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Right hemisphere dominance in perceiving coherence of visual events

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Abstract

The visual world consists of static pictures as well as of coherent visual events. The present study investigated neural substrates underlying the perception of coherenceon of i.5(cohere50.450(recei r -250 n-250percep41 5;Uni(percepus50.3(uercepfunc TDof -245.eumagnef -25045.euTheDo245.5(co presented either in the coherent order as they were displayed in the movie clips or in a random order. Relative to the random order presentation condition, static images presented in the coherent order generated stronger activation in the right middle temporal cortex, the right posterior superior temporal cortex, and the right inferior postcentral gyrus. The results provide neuroimaging evidence for the dominance of the right hemisphere in perceiving coherent visual events.

Coherence; Cortex; Visual event; fMRI

We live in a world consisting of coherent events which con-

depicting human activities were used in this study. One movie clip showed two persons meeting and walking at a subway station. Another movie clip showed a student entering a classroom, sitting behind a desk, raising a hand, and asking questions. Sixty images were extracted at every second from each movie clip. At a viewing distance of 70 cm, each image subtended a visual angle of $28^\circ \times 16^\circ$ (width $\times$ height). One scan of 280 s was obtained from each subject, which consisted of four one-minute epochs, alternating pseudo-randomly between the coherent and random order conditions. There were 60 images in each epoch. Each image was presented for 1000 ms. A blank screen was presented for 10 s before each epoch to set up a baseline for each epoch of stimuli. Subjects were asked to view freely the images while keeping their heads still.

Scanning was performed on a 3T Siemens Trio system using a standard head coil at Beijing MRI Center for Brain Research. Thirty-two transversal slices of functional images that covered the whole brain were acquired using a gradient-echo echo-planar pulse sequence ($64 \times 64 \times 32$ matrix with $3.4 \times 3.4 \times 4.4$-mm spatial resolution, TR = 2000 ms, TE = 30 ms, FOV = 220 mm, flip angle = 90°). Anatomical images were obtained using a standard 3D T1-weighted sequence ($256 \times 256 \times 176$ matrix with $0.938 \times 0.938 \times 1.3$-mm spatial resolution, TR = 1600 ms,