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# Breaking WEIGHT BIAS

Promoting Health without  
harming through digital  
training tools

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## 5.2. Control of body weight



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## TRAINING CONTENT

### 5.2. Control of body weight

#### How easy it is to control one's weight

Over the years, there have been many different approaches and attempts to achieve efficient “weight-control”. Despite the wide theoretical knowledge that we have around energy balance, still the evidence derived from human research poses controversial questions. One of the first studies that proved the existence of **underlying mechanisms that regulate body weight** was the classical Minnesota experiment. After the initial, significant body fat loss in response to semi-starvation, the individuals gained more fat mass (reaching 145% of their post-starvation values) during their *ad-libitum* re-feeding (Keys, Brožek et al., 1950). Similarly, the extremely high rates of diets' inefficacy to control people's body weight in the long-term suggest the **significant role of basic physiological laws that govern the regulation of body composition**, including post-starvation fat overshooting (Dulloo et al., 2012). *(You can see more about dieting as a weight-control method in chapter 5.3.)* These findings indicate the need to assess parameters that influence body weight in more depth and avoid focusing on overly simplistic theories that do not consider the contribution of a wide variety of factors and their complex interactions.

#### The role of genes

The results of an adoption study showed that adopted children had body weights closer to those of their biological parents than to those of their adoptive parents, independently of environmental conditions otherwise associated with obesity (Sørensen et al., 1998). The most impressive evidence that genetic factors play a determinant role in weight regulation comes from twin studies (Stunkard, Harris and Pedersen, 1990). It has been supported that heritability accounts for approximately 70% of body weight (Shetty and Shantaram, 2014). There is also a theory of the so-called “set point”, which supports a strong genetic and humoral control of body weight by a proportional feedback system designed to regulate body weight to a constant “body-inherent” weight (Müller et al., 2010). However, since 1975 there has been a significant increase in the body mass index (BMI) of the population, which cannot be explained solely by genetics (Brandkvist et al., 2019). The development of the dual intervention point model acknowledges that there is no single set point and thus, body weight can change depending on environmental factors within a range that may be biologically determined (Speakman et al., 2011).

#### Gene-environment interaction

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The term “obesogenic environment” was first invented in the 1990s to describe the total impact of life’s surroundings, opportunities, or conditions on promoting obesity in individuals and populations. The definition includes social, cultural, and infrastructural parameters that can affect a person’s ability to engage in health-promoting behaviours (Eggar and Swinburn, 2002).

Effects of obesogenic environment on nutrition:

- increased availability of energy-dense food products at work and school,
- ubiquitousness of vending machines,
- low cost and large serving sizes of highly processed food,
- heavy promotion of fast food, nutrient-poor snacks, and sweetened beverages,
- aggressive food marketing,
- increased density of fast-food outlets in **neighbourhoods**,
- reduced time spent for family meals and preparation of fresh meals.

Deleted: neighborhoods

Effects of obesogenic environment on physical activity levels:

- reduced use of active transport (walking, bicycling),
- increased car use,
- reduced outdoor play,
- increased sedentary leisure time (television, computer games),
- sedentary jobs,
- limited opportunities for physical activity both at home and at work due to rapid technological progress (Jones et al., 2007).

It seems that there is a strong interaction of genetic predisposition with the obesogenic environment, which leads to the increase of BMI in recent decades. Interestingly, BMI is higher even for people who are not predisposed, meaning that the effect of the environment is predominant (Brandkvist et al., 2019). As Lee YS. says “We have created a biology–environment mismatch, as the human weight regulation is unable to evolve fast enough to keep pace with the environmental change” (Lee, 2009).

**Less mentioned, yet crucial factors that can affect body weight**

Despite the widespread belief that body weight can be kept under control simply by eating less and moving more, evidence proves that there is a great variety of different determinants and their complex interrelationships, which can affect the homeostatic mechanisms of body weight regulation (Butland et al., 2007).

**Poor quality of sleep** (Beccuti and Pannain, 2013), cumulative **work stress** (Berset et al., 2011), **depression** (Milano, Ambrosio et al., 2020), and certain types of



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**medication** (Domecq et al., 2015) are some of the most important factors in modern societies that may influence body weight control.

Moreover, **socioeconomic status** (SES) (Molarius et al., 2000), **poverty** (Żukiewicz-Sobczak et al., 2014), **race/ethnicity** (Chumlea et al., 2002), and **reduction in variability in ambient temperature** (Moellering and Smith, 2012) may contribute to body weight changes.

Deleted: ,

**Dieting** (Dulloo et al., 2012) and **weight stigma** (Tomiya et al., 2018) are also two fundamental predictors of body weight gain.

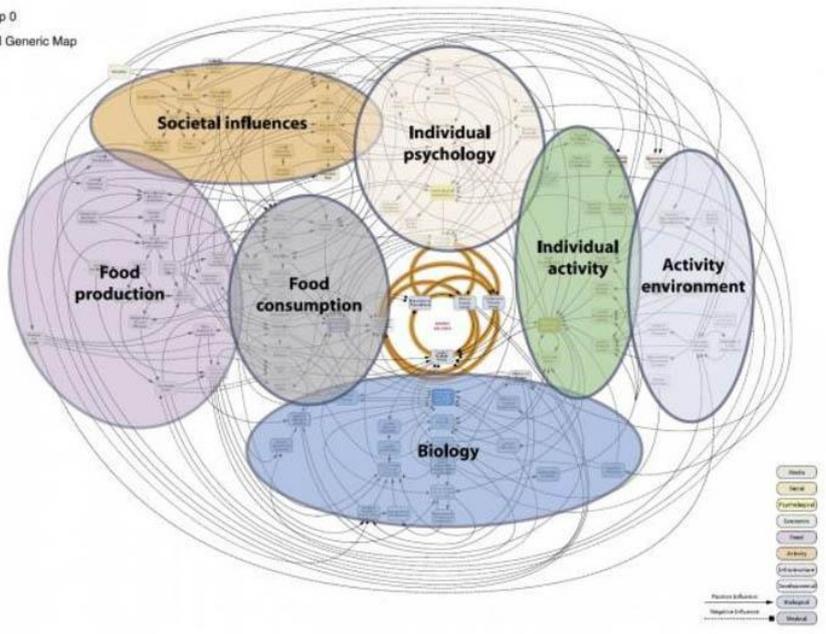
**Conditions in early life** can play a determinant role in weight regulation during adulthood, including **birth weight**, exposure to endocrine-disrupting chemicals in-utero, formula-feeding, and weaning practices (Butland et al., 2007).

Deleted: birthweight

Finally, yet importantly, unexpected life events can also have a great impact on body weight, with the **COVID-19 pandemic** being one of the most representative cases (Zeigler, 2021).

The **Foresight obesity system map** (Figure 5.2.1.) illustrates the complexity of 108 variants that directly or indirectly affect energy balance. It should also be noted that certain interventions that focus on specific factors can cause unintended effects on others, because of their **complex interdependencies** (Butland et al., 2007).

Map 0  
Full Generic Map



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**Figure 5.2.1.:** The full obesity system map with thematic clusters. Source:  
<https://www.gov.uk/government/publications/reducing-obesity-future-choices>.

### **Let's end the stigma and start focusing on effective interventions**

Understanding the complex interplay of a wide variety of factors that affect weight control is a necessary step to counter the most rigid weight misperceptions and the widespread message of “personal responsibility”, which perpetuate and reinforce weight stigma (Puhl and Heuer, 2010). Moreover, taking the underlying complexity of the regulation of energy balance into consideration can help us develop **multifaceted interventions** and abandon the inefficient “one size fits all” approach (Butland et al., 2007).



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