What can the brain tell us about the mind?

A personal dilemma

functional imaging
EEG
single cell physiology
TMS
patients

Principled Answer
Henson (2005) Q J Exp
6 examples where neuroimaging told us something about the mind.

Cognitive theory C1 vs C2

- Editorial  WHAT HAS FUNCTIONAL NEUROIMAGING TOLD US ABOUT THE MIND (SO FAR)? Max Coltheart

Not trying is disparage brain questions
Working Memory

Baddeley
- Phonological
- Visual/spatial

Coltheart
- Single Mechanism
Word Perception

Feature Detection \(\rightarrow\) Letters \(\rightarrow\) Phonological Units \(\rightarrow\) Look-up Lexicon \(\rightarrow\) Think \(\rightarrow\) Resp.

Feature Detection \(\rightarrow\) Letters \(\rightarrow\) Visual Units \(\rightarrow\) Look-up Lexicon \(\rightarrow\) Think \(\rightarrow\) Resp.

No! \hspace{5cm} Yes!
WHAT HAS FUNCTIONAL NEUROIMAGING TOLD US ABOUT THE MIND (SO FAR)? Max Coltheart

WHAT HAS (NEURO)PSYCHOLOGY TOLD US ABOUT THE MIND (SO FAR)? A REPLY TO COLTHEART (2006) Richard Henson

USING FMRI TO DISCOVER COGNITIVE OPERATIONS David Caplan and Evan Chen

BRAIN IMAGING: USEFUL, HELPFUL, BENEFICIAL? Stefano F. Cappa

LOCALIZATION OF COGNITIVE FUNCTIONS IN THE BRAIN DOES ALLOW ONE TO DISTINGUISH BETWEEN PSYCHOLOGICAL THEORIES Carlo Umiltà

MIND, BRAIN, AND FUNCTIONAL NEUROIMAGING Giuseppe Vallar

HOW IMAGES OF THE BRAIN CAN CONSTRAIN COGNITIVE THEORY: THE CASE OF NUMERICAL COGNITION Xavier Seron and Wim Fias

SCALING PROBLEMS IN THE BRAIN-MIND CONUNDRUM Dennis J.L.G. Schutter, Edward H.F. de Haan and Jack van Honk

WHAT HAS FUNCTIONAL NEUROIMAGING TOLD US ABOUT THE MIND? SO MANY EXAMPLES, SO LITTLE SPACE John Jonides, Derek E. Nee and Marc G. Berman

 LOSING OUR BRAINLESS MINDS: HOW NEUROIMAGING INFORMS COGNITION Anthony I. Jack, Chad M. Sylvester and Maurizio Corbetta

PERHAPS FUNCTIONAL NEUROIMAGING HAS NOT TOLD US ANYTHING Max Coltheart

WHAT CAN’T FUNCTIONAL NEUROIMAGING TELL THE COGNITIVE PSYCHOLOGIST? Mike P.A. Page
John Kihlstrom
John Campbell
Bill Prinzmetal
Can the brain tell us anything about the mind?

No!

Yes, but...

Epistemological issues similar to behavioral research.
1. Henson (2005) Isn’t it good to have additional dependent variables.

but you have to “know” what those variables mean.

The case of the ACC

The case of RT
2. Non explanatory explanations

The case of mirror neurons

Language Acquisition Device

Attention
3. Poor Cognitive Theory

- Equally bad for behavioral research and cognitive neuroscience.
4. Perfect experiment!  not
What can the brain tell us about the mind?

What has the brain tell us about the mind?

Not a lot...

1. See above...
2. Weak constraints between algorithm and implementation
3. Not high priority
What have I really learned...