
Neuroanatomical Mechanism for the Influence of Emotional Distracter On Working Memory Maintenance in Patients with Schizophrenia Using Functional Mri

J.C. Yang¹, W.M. Bahk², B.H. Yoon³, M.D. Kim⁴, J.S. Seo⁵, H.M. Sung⁶

¹Psychiatry, Chonbuk National University Hospital, Jeonju, Korea ; ²Psychiatry, Catholic University Hospital, Seoul, Korea ; ³Psychiatry, Naju National Hospital, Naju, Korea ; ⁴Psychiatry, Jeju National University Hospital, Jeju, Korea ; ⁵Psychiatry, Konkuk University Chungju Hospital, Chungju, Korea ; ⁶Psychiatry, Kumi CHA University Hospital, Kumi, Korea

Objectives: The purpose of this study was to assess the influence of non-emotional and emotional distracters on working memory maintenance in schizophrenic patients and to demonstrate the associated brain areas.

Methods: 16 schizophrenic patients and 16 healthy controls underwent 3.0T fMRI during a face recognition task with non-emotional (novel face pictures) and emotional (fear-provoking pictures) distracters. The paradigm consisted of 20 trials with the sequence "encoding - maintenance - distracter - retrieval". As the encoding, three different human faces sequentially appear once on a quartile coordinate. Subjects were instructed to look at the distracters and maintain the memory for the encoded faces. In the retrieval, participants were presented either the previously encoded face or a new face, asked whether they recognize the face. We compared the accuracy and the brain activation maps by SPM 8.

Results: The accuracies were lower in schizophrenic patients than controls with non-emotional (52.6% and 65.4%, respectively, $p < 0.05$) and emotional (53.3% and 65.6%, respectively, $p < 0.05$) distracter. For non-emotional distracter, schizophrenic patients showed significantly increased activation in superior frontal gyrus, dorsolateral prefrontal gyrus, ventrolateral prefrontal gyrus (VLPFG), superior parietal gyrus (SPG), inferior parietal gyrus, anterior cingulate gyrus, and fusiform gyrus (FG) ($p < 0.001$). And for emotional distracter, patients showed increased in VLPFC, SPG, FG, hippocampus, parahippocampal gyrus, amygdale, superior and middle temporal gyrus, middle and inferior occipital gyrus ($p < 0.001$).

Conclusions: There was significant difference of neuroanatomy associated with the effects of non-emotional and emotional distracters in schizophrenia. Working memory of schizophrenic patients was significantly influenced by emotional distracters.