

CS04-01 - STARVING INSTEAD OF EATING AS A REWARD: THE CASE OF ANOREXIA NERVOSA

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Introduction: Anorexia nervosa is characterized by severe emaciation, amenorrhea and hyperactivity. Aetiology of the disorder is unknown however evidence grows that factors that maintain the core symptoms are important for the understanding of the chronicity of the disorder.

Objectives: Theories based on research on self-starvation in animals emphasise the interaction of stress and feeding behaviour, since under certain dietary conditions and possibility for non-forced physical activity, self-starvation through excessive wheel running until death is seen in rodents. Results of these studies suggest a pivotal role for the mesolimbic dopaminergic reward system of the brain in self-starvation in the animal. The activity level of this system with the ventral striatum as a core structure is modulated by expectation or receipt of rewards. There is also growing evidence referring to reward related processes in patients with anorexia nervosa with the mesolimbic dopaminergic reward system being essential in mediating maintenance of the disorder. It is suggested that alterations in the dopaminergic neurotransmission could affect the evaluation of reward stimuli in the patients, resulting in reduced responsiveness towards disease-unspecific rewarding stimuli, and obsessive and increased reaction towards disease-specific stimuli, like cues for emaciation or experience of the own cachectic body.

Aims: The present study examined activity in the ventral striatal system in response to disease specific stimuli in acute anorexia patients.

Methods: During functional magnetic resonance imaging 14 patients with anorexia nervosa and 14 healthy control women evaluated images of a BMI-standardized female body depicting features of under-, normal- and overweight. Photorealistic textures were used to give a familiar presentation of specific features according to the particular BMI. Subjects were asked to process the stimuli in a self-referring way (task "feel": Imagine you have the same body shape as this woman. How would you feel?), and to give ratings by four buttons on a keyboard (scaling from 1 "very bad" to 4 "very good"). In the control task "weight" subjects had to estimate the weight of the images as one out of four categories (30 - 45 - 60 - 75 kg).

Results: Behaviourally, patients with anorexia nervosa rated underweight stimuli as the most preferred, while healthy control women preferred normal weight stimuli. The groups did not differ with regard to correctness or decision times in the control task. Functionally, ventral striatal activity demonstrated a highly significant group-by-stimulus interaction for under- and normal weight stimuli during self-referred processing of the stimuli: In patients activation was higher during processing of underweight compared to normal weight stimuli. The reversed pattern was observed in controls. Differential responses on overweight stimuli did not substantially contribute to the overall effect either behaviourally or functionally in either task

Conclusions: This pattern of activation is in good agreement with previous assumptions concerning differential responsiveness upon disease-specific and -unspecific stimulation in patients with anorexia nervosa. Results also align with predictions derived from animal studies on the pivotal role of the human dopaminergic reward system, and thereby support theories of starvation-dependence to account for the maintenance of the disease.