

BRAIN ACTIVATION IN RESPONSE TO FACE IMAGES WITH BACKGROUNDS

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ABSTRACT. *Background images are considered important in art forms (painting, photography, etc.) for eliciting effective expressions. We assessed the effect of background images on brain activation, using functional magnetic resonance imaging (fMRI). During the fMRI scanning, face images (six photographs of a fearful face) with background images (two photographs, i.e., one of lightning; the other, of a flower garden) were repeatedly presented to 11 healthy right-handed males. After this, the subjects rated their impressions of the images on the Plutchik scale. Significant effects of the image of the fearful faces against the lightning background minus that against the flower garden were assessed using a t-test and were displayed as statistical parametric maps (SPMs) using SPM2 software. The results demonstrated the activation of the right amygdala and right hippocampus, and the image of the fearful face against the lightning background created a more fearful impression than that against the flower garden. Therefore, the image of the face and background together create the overall impression. These differences in the activation of the amygdala and hippocampus may have been due to the creation of this overall impression. This demonstrates the importance of background images in the formation of impressions of face images.*

Keywords: Functional magnetic resonance imaging, Background image, Face image, Computer interface

1. **Introduction.** In recent years, many studies have been conducted in an attempt to clarify the neural systems involved in emotional perception. Previous studies have suggested the involvement of the limbic system in emotional perception: Papez et al. indicated the relationship between emotional perception and the hippocampus (Papez, 1937).

One of the concepts of emotion, called Plutchik's psychoevolutionary theory of basic emotions, was suggested by Plutchik et al. (Plutchik, 1962). These postulated basic emotions are acceptance, anger, anticipation, disgust, joy, fear, sadness, and surprise. All other emotions are derivative states produced by combinations of these basic emotions. It is well known that these complex emotions are caused by complex processes of the brain and body.