

## Full4health - News & Notes no.3



### Eating on the run!

**Dr Graham Finlayson**

University of Leeds

Email:

[G.S.Findalyson@leeds.ac.uk](mailto:G.S.Findalyson@leeds.ac.uk)

#### What is the problem that this research is addressing?

In modern Europe, the combination of low physical activity levels and high energy foods in the diet encourage patterns of 'passive overeating'<sup>1</sup> that have become the norm (nearly 3 in 4 men and women in the European Region are overweight or obese).

Against this background, powerful biological mechanisms exist which determine how hungry and how full we feel both during<sup>2</sup> and after<sup>3</sup> consuming snacks and meals throughout the day. More recently we are starting to understand how these mechanisms can also determine our enjoyment of food<sup>4</sup> and the motivation to consume palatable – often high energy – food<sup>5</sup>. Understanding how these processes influence eating behaviour in hungry and fed states, in response to different types of food, and in lean compared to overweight people is important to inform strategies for keeping our appetites under control.

In efforts to raise physical activity levels across the population, a further issue to address is the problem of 'compensatory eating'<sup>6</sup>. This is when people consume more food (voluntarily or inadvertently) in response to a period of exercise. The role of both hunger and reward in compensatory eating is thought to be crucial, but very little is known about how these processes adapt with the biological changes that occur when people increase

physical activity over sustained periods of time (long enough to reduce overweight and improve health).

Research in this area will help to tackle the prevalence of passive overeating and support the transition to a healthier diet and better appetite control as Europeans start to incorporate physical activity in their lives.

#### Glossary:

1. When people unintentionally consume too much energy it is known as 'passive overeating'
2. The development of fullness and reduction of hunger during a meal is known as 'satiation'
3. The continuation of fullness and suppression of hunger between meals is known as 'satiety'
4. The pleasure experienced from the taste of food is known as 'liking'
5. The motivation to eat foods that are well liked is known as 'wanting'
6. When people eat more (voluntarily or inadvertently) after a period of exercise or dieting it is known as 'compensatory eating'



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### What is already known?

The familiar stomach stretch and fullness that people experience after a meal is an important part of the satiety process, enabling them to control the amount of energy consumed over the day. However, due to the high energy density of fat, the amount of energy consumed for a 'normal' quantity of food can easily be doubled or more if high fat foods are chosen over low fat alternatives. This tendency to eat more when high fat foods are available is termed 'passive overconsumption' but the extent to which people are susceptible to this effect has been

studied and some of the findings have interesting implications for appetite regulation. For example, the sensitivity to a hormone called insulin (which is often impaired in obese people) is thought to be important for satiation with high fat food. This suggests obese people with a high fat diet could be more prone to passive overeating. Secondly, the ability to compensate for a high fat snack by eating less at a subsequent meal is enhanced in regular exercisers compared to sedentary individuals. Such findings could mean that engaging in exercise can reduce the risk of passive overeating in people who are obese. When overweight or obese individuals undertake a program of

physical activity, there are remarkable differences in their capacity to reduce body fat and improve health, even when adherence to the exercise is monitored and verified. Some individuals appear predisposed to compensatory responses that render them resistant to the benefits associated with exercise. The mechanisms behind this compensation could be regulatory – for example an increase in hunger to replenish depleted energy stores – or linked to altered use or response to food as reward after physical exertion. Whether these behaviours are 'wired-in' predispositions or responses that develop after changes in body composition or hormonal signals is unknown

### What research are you undertaking in Full4Health?

For some individuals, altered liking or wanting of food can lead to unhealthy food choices or increased appetite that causes a strong resistance to reducing body fat or improving metabolic health. Our work will examine the behaviours and physiological mechanisms, which underlie resistance to weight loss during a program of supervised exercise under conditions relevant to European consumers at risk of obesity (under sedentary or physically active states, and in response to high or low fat diets). Previously sedentary participants come to our laboratory fitness facility 5-times a week for 3 months to exercise at a fixed intensity and level equivalent to 2,500kcal/wk.

On 6 occasions at the beginning, mid-point and end of the exercise program, 24hr food intake, appetite and passive overconsumption is assessed through laboratory test meals. We have developed a theoretical and methodological understanding of liking and wanting food behaviour in humans, and developed a methodology for detecting changes or differences in liking and wanting responses. This involves a computerised procedure (an

interactive task) in which the participant responds to a battery of food stimuli. Appetite-related hormones released in response to different meal compositions are examined on separate test days prior to and following the 12 week program. These hormones will be tested for their association with appetite, food reward and passive overconsumption.

### What do you hope will be the major outcomes?

Major goals of the project are to identify biomarkers of exercise induced compensatory eating that might be used to improve the effectiveness of exercise as a means to improve health and well being. We also aim to understand why some people are more susceptible to compensatory eating and passive overconsumption than others, and how this vulnerability is expressed through hunger and/or reward driven behaviour. As all these factors can be measured in relation to meal size and sequences of meals, it will be possible to determine their importance in relation to food selected and the amount of energy consumed.