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Obesity Needs Experimental Psychology

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'Genes load the gun; the environment pulls the trigger' is a popular metaphor that intends to illustrate the cause of the current obesity epidemic. People who are genetically determined to be obese do badly in the present environment that facilitates overeating. Highly palatable energy-dense foods are abundant, cheap, aggressively marketed, and easy to get. If one's genetic software is programmed to overeat, it is almost impossible to resist these environmental temptations. This argument, obesity following from an interaction between genetic predisposition and environmental triggers, is very common amongst obesity experts. The interaction between genes and environment is considered a sufficient explanation of obesity. The argument, however, sidelines psychology while psychological processes do play a big role in overeating, becoming obese and staying obese.

The ultimate cause of obesity, or excess body fat, is calorie intake exceeding calorie output. This energy imbalance between calories consumed and used is mainly due to increased intake of palatable foods high in energy and it is one's eating behaviour that is a very strong predictor of one's weight gain (Hays, Bathalon, McCrory, Roubenoff, Lipman, & Roberts, 2002). People who get obese overconsume calories and they are unable to refrain from eating despite, in many cases, the desire and intention to do so. Why are some people not able to restrict their food intake to a level that maintains a healthy weight or to a level that reduces overweight? Psychological processes are responsible. Let us review some of them.

Learning processes

Learning processes are underestimated in the explanation of obesity while they play a big role. High-calorie foods are extremely reinforcing because they signal energy to survive. They are strongly wanted reinforcers (Epstein & Leary, 2006) that easily lead to reward-driven or 'hedonic' eating. Because food is such a strong positive reinforcer, it has high potential for conditioning. Any time food is ingested, there is an opportunity to associate consumption with cues and contexts that are present at the time (Bouton, Woods, Moody, Sunm, & Garcia-Gutierrez, 2006). The physical location where is eaten, the people with whom is eaten, specific actions that are done during eating, food



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preparing rituals, the smell and taste of foods, and also moods and mental states; they may all become associated with the eating and when this happens, classical conditioning occurs. Frequent exposures to large portions of highly palatable high-calorie foods make a large number of daily learning opportunities. The context and/or cues become signals for eating and every time one is exposed to a context or cue, strong eating desires are triggered – also called cue reactivity – thereby increasing the chance of overeating: cued overeating. To give you an example of learned cue reactivity and cued overeating: Imagine that you have been dining in an excellent restaurant. You ate a starter and a main dish and you drank some glasses of good wine. You decide to skip the dessert because you have had enough. The dessert card passes and you read 'chocolate mousse'. You think of the very delicious chocolate mousse you ate a month ago and you decide to order the mousse. Thinking of the delightful mousse made your mouth water, despite being satiated. You showed cue reactivity; the cue is the word chocolate mousse and your thinking of how delicious the mousse would be. Your response is the desire that you experience, possibly combined with bodily reactions like the release of insulin and a salivation response (the mouth watering). At that moment, eating is the most appropriate response. ►

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Many animal studies show that cued overeating is easily learned. Conditioned cues are able to elicit feeding in sated rats. It was even found that a context in which rats had learned to eat highly palatable foods, induced the overeating of unpalatable foods after conditioning (Boggiano, Dorsey, Thomas, & Murdaugh, 2009). Few human studies were done, but these few do consistently show that conditioned food cues and food contexts strongly determine intake (e.g., Van Gucht, Vansteenwegen, Van den Bergh, & Beckers, 2008). They also show that the extent of cue reactivity determines the amount eaten. Cue reactivity promotes overeating, and is positively correlated with Body Mass Index (BMI) in adults and children.

Food cue reactivity is yet an underestimated risk factor for relapse. The reinforcing value of food starts the conditioning process and learned cue reactivity is the maintaining mechanism of overeating. Cue reactivity makes it difficult to not eat: it is difficult to resist food in a cue reactive state. One is not always aware of the cue/context – eating associations and one's own reactivity: cues or contexts can automatically trigger a desire to eat, approach behaviour and excessive eating. Most of the time, overeating in response to increased cue reactivity is done more or less automatically. This 'automatic overeating', of which one is not aware, might easily end up in habitual overeating or habitual snacking (Rothman, Sheeran, & Wood, 2009). Habitual overeating in response to everyday cues strongly correlates with long-term weight gain and obesity. The automaticity of this context-induced or cued overeating makes it very difficult to control the overeating (Jansen, Stegerman, Roefs, Nederkoorn, & Havermans, 2010; Jansen, Havermans, & Nederkoorn, in press). An exciting prediction is that cue exposure with response prevention should be able to extinguish the learned eating desires and automatic overeating (Jansen et al., in press).

Negative Affect

Another psychological process that strongly influences overeating is related to mood. It has been documented frequently that the obese are vulnerable for depression. Many studies show strong and significant associations between depressive symptoms and obesity. While strong emotions usually lead to decreased intake, emotions do increase intake in many obese. The obese are more frequently self-reported emotional eaters compared to lean people. Associations between brain reward responses to food cues and self-reports of negative affect were demonstrated in emotional eaters (Bohon, Stice, & Spoor, 2009), indicating an association between low mood and food reward in emotional eaters.

Emotional overeating is a main source of excessive calorie intake in many obese people and it might sabotage efforts to lose weight.

Impulsivity

Although the prevalence of obesity is growing, not everybody is obese, pointing to individual differences in vulnerability. Clearly, some people are better able than others to regulate their eating in spite of overwhelming environmental temptations. Robust findings show that personality characteristics are involved in these individual differences: the obese are more impulsive than lean people (Nederkoorn, Havermans, Roefs, Smulders, & Jansen, 2006). Individual differences in self-regulatory abilities are visible early in life. Some children are better in the 'delay of gratification' than others; they show good ability to wait for a bigger treat instead of an immediate smaller one now. Effective delay of reward is related to protective and positive outcomes later in life, like less negative affect, increased self-esteem, less mental health disorders, higher income and higher education level. Impulsivity can be divided in two components: a component reflecting high sensitivity to immediate reward and a component reflecting poor response inhibition. Many studies showed that obese people are extremely sensitive to reward and bad response inhibitors, also when these rewards and responses are not related to eating. It has further been documented that general reward sensitivity and poor response inhibition are also related to overeating, weight gain, and less weight loss during weight reduction treatment (Nederkoorn, Jansen, Mulken, & Jansen, 2007). The finding that the induction of impulsivity in lean people led to overeating and weight gain, demonstrated that impulsivity is causally connected to overeating (Guerrieri, Nederkoorn, Stankiewicz, et al., 2007). Clearly, it is more difficult to regulate oneself and one's food intake when characterized by the personality trait impulsivity. Experimental studies show that inhibition training is a promising intervention to better resist temptations (Houben & Jansen, 2010).

Control resources

Being able to resist temptations of the current environment depends largely on someone's capacity to control oneself and the availability of cognitive control resources. Individuals differ in their capacity to control themselves, and recent studies into the role of this so-called executive system show that limited executive control capacity predicts overconsumption. The amount of control resources is also state-dependent. When control resources are depleted, for example because ►

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somebody has been doing a hard job that required lots of self-control, this depletion might lead people to automatically give in to their impulses – at that very depleted moment there is no control system available to override impulses. Depletion of control resources and/or a weak executive system increase the risk of automatic or mindless overeating. Working memory training might be an interesting way to strengthen the executive system.

To conclude

Psychological processes contribute largely to obesity. They are able to explain, at least partly, why people overeat while they do not want to, and why they cannot lose weight. I reviewed some psychological processes that are obviously related to overeating and the maintenance of obesity: learned cue reactivity, negative affect, increased reward sensitivity, weak response inhibition, and depletion of control resources. Without doubt, there are more mechanisms that can explain excessive appetitive motivation. For example, there is some strong evidence for shared brain reward pathways for food and drug rewards in animals and that is another argument to consider obesity a 'food addiction' or mental disorder (Volkow & O'Brien, 2007).

It is amazing to observe that the influence of genetics and environment is reason to not consider obesity a cognitive behavioural problem. Many mental health problems, like depression, anxiety disorders, addictive behaviours, eating disorders and so on, have genetic roots and are triggered by cultures or environments. For these mental health problems, genetic contribution and context-specific triggers are not at all a reason to doubt the strong influence of cognitive and behavioural processes. On the contrary: it is often a reason to arm the individual against his or her own weaknesses in specific situations, for example by challenging and changing specific core beliefs and by exposures to situations that trigger the undesirable behaviour. It is clear that obesity suffers from a biomedical research bias. But obesity mainly is a behavioural problem: the obese overeats and is not able to reduce intake. Psychological studies into mechanisms that maintain the overeating and sabotage weight loss are highly needed.

At least half of the obese people are not happy. They are concerned about their body shape and weight and show depressive symptoms. Many of them report emotional overeating. These obese sufferers might benefit from treatment in mental health care. Many obese people report they want to lose weight but they are not able to, they fail time after time. These obese people might also benefit from treatment in mental health care. Cognitive behaviour therapists are trained

to change behaviour. I know that behaviour therapy is not an effective treatment for adult obesity. Yet. Effective interventions need knowledge about maintaining mechanisms. We do not know anything yet about the weight maintaining mechanisms in obesity. We need to know more about the mechanisms that keep people eating and that sabotage intake reduction. Therefore, experimental studies into the mechanisms that maintain the behaviour are needed. What happens when the mechanism is manipulated? Induction of the putative maintaining mechanism should increase overeating and weight gain whereas a reduction or removal of the mechanism should induce decreased eating and weight loss. Experimental studies into the psychological mechanisms that maintain overeating and obesity are scarce. Very scarce. For many behavioural disorders effective treatments exist because there is a longstanding tradition of rigorous and outstanding experimental research into the maintaining psychological mechanisms of these disorders. That is what obesity needs too. After all, it is the obesogenic environment that loads the gun, but the mind pulls the trigger. ■

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