Comparative Neurocognition

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Evolution and Comparative Neurocognition

Cognitive abilities and their neural substrates as:

1. Synapomorphic (derived) characters
   - What were the selection pressures that lead to the evolution of a derived behavior/neural substrate in multiple taxa?
   - How is the behavior/neural substrate different across taxa?

2. Symplesiomorphic (ancestral) characters
   - Why has the behavior/neural substrate persisted?
   - Has the behavior and its neural substrate changed as a result of the evolutionary history of the taxa possessing it? How? Why?

The Prefrontal Cortex

Executive functions (or goal-directed behavior):
- Decision making
- Directing attention
- Planning/initiating activities
- Initiation/control of deliberate actions
- Problem solving
- Working memory
- Social behavior
- Reasoning/judgment

Working Memory & Delay Neurons

Is the PFC Uniquely Mammalian?

Gambling Pigeons

“Near-miss cell”
Hippocampal Function

**In humans:** memory consolidation (primarily episodic in nature).
- Neuropsychological case of H.M. and K.C.
- Core node of the consolidation model.

**In non-human animals:** spatial memory and navigation.
- Seat of the "cognitive-map"
- Lesions impair ability to navigate to goal locations.

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References


