

The University of Hong Kong  
Department of Psychology

*Departmental Seminar*

***The Neural Basis of Social Decision Making in Patients  
with Major Depressive Disorder***

Date: February 7, 2014 (Friday)  
Time: 11:30 a.m. – 12:30 p.m.  
Venue: Room 813, 8/F, The Jockey Club Tower, Centennial Campus, HKU  
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Social decision making is a complex process of selecting an optimal option with the most desirable outcome in the interpersonal context. Because of the involvement of human interactions, social decision making usually demands heavily on the affective neural system. Within the system mood plays a vital role in the social interaction. Given the fact that depression is characterized as a stable state of low mood, researches have begun exploring the relationship between depression and social decision making. As yet, research on how the depression influences social decision making has been scarce. Moreover, the neural basis underpinning the relationships between depressed mood and altered social interactions is undertermined. This thesis contains two studies conducted to extend the understanding of the behavioral presentation and the neural underpinnings of people with depression when they were involved in a social decision making process.

Study 1 examined altered ability of decision making in social interaction among patients with major depressive disorders (MDD). A modified trust game was adopted to measure the behavioral differences between 50 female patients with MDD and 49 healthy

matched controls. Relative to the controls, the MDD patients made less frequently and smaller ratio of deceptive decisions when the repayment proportion was high and when the risk was low. They also made less frequently benevolent responses than healthy participants when the repayment proportion was low and medium. These findings indicate the MDD patients tended to be risk avoidant and fail to adjust their responses even when the risk was low.

Study 2 examined the neural correlates associated with social decision making in people with MDD. They performed on a modified trust game while their brain activities during risky decision making (high vs. low) and choices of behavior (benevolence vs. deception) were monitored by a 3T MRI scanner. Fifteen MDD patients and 15 healthy controls participated in this study. The behavioral patterns of both groups were very comparable to that of Study 1. Findings revealed that, compared with low risk condition, MDD patients exhibited hyperresponsivity to the difference between risks in the insula. Attenuated differentiated activity in the caudate nucleus, and exaggerated differentiated activity in the dorsolateral prefrontal cortex when displaying deception was observed in clinical subjects. Healthy participants, on the other hand, exhibited increased activity in the interaction between risk and choice in the middle frontal lobe. These findings indicate the impaired reward processing, as well as the inflexible adaptation of behaviors to external conditions, is affected by the depressed mood. These neural dysfunctions subserve the altered social decision making in MDD patients.

From the observations that MDD patient's social decision making is altered both in the behavioral pattern and in neural activity, mood is demonstrated to affect social decision making processes and risk is associated with depression. Our findings provide neural evidence of social decision making in MDD patients, which will shed light on the interaction between mood and social cognition, and further extend our insight about possible mechanisms explaining the relationship of depressed moods and the presented social deficits in MDD patients.

Key words: mood, major depressive disorder, clinical patients, social decision making, trust game