Lecture 24

Correlations w/PCC seed during resting fixation

- **Default Mode Network (DMN)**: is a network of brain regions that are active when the individual is not focused on the outside world and the brain is at wakeful rest
- fMRI BOLD signals: because BOLD is measuring blood flow, then correlation may be influenced by the fact that they share blood supply

Resting state and the default mode network

- Meta-analysis of PET data during resting state 132 participants
- Not-susceptible to blood flow
- Temporal-parietal junction (TPJ) + PFC //elaborate
    - Components
        - Medial temporal lobe: memory
        - Medial prefrontal cortex: theory of mind
        - Posterior cingulate cortex: integration
        - Adjacent ventral precuneus and the medial lateral and inferior parietal cortex

Regions associated with the default network

- vMPFC
- PCC/Rsp

- IPL
- LTC
- dMPFC
- HF+

Different sorts of ‘resting’ states

- Normal wakefulness
- Hypnotic state
- Anesthesia

People with autism show more default network activity

Resting state and patient populations

- VS/UWS: vegetative state / unresponsive wakefulness syndrome
- Locked-in syndrome patient: has default network

The default network and task-related decreases in BOLD

- Resting state correlations in Bold
- Task-related decreases in BOLD
- Really slow (.1 Hz)

People who daydream show more default network activity

The default network appears to be activated in some sorts of behavioral and cognitive tasks

- Autobiographical memory
- Theory of mind
    - Predict the mental state of others

- Envisioning the future
- Moral decision making

Narrative comprehension & semantic selectivity

- Regions of the brain that are more selective for semantic concepts in this task (passive listening) happens to correlate quite highly with the default network
- PFC, LP, Posterior Precuneus
- All of the above encompass the DMN
- Overlap between semantic and default network

Semantic tuning shifts during visual search

- Two principal components: humans and vehicles
- Red: shifting toward target
- Blue: shifting away from target
    - Regions of the cortex identified in DMN

DMN: inner speech?

Resting state network consists of regions of the brain that These regions of cortex in the DMN tend to be deactivated when doing a visual spatial attention task Default areas overlap with the semantic network and are the parts that show more semantic selectivity when doing a story attention task (and also internal speech)

The default network as a collection of subnets

- The medial temporal lobe subsystems **provides**

    - information from prior experiences in the form of memories and
    - associations that are the building blocks of mental simulation
- The medial prefrontal subsystem **facilitates** the flexible use of this information during the construction of self-relevant mental simulations
- These two subsystems **converge** on important nodes of integration including the posterior cingulate cortex
- The default network may be involved in exploiting past experiences to plan for the future, navigating social interactions, and ruminating when not performing tasks