

Looking at the Mind through the Lens of Functional Magnetic Resonance Imaging: Chances and Challenges

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Summary

Advances in non-invasive brain scanning and imaging technologies over the last ten years have opened up promising new methods of work for researchers. Neuroimaging techniques has enabled scientists to look for the first time into the human brain *in vivo*, to literally watch it while it works. This has revealed exciting insights into the spatial and temporal changes underlying a broad range of brain functions, including perceptual and motor abilities (e.g. Di Salle et al., 2003; Hlustik et al., 2001), normal and abnormal language processes (e.g. Paulesu et al., 2001; Perani, et al., 2003; Small & Nusbaum, 2004) and higher cognitive processes (for a discussion of neuroimaging results of higher level cognition see Cappa & Grafman, 2004).

Functional magnetic resonance imaging (hereafter fMRI), being the least invasive of brain imaging techniques, has gained an increasing popularity among cognitive scientists and in the last decade it appeared that its use was alone a good reason for assuring publication. At present, once the glamour of the novelty has cooled down, it is time to seriously assess its real contribution in the study of cognitive processes: can fMRI really challenge some of the remaining frontiers in neuroscience? To what extent can we trust what we see?

In our view, fMRI can greatly enhance our knowledge about the functioning of the mind-brain system, provided that scientists are aware of its constrains and take into account that each experimental decision, from parameter setting to statistical analysis, has specific consequences and thus has to be considered in the result interpretation. The goal of this symposia is to discuss the advantages and limitations of fMRI at the epistemological, methodological and technical levels.

List of speakers and talks

Moderator: Steven Small

Introduction

Steven Small and Katiuscia Sacco

Methodological Issues and Technical Tricks: What's Hidden behind a Brain Map?

Francesco Di Salle, University of Pisa (Italy)

Cognitive Neuroscience and Functional Imaging: What can be Learned from Patient Studies

Eraldo Paulesu, University of Milan (Italy)

What Can fMRI Show us and what Cannot

Stefano Cappa, University of Milan (Italy)

Beyond Localization: Cortical Circuit Analysis of fMRI Data

Ana Solodkin, University of Chicago (USA)

References

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- Small S. L., Nusbaum H. C. (2004). On the neurobiological investigation of language understanding in context. *Brain and Language*, 89(2):300-11.