Abstract

Emotion-related impulsivity (ERI) is the tendency to make impulsive decisions at times of intense emotions. ERI in individuals with Borderline Personality Disorder (BPD) has been associated with maladaptive decision-making and altered neural connectivity in several brain regions. In this study, we examined how individual differences in connectivity between vmPFC, BLA, and CeN are associated with decision-making in individuals with BPD and healthy controls (HC). Specifically, we investigated how neural connectivity moderated the association of ERI and maladaptive decision-making in a three-armed bandit reinforcement learning task. Adaptive decisions in this task were characterized by exploration of different options, switching to high-value options in consecutive trials, and choosing the best option. We found that the vmPFC→CeN effective connectivity in HCs was associated with higher exploration, favorable switching decisions, and shorter decision times, while the BLA→CeN effective connectivity in the BPD group was associated with less exploration, unfavorable switching decisions, and longer decision times. Specifically, the vmPFC→CeN effective connectivity significantly mitigated ERI's effects on task performance, such that HCs explored more, made favorable switches, and took less time to make decisions. In contrast, the BLA→CeN effective connectivity significantly moderated ERI's effects on task performance, such that the BPD group explored less, made unfavorable switches, and took longer to make decisions. Overall, we found that the BLA→CeN effective connectivity was negatively associated with the quality of value-based decision-making in individuals with BPD symptoms, while the vmPFC→CeN effective connectivity in the HC group mitigated the negative effects of ERI on decision-making.