Planning and Problem solving

Dean Wyatte
Fincham et al. (2002)

• Neural basis of planning
  – Issues with strategy variability between participants
  – “Sophisticated perceptual subgoaling strategy” illuminates goal-setting behavior (Anderson and Douglas, 2002)
Fincham et al. (2002)

- Tower of Hanoi
- Participants trained use optimal solution path
- Use ACT-R to predict plan formation and its time course

http://ford.ieor.berkeley.edu/
Fincham et al. (2002)

- Increase in activity with number of planning steps as predicted in model
- DLPFC, parietal areas, and premotor areas show this pattern, indicating their involvement in planning
Unterrainer et al. (2004)

• Neural basis of problem solving
  – Sources of individual differences in ability
  – Do error-related processes contribute to problem solving brain activity?
Unterrainer et al. (2004)

- Grouped participants by problem solving ability
- Tower of London task

http://www.psypress.com/groome/
Unterrainer et al. (2004)

- Problem solving ability correlated with right DLPFC and right inferior parietal (a.) during planning as well as ACC during planning on error trials (b.)
Chase and Simon (1973)

• Chunking representation in STM
  – Changes due to expertise
Chase and Simon (1973)

- Master (M), Class A (A), and beginner (B) chess players

- *Perception task*: Reconstruct a chess position while it remains visible

- *Memory task*: Reconstruct a chess position from memory

- Are chunks defined by perception task the same as chunks defined by memory task?
Chase and Simon (1973)

- **Within-glance interval**: Intervals between placement without glancing back at original position
  - Seldom exceeds 2s
- **Between-glance interval**: Intervals between placement with glance back at original position
  - M=2.8s
  - A=3.2s
  - B=3.5s
Chase and Simon (1973)

- ~2s required to recognize a chunk and encode to STM
- Intervals of < 2s correspond to a single chunk
- M’s chess expertise is characterized by speed of chunking in perception task and size of chunks in memory task
  - Also evidence for chess-specific expertise characterized by chunking according to chess relationship (e.g. attack, defense, color, piece type, proximity)