SYMPOSIUM ZIMMER

Active processing in visual and visuospatial working memory

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Background

A distinction between visual and visuospatial working memory is discussed recently in the literature. The present study aimed to investigate whether similar neuronal mechanisms underlie the manipulation and active processing of visual and visuospatial stimuli with low and high working memory demands.

Methods

Simultaneous and successive mental rotation and identity judgement of 2-D matrices and 3-D cube figures were contrasted using functional Magnetic Resonance Imaging (fMRI).

Results

Results demonstrate that activation patterns during mental rotation with low working memory demands differ depending on stimulus type (2-D vs. 3-D). Comparison of simultaneous mental rotation of matrices and 3-D cubes resulted in activation of frontal as well as inferior and superior parietal cortices. The opposite contrast (mental rotation of 3-D cubes vs. 2-D matrices) yielded only frontal cortex activation. Mental rotation of 2-D matrices and 3-D cubes with increased working memory demands yielded nearly overlapping activation patterns.

Conclusion

Converging and overlapping activation patterns for 2-D and 3-D stimuli with increased working memory demands suggest that visual and visuospatial working memory share the same neural mechanism under specific conditions (see Suchan et al. 2006). Results are discussed in terms of the distributed 'continuum' model as suggested by Cornoldi and Vecchi (2000).

Keywords Visual · Visuospatial working memory · fMRI · Mental rotation

References

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