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Food: Treat or threat or treatment? Reward and punishment in eating behaviour and interventions to change them

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Overview

The reinforcing value of food is a strong determinant of food intake, often overriding homeostatic signals of deprivation and satiety. For most people, food is a treat (reward), however, for some (e.g., people with eating disorders), it can be a threat (punishment). Individual differences in reward and punishment processing (sensitivity to reward and punishment) are related to food reinforcement. Insight on the reinforcing characteristics of food might be of crucial interest for interventions (treatment) aiming to improve eating behaviour and diet quality.

Major Findings

People not only eat because they are food deprived, but also because eating gives them pleasure. Eating because of food deprivation is aimed at restoring energy balance and can be referred to as homeostatic hunger. Hedonic eating, however, is driven by the pleasure that is associated with eating. Consistent with this intrinsic rewarding character of food, most people enjoy eating. However, the foods from which people derive the most pleasure, and ones that are abundantly available in the present obesogenic environment, are those that tend to be the most calorically dense. High energy, less healthy foods are considered to be more rewarding than low energy, healthier foods. Nonetheless, the reward value of healthy food can be increased, for example through associative conditioning procedures.

Despite the fact that food is a primary reinforcer, not all individuals are equally sensitive to the rewarding aspects of food. The reward value of food is determined, among others, by an individual's weight status (with increased food reward observed in obese people), gender (with increased food reward seen in boys), and hunger (with increased food reward under food deprivation). The influence of the reward value of food might be particularly relevant for individuals with high dispositional sensitivity to reward. Sensitivity to reward is a psychobiological personality trait, related to activity in the reward regions of the brain, and refers to an individual's ability to experience pleasure or reward in response to exposure to appetitive stimuli (i.e., palatable foods). This personality trait is particularly important in the understanding of eating behaviour. For example, consumption of fast food, snacks and sugar sweetened beverages is higher in individuals with a higher sensitivity to reward. Furthermore, studies have shown that the acquisition of conditioned responses to food

cues and their extinction might be influenced by sensitivity to reward and other aspects of impulsivity.

Despite the strong motivational character of food, food may not necessarily be rewarding for all individuals. For example, neophobic children are afraid of novel foods, and for people with high dispositional sensitivity to punishment, the short term reinforcing effect of food might be considered a problem. Sensitivity to punishment is a psychobiological personality trait, related to activity in the septohippocampal regions of the brain, and refers to an individual's susceptibility to aversive stimuli. This personality trait can be associated with the fear of becoming overweight and obese, and might result in the motivation to lose weight by dieting. For individuals who are highly responsive to both punishment and reward, this may result in a vulnerability for unsuccessful dieting behaviour. This might be especially the case for individuals with low executive control since they are less able to direct thoughts and actions towards obtaining their dieting goals.

Clinical Implications

Interventions aimed at improving eating behaviour and promoting weight loss often use reward strategies, based on insights from theories of learning and behaviour. For example, reward-based parent management training (cognitive-behaviour therapy [CBT]) for weight reduction in overweight children, can lead to sustained weight loss and positive changes in the eating behaviour of children and families. However, the effect of such treatments might be dependent on an individual's sensitivity to reward. It is very likely that treatments or strategies in which rewards are used are more effective for children high in reward sensitivity. The critical aspect of strategies to improve children's liking and consumption of food items is familiarising children with the

taste of the food item by bringing the food item into contact with the taste buds. A high reward sensitive child might be more eager to taste if she/he knows she/he will be rewarded for tasting. As a consequence the learning process might be facilitated in high reward sensitive children. To conclude, food can act as a reward (treat) or a punishment (threat), depending on individual characteristics like weight status and dispositional sensitivity to reward or punishment. The reinforcing value of food and sensitivity to reward and punishment can be considered strong determinants of both normal and disordered eating behaviour. Taking into consideration the reward value of food and reward and punishment sensitivity when developing interventions to improve enhance eating behaviour is a promising way to increase the effectiveness of such efforts.

Future Directions

Future research should consider reward and punishment, and their interactions, at those three levels (reinforcing value of food, individual differences and treatment) in order to fully understand their implications for both normal and disordered eating behaviour. Furthermore, consistent with a bio-psycho-social view, the concepts should be studied in relation to other known determinants of eating behaviour (e.g., individual factors, like socioeconomic status (SES) and pubertal state; social factors, like peer and family influences; characteristics of the physical environment, like healthy food availability).

Further Reading

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