

### **Reward sensitivity in impulse control disorders in Parkinson's disease**

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Parkinson's disease patients who are treated with dopamine replacement therapy may develop behavioral addictions. These abnormalities, defined as impulse control disorders (ICDs), include pathological gambling, binge eating, excessive hobbyism, hypersexuality, and the excessive use of dopaminergic medication. According to the incentive sensitization theory, compulsive reward seeking in ICDs seems to arise from excessive attribution of incentive salience (or 'wanting') for rewards [1]. However, only a few studies have systematically investigated this hypothesis.

In this study, we investigated food liking and food wanting in PD patients with ICDs (binge eating, in particular), PD patients without ICDs and healthy matched controls (C). The presence of ICDs was evaluated with the Questionnaire for Impulsive–Compulsive Disorders in Parkinson Disease Rating Scale (QUIP-RS). First, we asked participants to rate the degree of liking and wanting of sweet and non-sweet foods. Secondly, we asked them to perform two experimental tasks: a) a grip-force task, in which the motivation towards foods is operationalized as the exerted effort, and b) an affective priming task, to measure the implicit attitude towards foods. Finally, participants also performed a series of neuropsychological tests and completed the Barratt Impulsiveness Scale (BIS-11), the Behavioral Inhibition & Activation Scales (BIS/BAS), and the Hospital Anxiety and Depression Scale (HADS).

Results showed that the three groups did not differ when their subjective liking and wanting scores were considered. However, PD with ICDs showed an increased wanting for sweet foods compared to PD without ICDs and C in the grip-force task, and a negative attitude towards sweet foods in the priming task. Significant positive correlations were observed between "binge-eating" scores on the QUIP-RS and attentional impulsivity, total impulsivity in the BIS and depression in the HADS.

This study confirms that ICDs are characterized by an alteration of 'wanting' of rewards. Interestingly, this evidence emerges only when a more objective measure is used. Moreover, it also shows the presence of an implicit negative attitude toward palatable foods, in line with studies on obese and restrained eaters [2,3]. Finally, the study reveals an association between "binge-eating" and attentional impulsivity. Accordingly, with this last result, high levels of attentional impulsivity have been found in binge eaters [4] and attentional impulsivity has been proposed as a risk factor for weight gain after subthalamic deep brain stimulation in PD patients [5].

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