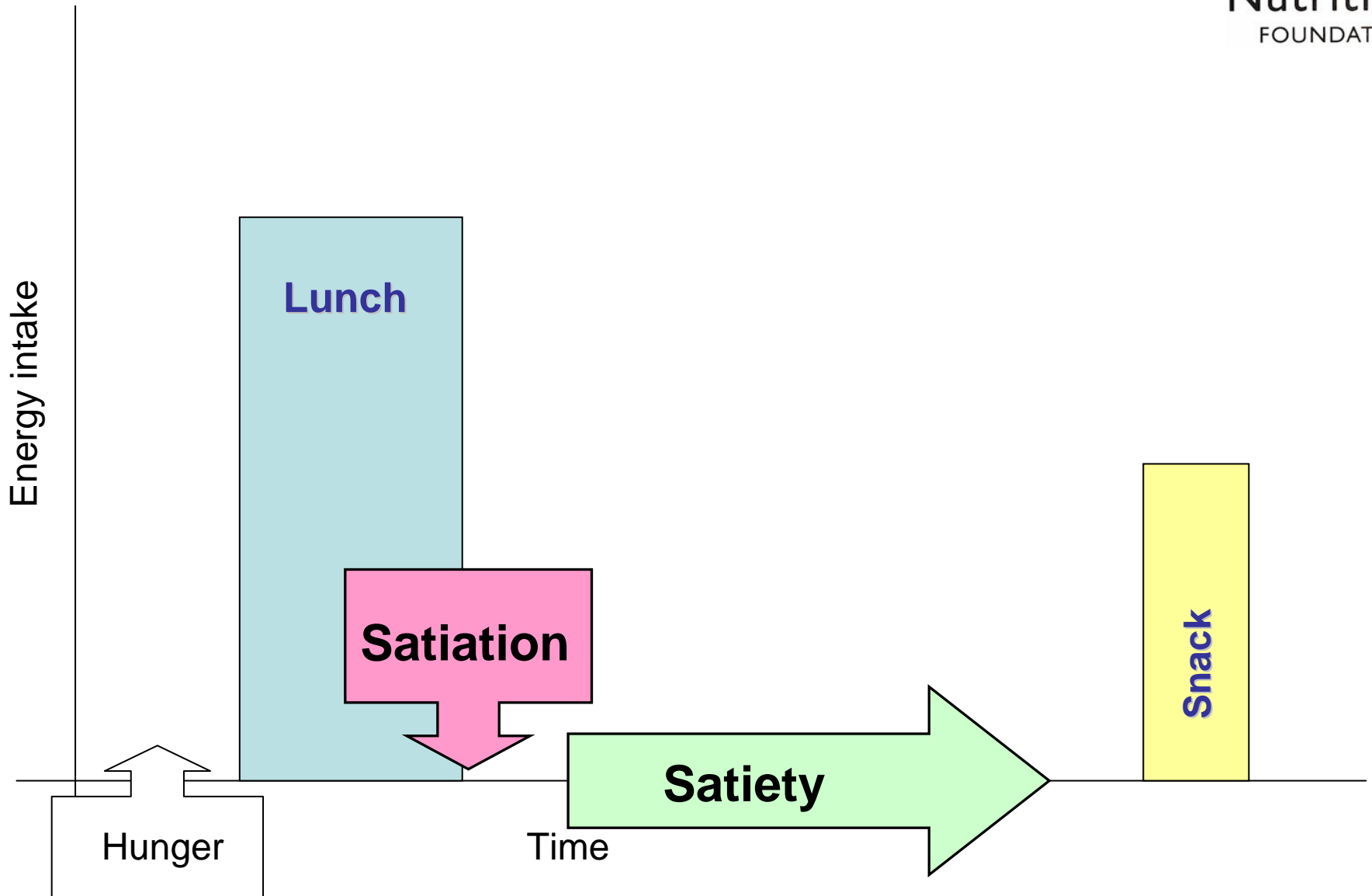




# Introduction to satiation & satiety

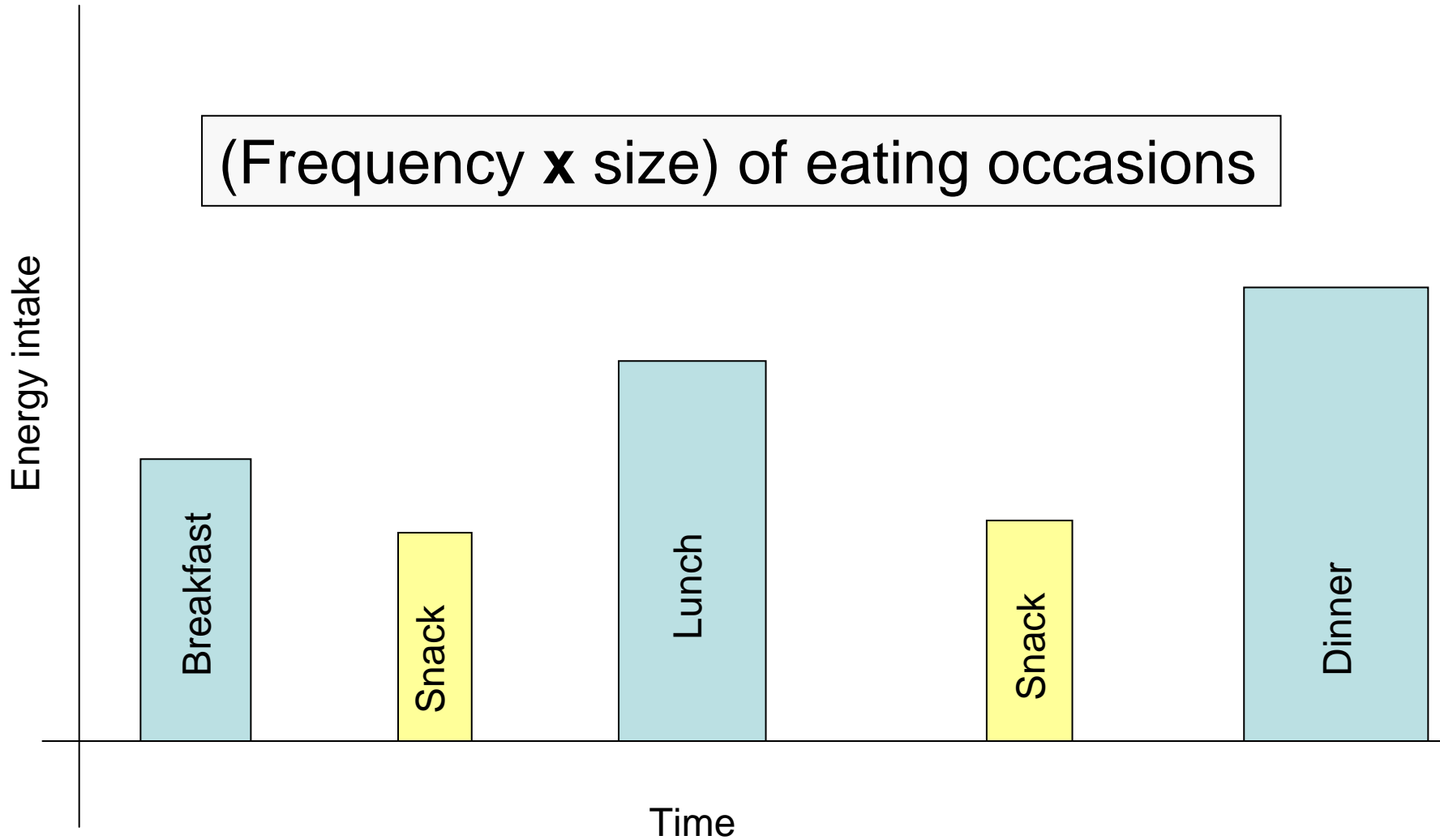
Bridget Benelam  
British Nutrition Foundation

# What are satiation and satiety?



# Energy intake

(Frequency  $\times$  size) of eating occasions



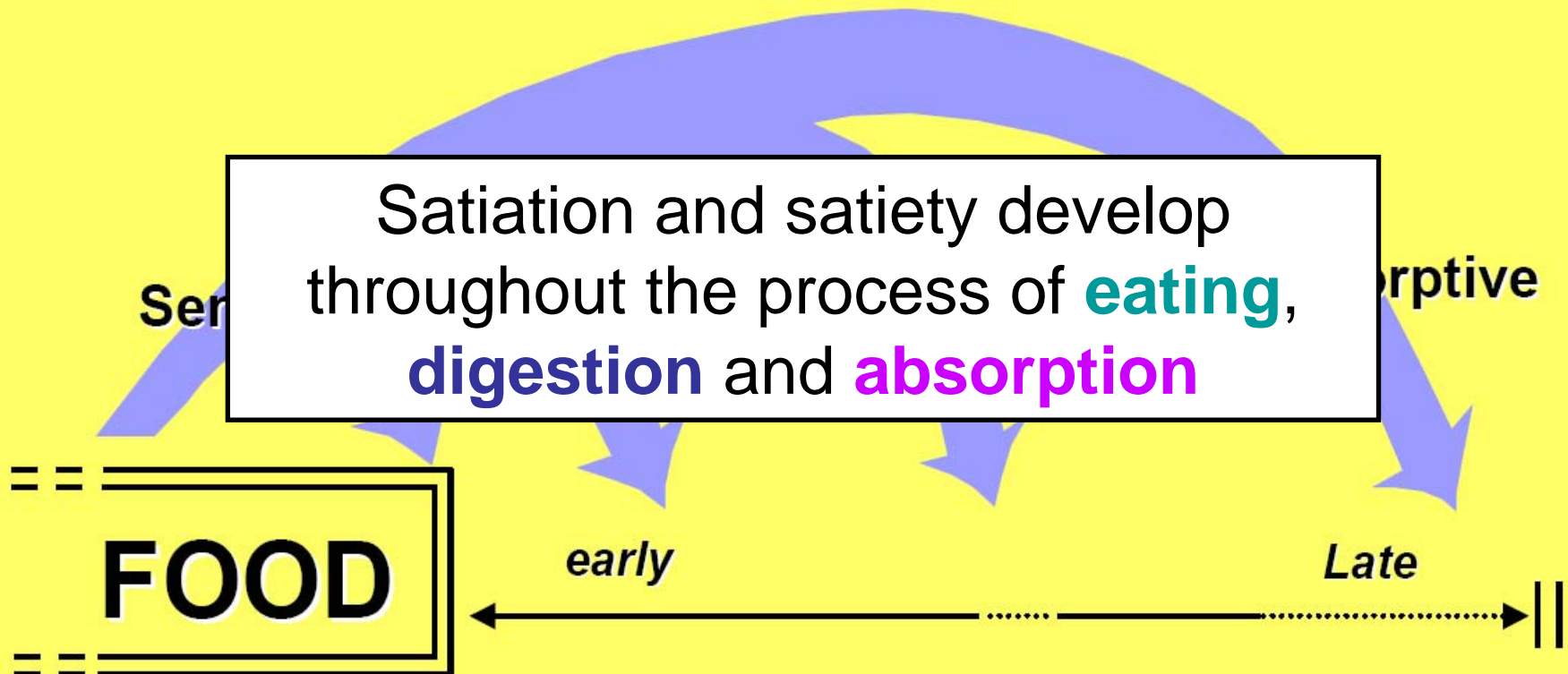
# Satiation and satiety

- Satiation – prompts the termination of eating
- Satiety – fullness that persists after eating
- Both are important in controlling energy intake
  - Satiation – amount consumed at one sitting
  - Satiety – length of time until next eating occasion





# Satiety Cascade (Blundell et al, 1987)





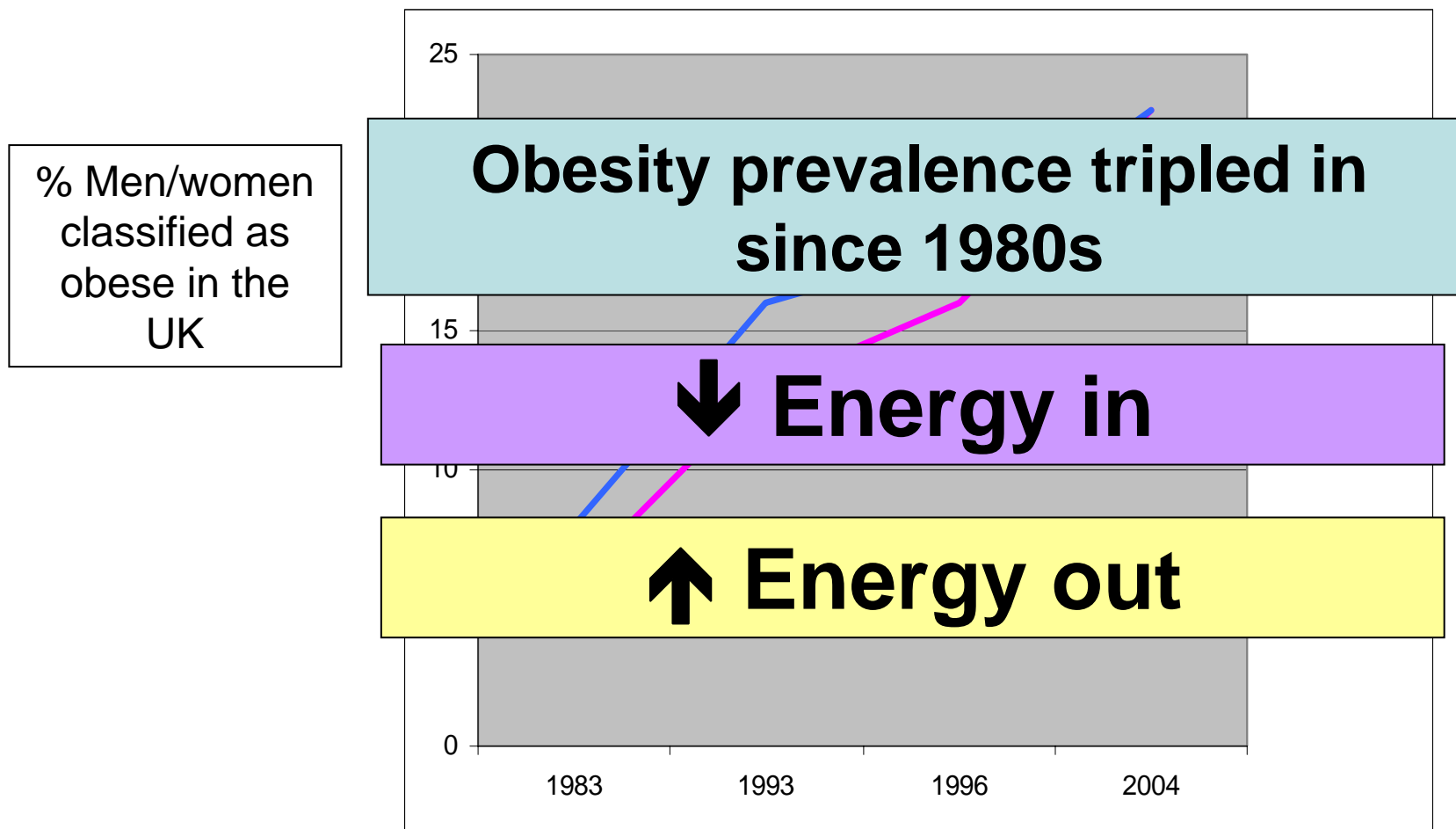
BRITISH  
**Nutrition**  
FOUNDATION



**Why are satiation and  
satiety important?**



# Controlling Energy intake



# Hunger

- *a compelling need or desire for food*
  - *the painful sensation or state of weakness caused by the need of food*
- 
- ↑ Satiety
  - ↓ Hunger
  - ↓ **energy intake?**

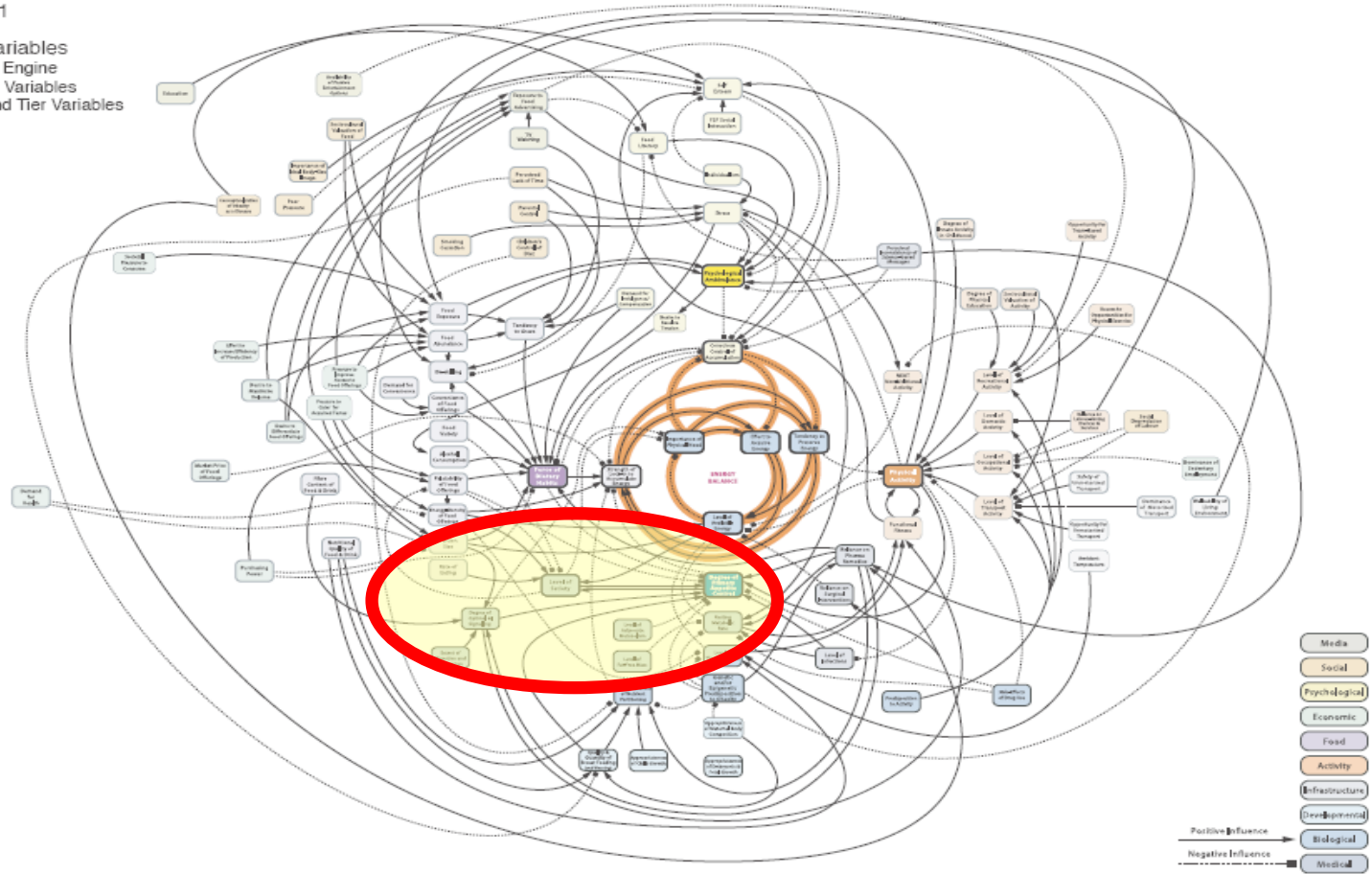




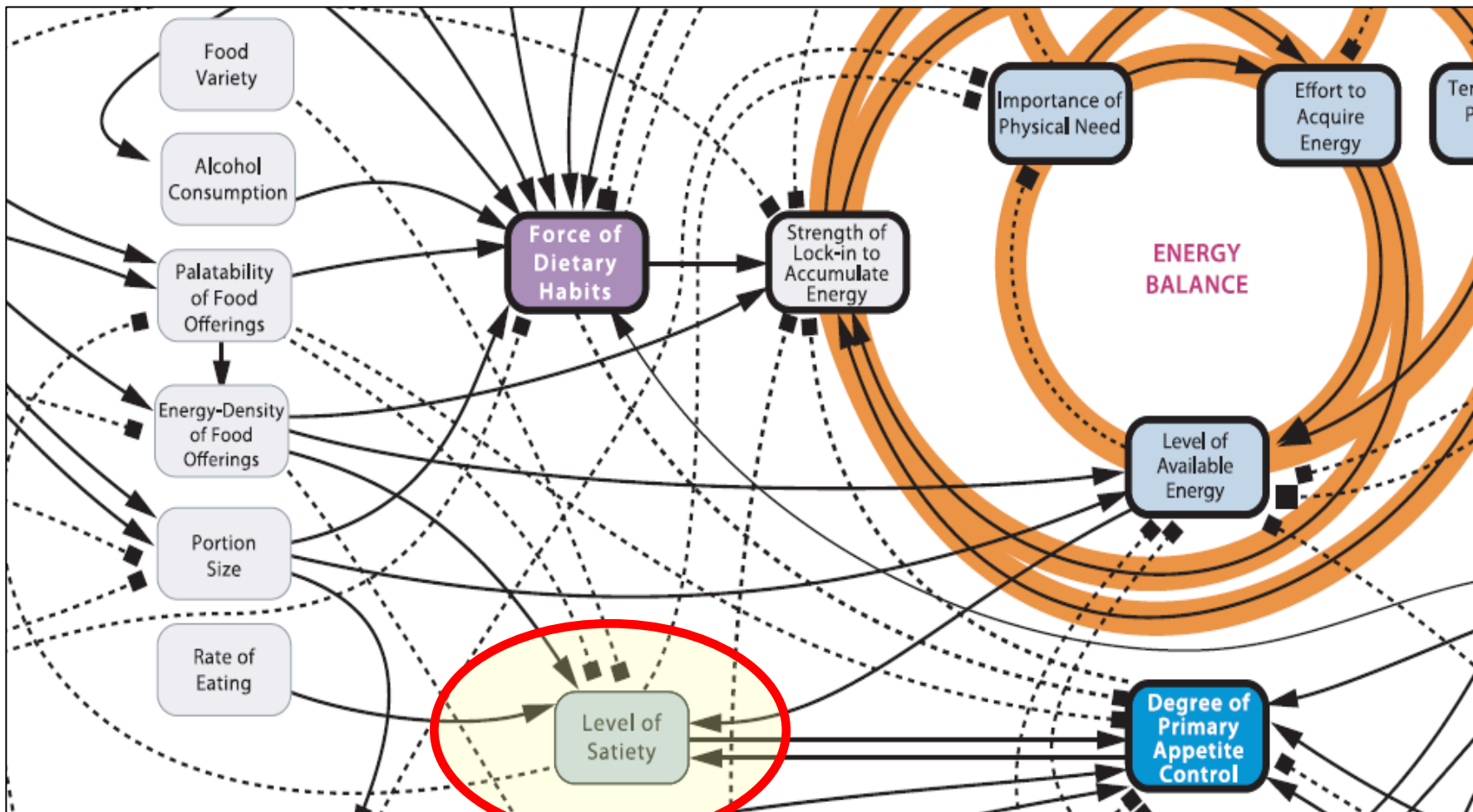
# Control of energy balance 1

Map 21

Key Variables  
System Engine  
+ 4 Key Variables  
+ 1st/2nd Tier Variables



# Control of energy balance 2



# Satiety in the press

Last Updated: Monday, 15 October 2007, 00:11 GMT 01:

E-mail this to a friend | Printable version

# Appetite 'control centres' found

UK-based scientists say they have identified the brain circuits that control how much we eat.



The Nature study, by University College London and King's College London, has developed a new drug.

**F FACTOR FOODS**

Fat fighters ... feel full Foods

# Foods may soon be modified 'to make you feel full for twice as long'

Millions of dieters have been offered hope after scientists discovered a way to modify everyday foods such as cakes and pastries to make diners feel full for twice as long.

HEALTH

# Foods that makes you feel full

By JANE SYMONS and TESSA THOMAS

Published: 09 Oct 2008

ADD YOUR COMMENTS

A DIET where you shed pounds but never feel hungry may sound too good to be true – but it is the future of weight loss, say experts.

Like the hugely successful GI eating plans, the new approach is based on solid evidence.

It is the science of satiety, or the fullness factor, and it is all about eating foods that satisfy appetite quickly.



Don't run on empty ...

# How soup can help you lose weight

By Jack Challoner

In the battle to lose weight, hunger is the dieter's enemy. But research has revealed a simple aid to the appetite: soup. It's dieting's best kept secret, says the science writer.

# Not everybody needs to eat less...

- Eating disorders
- Illness
- Elderly adults



# Measuring satiation & satiety

# Measuring satiation

- Test food or drink eaten *ad libitum*
- Controlled conditions
- Energy intake compared to control



# Measuring satiety

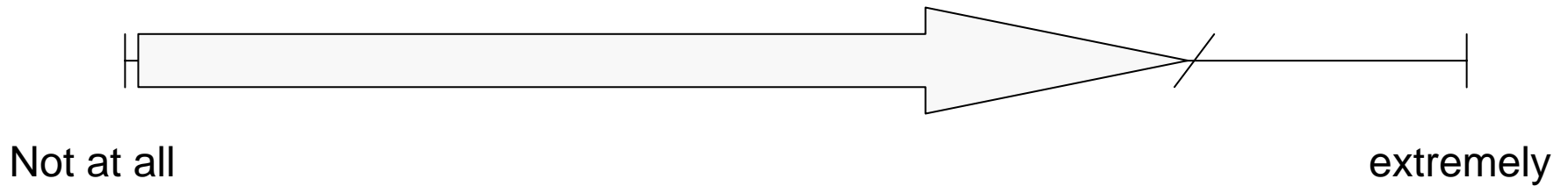
- Test preload
- Subjective measurement of related sensations at intervals
  - Visual analogue scales
- Measurement of energy intake after a specified period





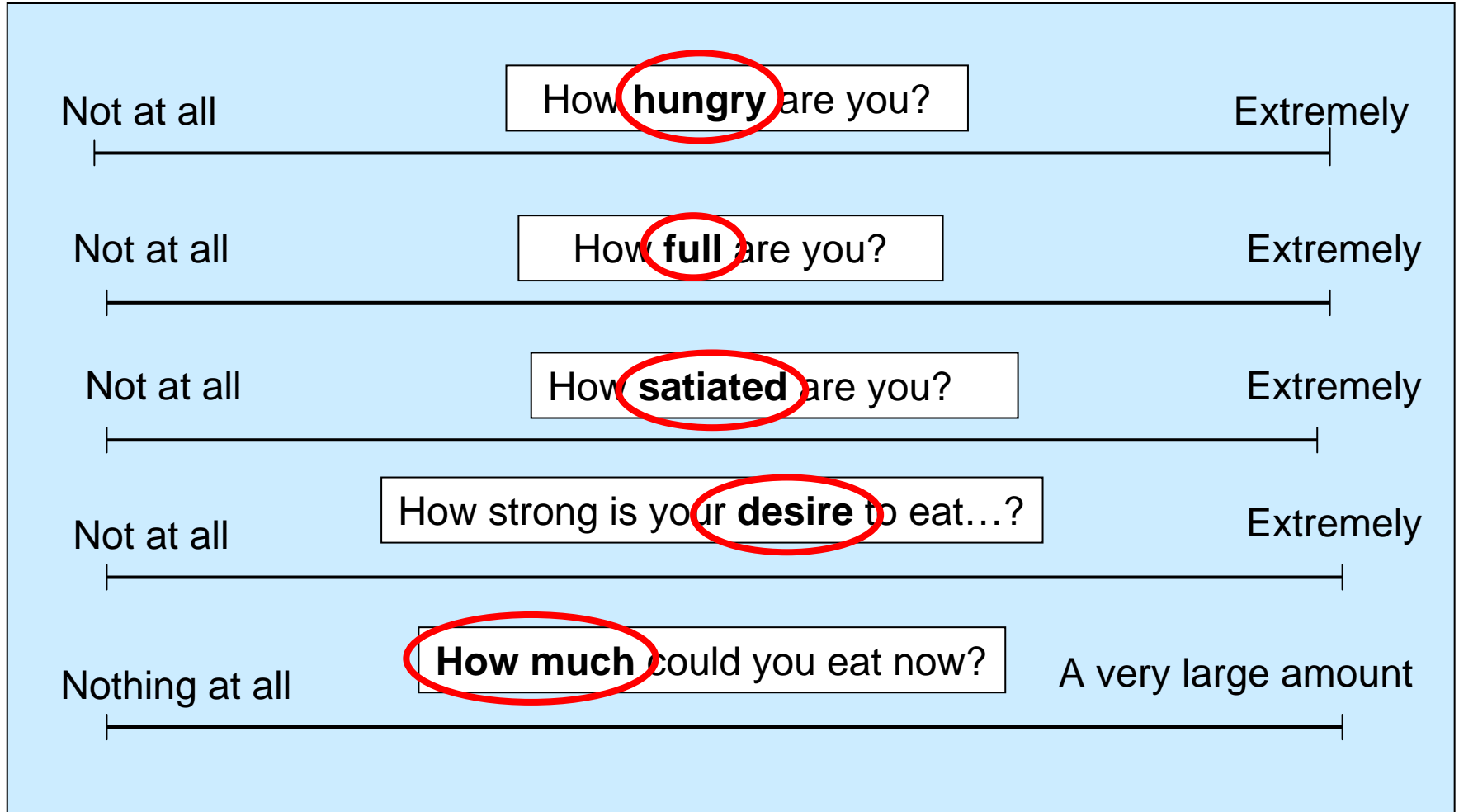
# VAS 1

**How satiated are you?**





# VAS 2



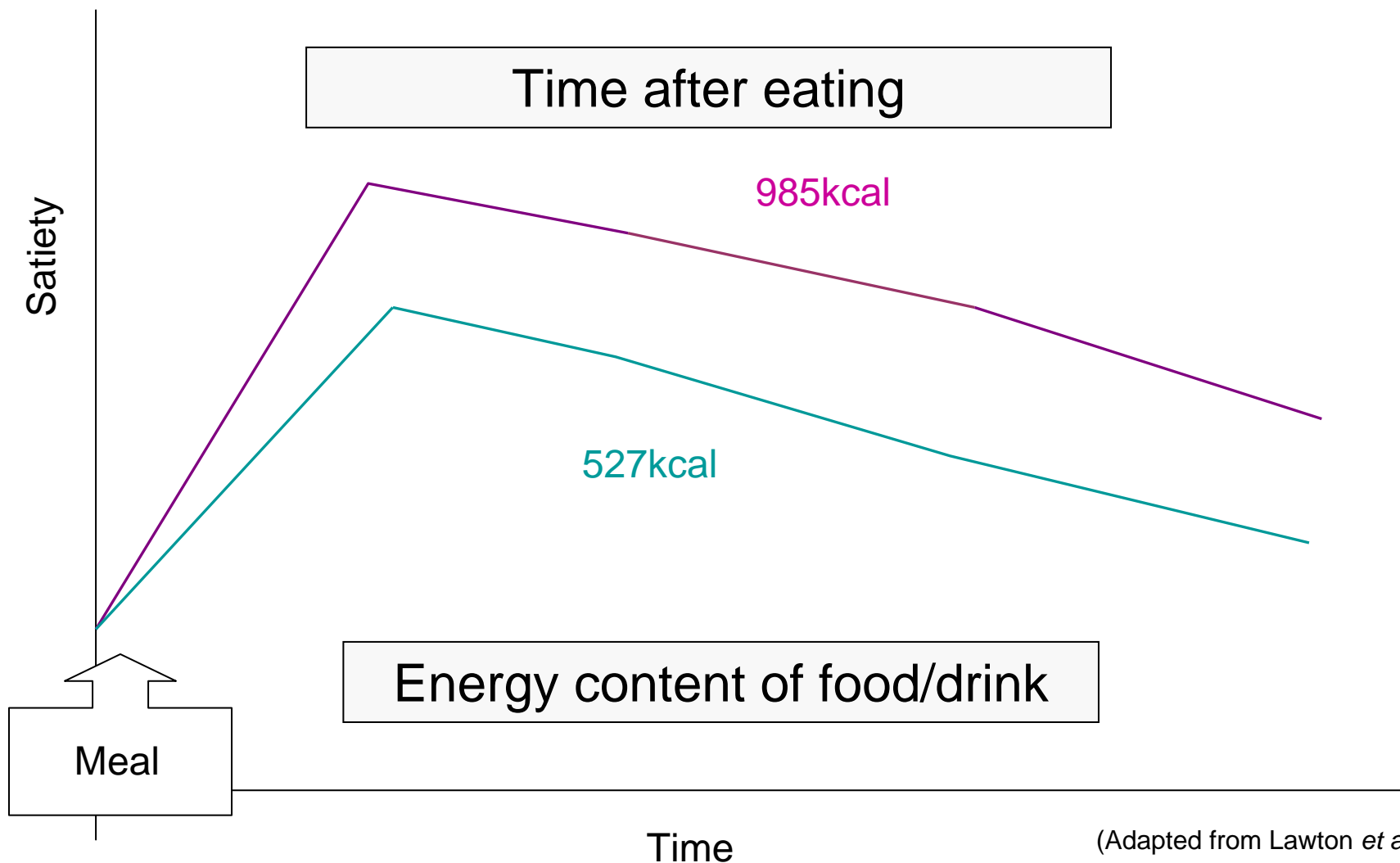
# Important factors to control

- Bodyweight
- Age
- Gender
- Habitual diet/ alcohol / physical activity
- Dietary restraint
- Beliefs / knowledge about test foods/drinks
- Effects of other people





# What factors affect satiety?



(Adapted from Lawton *et al.* 1993)

# Effect of foods and drinks on satiation and satiety...

- Anything we eat/drink can affect satiety
- For given energy content can a food/drink produce...
  - Consistently different
  - Meaningful effects on satiety and energy intake
  - In feasibly consumable amounts



# Effect of foods and drinks

- Protein – often enhances satiety
- Fibre – particular types enhance satiety
- Liquids – depends on mode of consumption
- Alcohol – promotes passive overconsumption
- **Energy density – major factor in determining satiating effect of foods**



**We have a sophisticated homeostatic system to control our energy intake...**



**...So why do we still get fat?**

# Eating behaviour



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**Energy intake = 100%  
behaviour**

**Habitual**



**Social**





# Behaviour and energy intake

- Palatability
- Variety
- Portion size
- Sleep
- Physical activity
- Distractions (TV)
- Eating with others

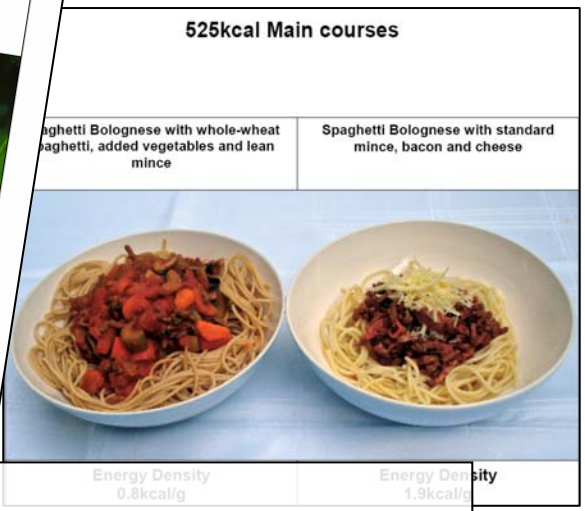




# Overall..

- Satiation and satiety are part of a tightly regulated system controlling bodyweight
- But...
  - Not designed for current environment
  - Internal signals of satiation and satiety
  - Overwhelmed by external cues to eat
  - Little need for physical activity





[www.nutrition.org.uk/satiety](http://www.nutrition.org.uk/satiety)

