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The influence of fusiform gyrus on the Autonomic nerve system: An fMRI study on emotion and chanting (prayer)

Juning GAO
The University of Hong Kong, Hong Kong

In our previous study on mindfulness-based stress reduction, we found an entrainment of electronic activities of brain and heart. In this study, we aimed to further identify the specific brain region which plays an important role in modulating heart beat. Sixteen participants with experience in chanting Amitofo Buddha were recruited in this emotion-related study. Fearful/neutral pictures from international affective pictures system were shown in a block-designed functional MRI (fMRI) study. Participants were asked to (1) chant Amitofo Buddha or (2) chant Santa Claus, or (3) remain silent when viewing the pictures. Physiological data like heart beat, skin conductance etc. were also recorded. FMRI data were analyzed by SPM8 and physiological data were analyzed by EEGlab. The results showed that responds of brain regions to fearful pictures were most intensive in bilateral fusiform gyri, left inferior parietal lobe, and the frontal lobe, among these regions only the activities in the fusiform gyri were significantly correlated with the heart rate. Moreover, such significant correlation only exists under condition (2) & (3), but not under condition (1) stated above. We also note that significant difference of heart beat between viewing fearful and viewing neutral pictures was found only under conditions (2) & (3). In conclusion, this analysis suggests that chanting Amitofo can reduce the emotional response to fearful events, and the correlation of fusiform brain activity and heart beat is most significant than other brain regions. This gives credit that central nervous system can interact with peripheral autonomic nerve system in emotional events.

galeng@hku.hk

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