Abnormal social interactive behavior in major depressive disorder

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Statement of the Problem: Major depressive disorder (MDD) is characterized with significant and pervasive impairments in social functioning. Limited knowledge about social dysfunction in MDD results from traditional paradigms, which lack insights into social interactions. Game theoretical modeling offers a new tool for investigating social interactive impairments in neuropsychiatric disorders. Several studies have used an Ultimatum Game to study social interactive behavior as a responder in MDD and obtained inconsistent findings. More importantly, it is unclear for the underpinnings of the abnormal behavior in MDD. We hypothesized that sensitivity to context changes is abnormal in MDD patients during the Ultimatum Game.

Methodology & Theoretical Orientation: In order to test our hypothesis, we recruited 27 MDD patients and 28 matched healthy controls to perform a classical Ultimatum Game as responders. During this game, an offer with fairness level from 4%-50% could be proposed either by a human or by a computer.

Findings: We found that MDD patients showed decreased rejection rate for the unfair offers and increased rejection rate for the fair offers. In addition, the patients were unable to discriminatively treat unfair offers from computer and from human proposers, unlike the healthy control whose rejection rate for human proposer was higher than that for computer proposer. Furthermore, using binary logistic regression modeling, we found that MDD patients showed decreased absolute values of both the slope and intercept across human proposer condition and computer proposer condition (respectively, $P=0.004$ and $P<0.001$), suggesting that the influence of fairness context on rejection rates was reduced in MDD patients.

Conclusion & Significance: MDD patients showed insensitivity to fairness context, which explained the pattern of lack of changes towards fairness during the Ultimatum Game. These findings suggest that reward processing and prediction error in a social context may be impaired in MDD patients.

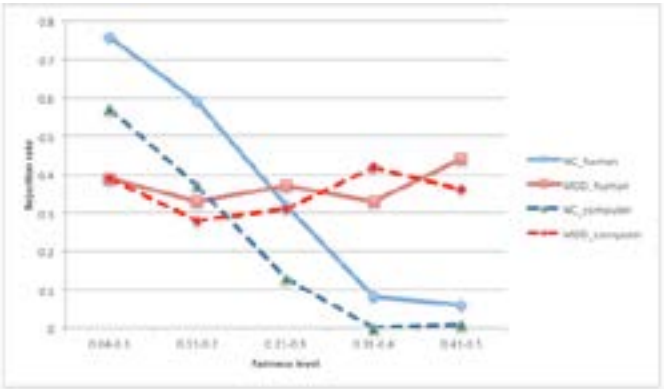

Figure 1. Changed rejection rate for offers in patients with Major depressive disorder (MDD)

Biography

Yuan Zhou received her MS in Psychiatry and Mental Health from Wuhan University in 2004 and her PhD in Pattern Recognition and Intelligence System from Institute of Automation, Chinese Academy of Sciences (CAS). She has been conducting research actively in neuroimaging and mental health, at first in characterizing the brain network of schizophrenic patients using resting-state fMRI and then in investigating cognitive deficit in psychiatric disorders using task-based fMRI. Recently, her research interest has focused specifically on understanding social decision making in patients with schizophrenia or major depressive disorder and its underlying psychopathology and neural basis. She has published her work in international journals including *Cerebral Cortex, NeuroImage, Schizophrenia Bulletin, Schizophrenia Research*, etc.

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