Introduction to satiation & satiety

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What are satiation and satiety?

- **Lunch**
- **Satiation**
- **Hunger**
- **Satiety**
- **Snack**
Energy intake

(Frequency $\times$ size) of eating occasions

Energy intake

- Breakfast
- Snack
- Lunch
- Snack
- Dinner

Time
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
Satiation and satiety develop throughout the process of eating, digestion and absorption.
Why are satiation and satiety important?
Controlling Energy intake

Obesity prevalence tripled in since 1980s

% Men/women classified as obese in the UK

Energy in

Energy out
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

Map 21
Key Variables
System Engine
+ 4 Key Variables
+ 1st2nd Tier Variables

Foresight 2007
Control of energy balance 2

Foresight 2007
Satiety in the press
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 researchers, shows how the brain connects food intake with physiological needs and emotions.

By Jane Symons and Tessa Thomas
Published: 09 Oct 2008

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 plan, 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.

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
How satiated are you?

Not at all  extremely
VAS 2

How hungry are you?

How full are you?

How satiated are you?

How strong is your desire to eat…?

How much could you eat now?

Not at all

Extremely

Not at all

Extremely

Not at all

Extremely

Not at all

Extremely

Nothing at all

A very large amount
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

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