

MEG study of an early face-object dissociation

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Many event-related potential (ERP) and magnetoencephalography (MEG) studies reported a face-distinctive response around 170 ms (N170/M170). Recent studies [1,2] found a face-selective MEG and ERP response occurring just 100 ms after the stimulus onset. Differences between faces and other object categories at these early latencies might be related to the low-level visual differences [3]. The aim of this study was to investigate early dissociation of MEG responses to faces and objects avoiding differences in low-level physical features of the stimuli.

Eleven subjects with available MRI scans participated in the study. Gray-scale stimuli were presented in the centre of the visual field for a duration of 150 ms with an interstimulus interval of 450 ms. The stimulus set consisted of nine different stimuli: face, flower, and 7 meaningless stimuli. The stimuli were created so that if they were added up in different ways they would produce the same summed stimuli. However, no summed stimulus was presented. Summed responses to the nine different stimuli were compared. Neurodynamic measurements were conducted at the BioMag Laboratory with a 306-channel Vectorview system (Elekta Neuromag Ltd., Helsinki). Standard Neuromag software was used in the data analysis that included also a spatio-temporal modeling.

Nine out of eleven subjects have shown reliable face-object dissociation of MEG responses around 120 ms. The difference in responses can not be attributed to the low-level characteristics of the stimuli because the compared sums were composed of the responses to the stimuli that added together would give an identical image. When compared summed responses included only responses to the meaningless stimuli no reliable difference was found. Spatio-temporal localization of the difference of sums containing face and flower revealed that the face-object dissociation takes place in occipital extrastriate regions. These results indicate an early separation of face and object processing that is not related to the physical features of the stimuli.

[1] Liu J, Harris A, Kanwisher N. *Nature Neuroscience* 2002, 5:910-916.

[2] Herrmann MJ, Ehlis AC, Ellgring H, Fallgatter AJ. *J Neural Transm.* 2005, 112:1073-1081.

[3] Halgren E, Raji T, Marinkovic K, Jousmäki V, Hari R. *Cereb Cortex.* 2000, 10:69-81.