**POSTER TITLE**: Successful detection of remitted major depression using resting state functional connectivity: A multivariate pattern analysis approach

**KEY WORDS**: Major Depressive Disorder, Functional Connectivity, Machine Learning, Support Vector Machine

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**ABSTRACT/BACKGROUND**: Recent advances in neuroimaging studies demonstrate that abnormal resting-state low frequency functional connectivities of distributed brain networks may contribute to MDD. To date, few studies have used resting state functional magnetic resonance imaging (fMRI) to discriminate MDD at an individual level, and to our knowledge none have done so in discriminating remitted (r)MDD. Our present study examines the efficiency of discriminant analysis of rMDD by computer assisted diagnosis.

**METHODS**: Multivariate pattern analysis was employed to classify 37 remitted patients from 29 healthy volunteers, all between the ages of 18 and 23. The analysis was conducted using 5 bilateral seeds in key cognitive control, resting state, emotion, and salience networks - the PCC, amygdala, anterior insula, DLPFC and SGAC. Support vector machines with linear kernel function were employed in the multivariate pattern analysis. The features of the classifier were the 45 functional connections from the 10 nodes. We used a leave-one-out cross-validation strategy to estimate the generalization ability of our classifier. The performance of a classifier can be quantified using the generalization rate, sensitivity and specificity based on the results of cross-validation.
RESULTS: The experimental results demonstrated that 96.9% of subjects were correctly classified training on whole data set by tuning the parameter from leave-one-out cross-validation, including 97.3% identification of all rMDD patients. The top nodes for classification were left PCC to right DLPFC and left PCC to left DLPFC. This indicates that the connectivity between control and default nodes is important.

CONCLUSIONS: The current study may shed new light on the pathological mechanism of major depression and suggests that whole-brain resting-state functional connectivity magnetic resonance imaging may provide potential effective biomarkers for its clinical diagnosis. It may be possible to use such approaches to detect at risk samples in targeting preventative treatments.