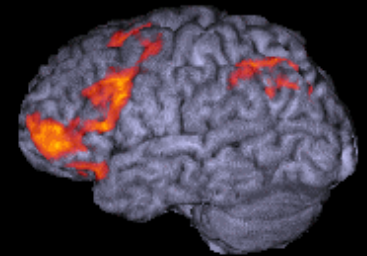


# Giftedness and the brain

## Day 2

### Session 2: 1200-1330

- What is the neural basis of creativity?
  - fMRI of fluid analogies
  - neuropsychology of creative intelligence
- How could we teach to optimise creative intelligence?



# Implications for educating (gifted) children

- intelligence involves the brain organising and reorganising information ...
- through the synchronous interconnectedness of multiple specialist functional modules ...
- coordinated by the frontal cortex through adaptive functioning

# The neural bases of intelligence

- The efficacy of modular functions, especially those enabling working memory in the lateral prefrontal cortex
- The density and distribution of grey matter (neurons) and white matter (myelination) that enable information processing
- The cytoarchitecture (gyri and sulci) of cortex in key areas
- The interconnectivity of functional modules

# Common brain functions for all acts of intelligence

- Working memory = lateral frontal cortex
- Long term memory = hippocampus + ...
- Decision making = orbitofrontal cortex
- Emotional mediation = limbic subcortex + ofc
- Sequencing of symbolic representation = fusiform gyrus + temporal lobe
- Conceptual inter-relationships = parietal lobe

# Centrality of Working Memory functions

Activity in lateral prefrontal cortex occurs in all studies of cognitive function

That is, Working Memory required in all cognition

Educate to maximise Working Memory functions

# Working memory as analogising

- establishment of categories in infancy and beyond
- categorisation of new information wrt previous experience (Piaget)
- retrieval from LTM in response to degraded input (“grandmother cell”)
- problem solving
- problem creation

# Educate to maximise Working Memory functions

- Short term memory capacity
- Accessing appropriate LTM store
- Making creative analogic connections
- Delaying closure
- Evaluating relevance

# Implications for gifted education

- promote inter- and intra-curricular interconnectedness rather than separateness
- ... through higher-order thinking applied to challenging problems requiring in-depth subject knowledge
- ... and creative analogising