

# Delayed amygdala response to positive emotional stimuli in major depressive disorder

Q. Li<sup>1,2</sup>, C. Li<sup>3</sup>, W. Wu<sup>1</sup>, Y. Shen<sup>1</sup>, P. Wang<sup>4</sup>, G. Dai<sup>4</sup>, X. Weng<sup>5</sup>, and Y. Liu<sup>2</sup>

<sup>1</sup>Department of Psychiatry, Tongji Hospital of Tongji University, Shanghai, Shanghai, China, People's Republic of, <sup>2</sup>Departments of Psychiatry and neuroscience, McKnight Brain Institute, University of Florida, Gainesville, Florida, United States, <sup>3</sup>Shanghai Jiaotong University, Shanghai Mental Health Center, Shanghai, Shanghai, China, People's Republic of, <sup>4</sup>Department of Radiology, Tongji Hospital of Tongji University, Shanghai, Shanghai, China, People's Republic of, <sup>5</sup>Laboratory of Brain High Function, Institute of Psychology, Chinese Academic of Science, Beijing, Beijing, China, People's Republic of

## Introduction

Increasing evidences have indicated that individuals with major depressive disorder (MDD) exhibit attenuated as well blunted responses to negative emotional stimuli rather than potentiation and facilitation. The amygdalar complex has been reported to have a specific temporal pattern of habituation to external information in healthy subjects, which has not got enough attention in subjects with MDD. In order to examine the temporal characteristics of emotion-related neural responses in MDD, pictures from the International Affective Picture System (IAPS) were adopted as passive visual stimuli. We hypothesize that that patients with MDD would show a delayed and blunted response to emotional pictures in the amygdala, relative to healthy subjects.

## Participants and Methods

Twelve first-episode unmedicated MDD patients and 13 healthy controls (HC) participated. Functional images with blood oxygenation level-dependent (BOLD) contrast were obtained on a Marconi ECLIPSE 1.5T MRI system using an EPI sequence (TR/TE/FA = 3000 ms/40 ms/90, matrix = 64×64, FOV = 25 cm×25 cm). All MRI data were preprocessed and analyzed with AFNI. Analyses were focused on the temporal dynamics of the BOLD signal in the amygdala across blocks of positive, neutral and negative emotional pictures in MDD versus HC participants. Within each ROI, time-varying patterns of the mean signal changing rate in the ROI were described with the mixed linear model (MLM) using SAS 8.1.

## Results and Conclusions

Both behavior and fMRI results support the hypothesis of blunted emotional response in subjects with MDD. The amygdalar responses in patients with MDD showed a delayed and attenuated response to positive IAPS pictures (Figure 1) and a blunted response to negative pictures (Figure 2) compared with the HC participants, which provided explanations for the manifestation of loss of interest and pleasure in individuals with MDD.

## References

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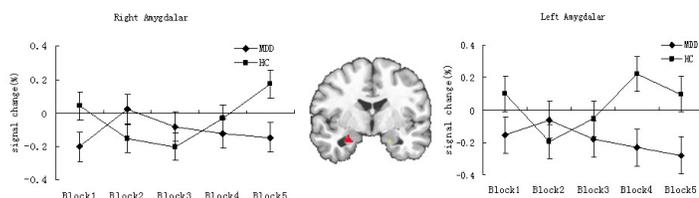


Figure 1: The temporal pattern of the BOLD signal response in the bilateral amygdala to positive pictures: right, 15 voxels (-21, 5,-18); left, 4 voxels (19, 3, -22) (RAI direction).

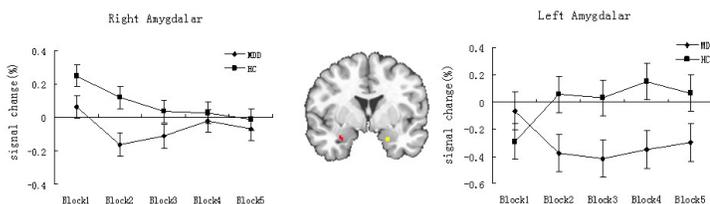


Figure 2. The temporal pattern of the BOLD signal change in the bilateral amygdala to negative pictures; right, 8 voxels (-27, 3,-20); left amygdala, 6 voxels (19, 3, -20) (RAI direction).