
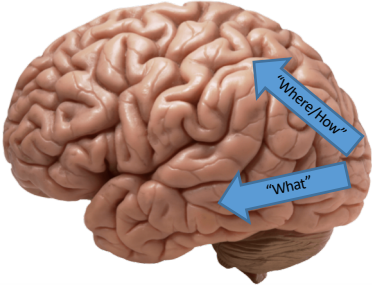
 BRIDGEWATER COLLEGE


Foundational concepts
of Neuroscience

Curtis A. Bradley, PhD.

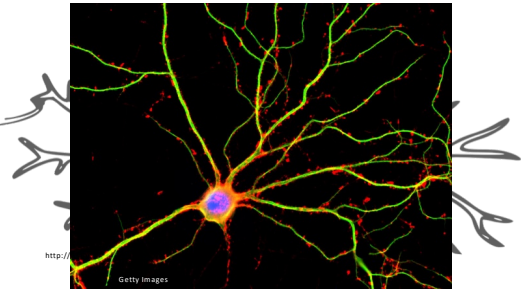
 BRIDGEWATER COLLEGE

The Brain



 BRIDGEWATER COLLEGE

The Neuron

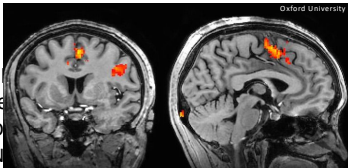


How'd we figure it out? Methods

- Animal
 - Pros: Experimental manipulation, less restrictive, easy to control
 - Cons: Structural brain differences, not humans
- Human
 - Pros: Most relevant species, have language
 - Cons: Restricted in methods, susceptible populations, lack of control, they're humans
- Converging evidence

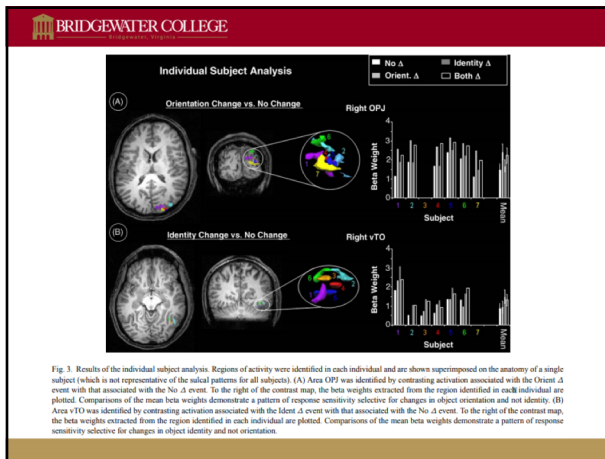
Spotlight: fMRI

- MRI
- fMRI
 - Dependent on blood oxygenated level dependent (BOLD) signal
 - Visualize changes in oxygen levels in regions
 - Voxels – changes from baseline
 - Spatial Resolution – (1-5 mm³)
 - -smaller: less signal, longer scan time



Spotlight: fMRI

- Methods
 - Procedures
 - Stimulus presentations
 - Tasks
 - Group comparisons
 - Double dissociation
 - Trial comparisons



BRIDGEWATER COLLEGE

fMRI Issues

- Feedback or feedforward? Excitatory or inhibitory?
- Blood flow isn't discontinuous like neural activity
- What Neuroscience Can and Cannot Answer (Choi 2017)
 - Reverse-Inference Errors
 - Multiple functions of brain regions
 - Group-to-Individual Inference problems
 - Group variability
 - Different situations

BRIDGEWATER COLLEGE

Tips

- News article – cite the studies
- Peer-reviewed articles whenever possible
 - Read the intro – converging evidence
- Look for the experts
- Replication is key
- Contact:
 - cbradley@bridgewater.edu
