Abstract

Drawing on the dual-process model of addiction, which posits that addictive behavior stems from an imbalance between impulsive and reflective processes, the aims of this dissertation were twofold: Studies 1 and 2 investigated whether smokers display biased automatic approach behavior in response to artificial (smoking stimuli) versus natural (food stimuli) rewards and whether such approach biases are modulated by polymorphisms of the dopamine D2 receptor (DRD2) gene, which was previously related to a wide range of impulsive-addictive disorders (Blum et al., 1996). Study 3 sought to unravel whether automatic approach biases for smoking stimuli are malleable through training and whether this translates to a reduction in nicotine consumption. Both, bias assessment and modification were accomplished by varieties of the Approach-Avoidance Task (AAT; Rinck & Becker, 2007).

Study 1 revealed that smokers (recruited: N = 92; included in the analysis: n = 90) showed a specific approach bias for smoking cues as compared to control pictures which depicted tooth-cleaning, food pictures or neutral pictures. Furthermore, there was a trend toward a group difference between smokers’ and non-smokers’ (recruited: N = 51; included in the analysis: n = 49) approach biases toward food pictures (p = .075), suggesting an attenuated response to naturally rewarding stimuli in smokers relative to non-smokers. Contrary to expectations, between-group comparisons failed to show a group difference regarding smoking stimuli.

The aim of Study 2 was to determine the role of genetic variability in smokers’ and non-smokers’ automatic approach biases and thereby elucidating the partly inconclusive findings obtained from study 1. To this end, data from study 1 were re-analyzed by taking the Taq1B polymorphism of the DRD2 gene into account. Although the predicted three-way interaction between genotype, smoking status and image category was only marginally significant (p = .053), exploratory analyses showed that smokers with the B1 allele of the DRD2 Taq1B polymorphism exhibited a stronger approach bias for smoking than food pictures and
expressed significantly less approach for food pictures than their non-smoking counterparts. However, as in study 1, no group differences regarding smoking pictures emerged. Complementing findings obtained with the AAT, smokers with the B1 allele reported significantly less attempts to quit smoking than smokers homozygous for the B2 allele. It can be concluded that tobacco smoking is instigated by an automatic preference for nicotine-related stimuli at the expense of naturally rewarding stimuli and this maladaptive preference is particularly present in smokers carrying the B1 allele of the DRD2 Taq1B polymorphism.

*Study 3* was designed to re-train an automatic approach bias for nicotine-related cues using a training variant of the AAT combined with a brief smoking cessation intervention in heavy smokers with comorbid psychiatric disorders (recruited: $N = 205$; included in the analysis: $n = 139$). While both training versions (AAT training and sham training) were equally effective in reducing a nicotine-related approach bias and nicotine consumption at post-assessment, the AAT training was superior to the sham training in reducing nicotine consumption at a three-month follow-up. Although the pattern of results was more complex than expected, our findings are promising and worth further investigating as they point to the clinical utility of a novel, conceptually-derived training intervention for reducing tobacco smoking in a group of heavy smokers.