



HCSNet Workshop: Tools and Techniques for
Conducting EEG and MEG Experiments

Monkey see, monkey don't: The role of the mirror system in complimenting actions

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Perception and action

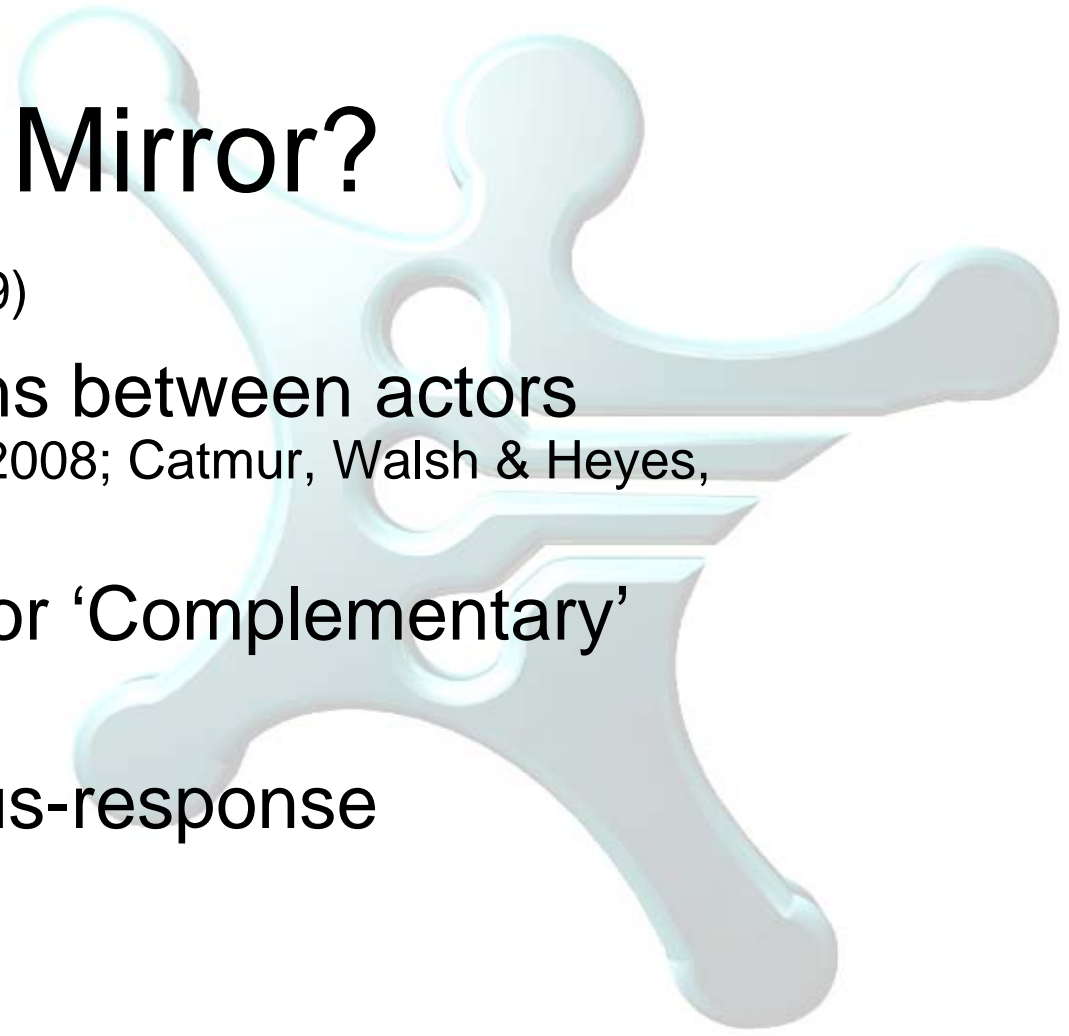


HCSNet

The ARC Network in Human Communication Science

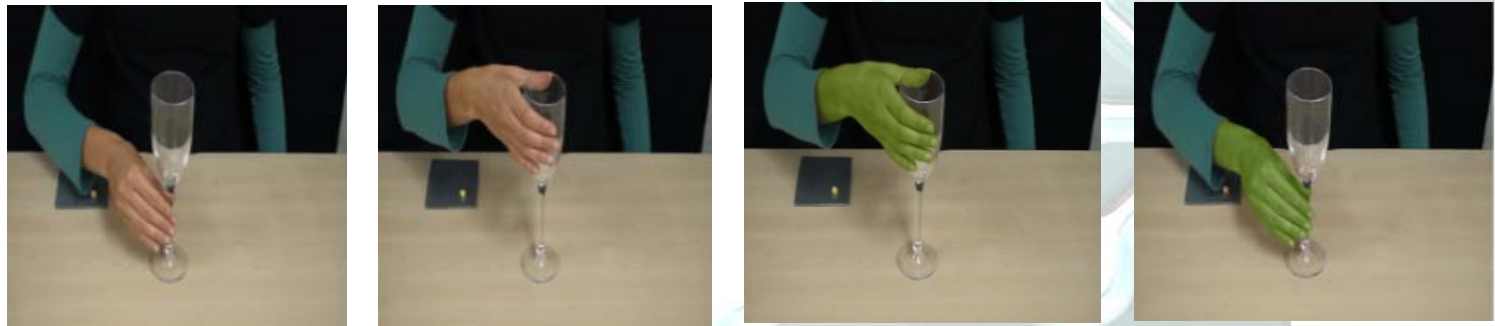
Why Mirror?

- Imitation (Iacoboni et al., 1999)
- Coordinating joint actions between actors (Newman-Norlund et al., 2007a, 2008; Catmur, Walsh & Heyes, 2007)
- Activity in rIPL greater for ‘Complementary’ actions.
- Mirror system or stimulus-response associations?



Two fMRI Experiments: Hands & Arrows

Green Hand: Wide



Imitate:

narrow

wide

wide

wide

Complement:

wide

narrow

wide

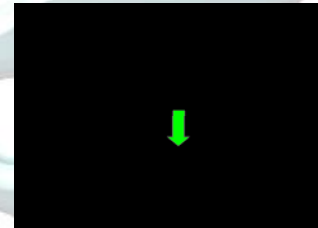
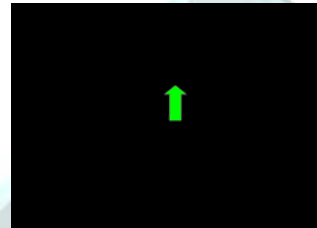
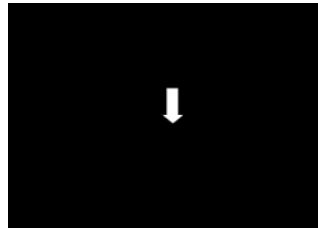
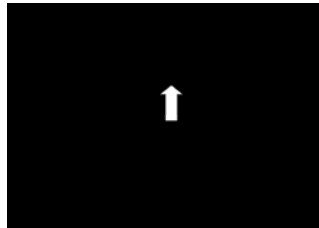
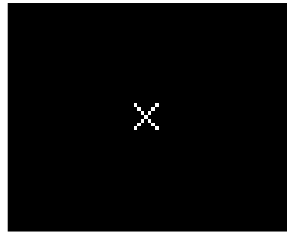
wide

- Identical (congruent) and non-identical (incongruent) actions were made in both action contexts.



Using symbolic cues...

100ms



300ms

Imitate

- Upwards pointing arrow: Wide grip
- Downwards pointing arrow: Narrow grip

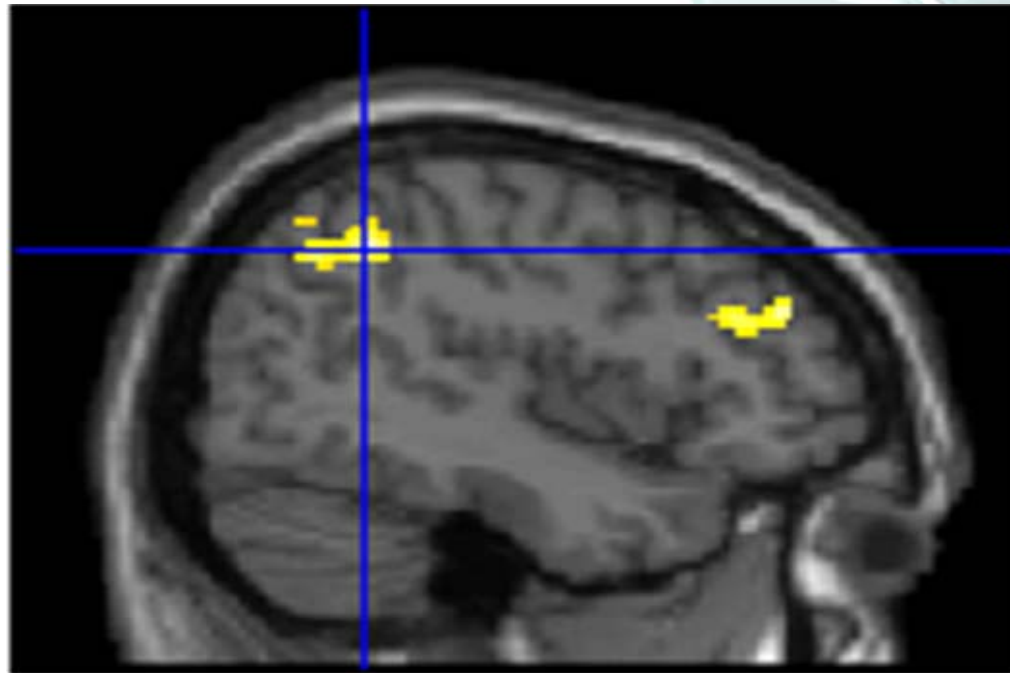
Complement

- Upwards pointing arrow: Narrow grip
- Downwards pointing arrow: Wide grip



Activity in rIPL...

- **Arrows:** non-identical actions in the Imitative context ($p < 0.06$, corrected), and identical actions in the Complementary context ($p < 0.05$, corrected). **Suggestive of overcoming conflicting response requirements/ response inhibition (Rubia et al., 2003).**



- **Hands:** identical actions in the Imitative context ($p < 0.01$, corrected), and non-identical actions in the Complementary context ($p < 0.05$, corrected). **Suggestive of a context-dependent activation of mirror system in response to observed actions.**



Conclusions

- The role of the mirror system during action observation and execution is dynamic in nature, and depends largely on the contexts in which actions are observed, and thus the goals associated with those actions.

