

# Neuropsychology for School Psychologists

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The INSPiRE Neuropsychology Clinic, Oak Lawn 218  
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# Objectives



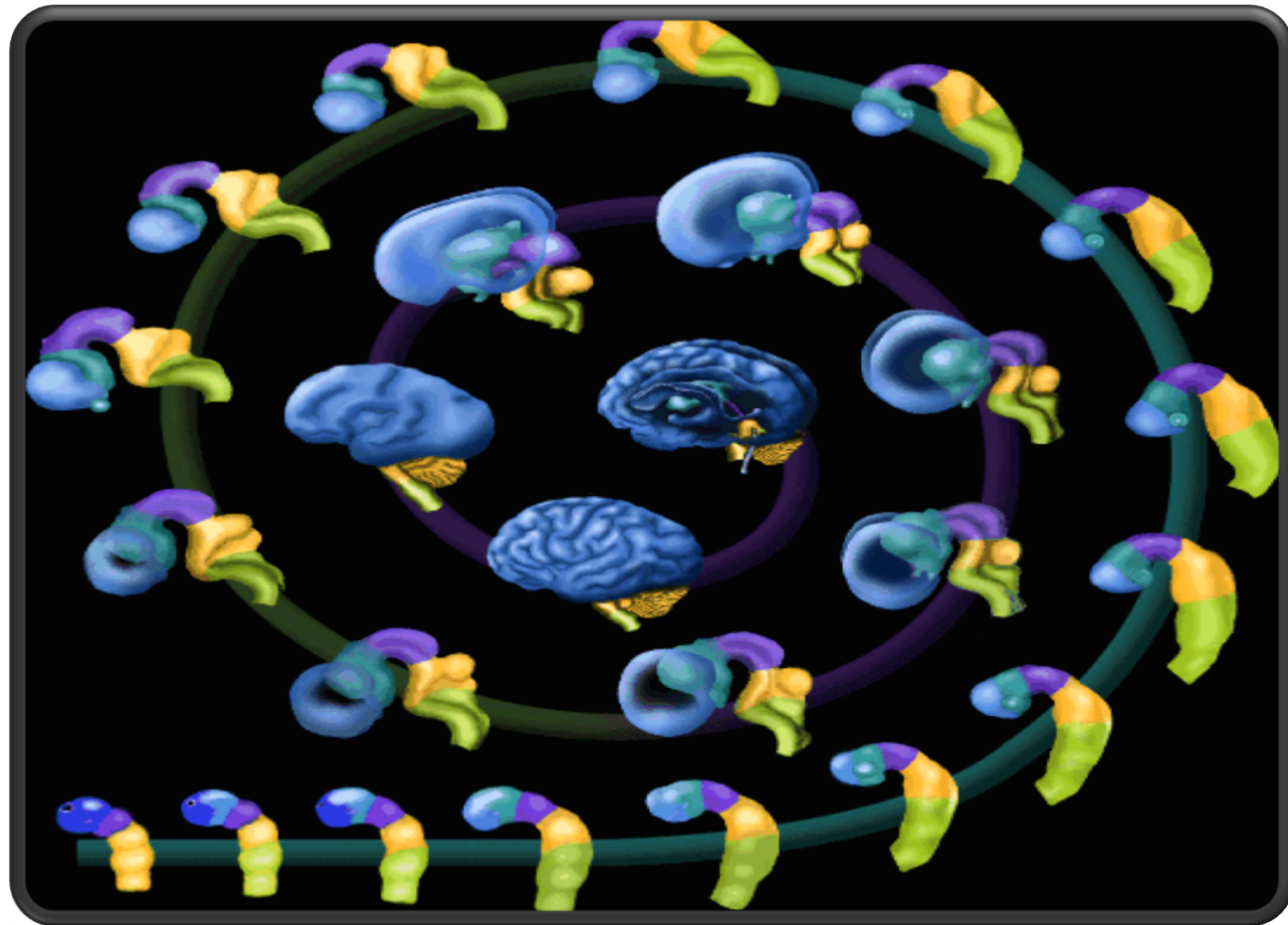
- Introduction
- Basic brain organization
  - 1. This session will help participants understand basic functional neuroanatomy of brain processes and products.
- Introduction of a neurodevelopmental approach to assessment
  - 2. This session will help participants understand brain processes and products from a developmental perspective
- Translating neuropsychology into school psychology practice
  - 3. This session will help participants understand the relationship between brain processes and academic products.
- Basic neuroanatomy and industry standards
- Introduction of a framework to use the information on Monday

# Genes & Experience



Bryan Kolb's analogy

# Brain Development



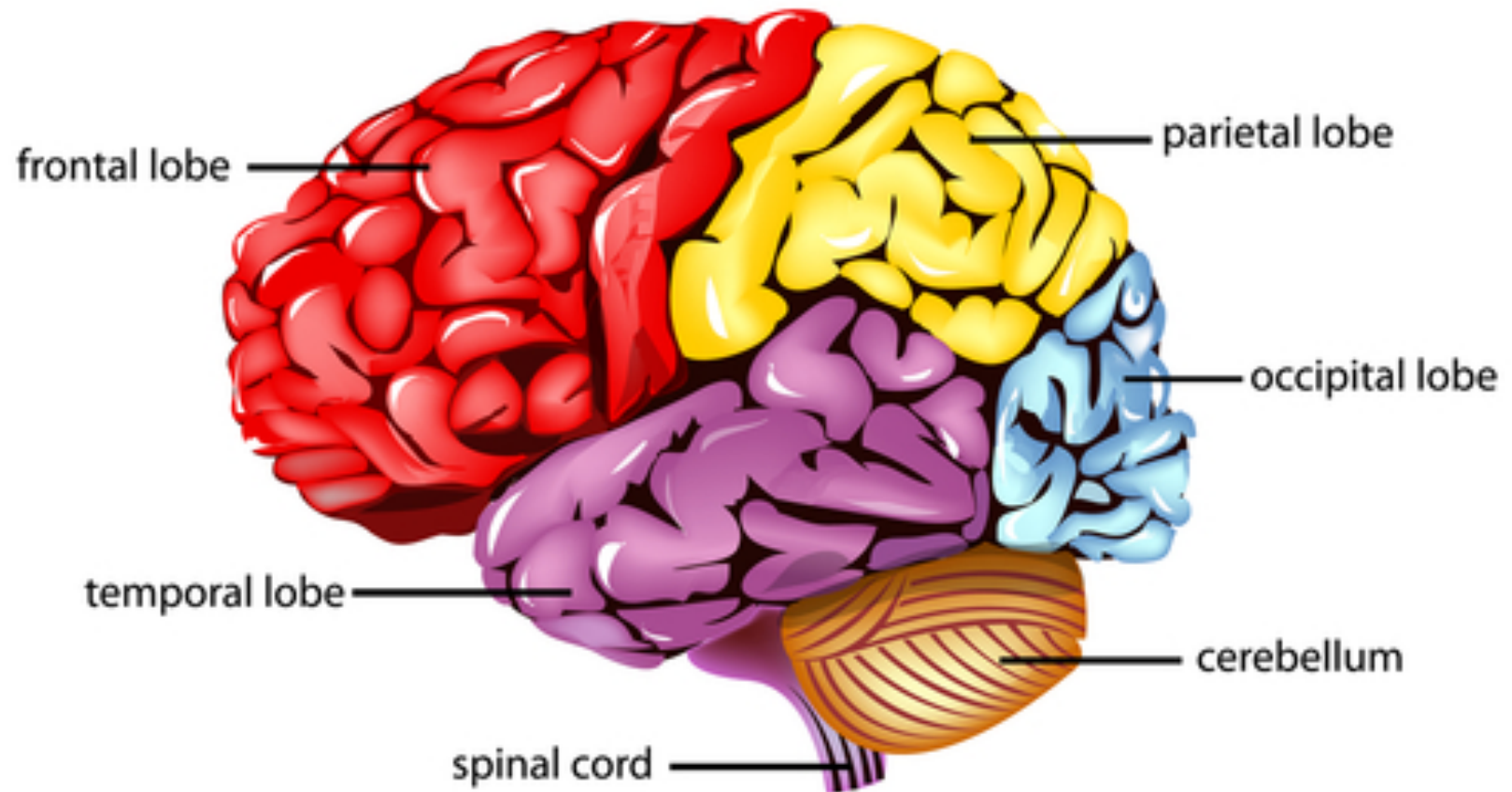


# Basic Principles of Brain Shaping

- Neuronal Group Selection (Neural Darwinism)
- Neurons that fire together wire together
- Use it or lose it
- Automaticity
- We are feeling beings who think not thinking beings who feel



# Parts of the Human Brain



Occipital Lobe



Frontal Lobe



Parietal Lobe



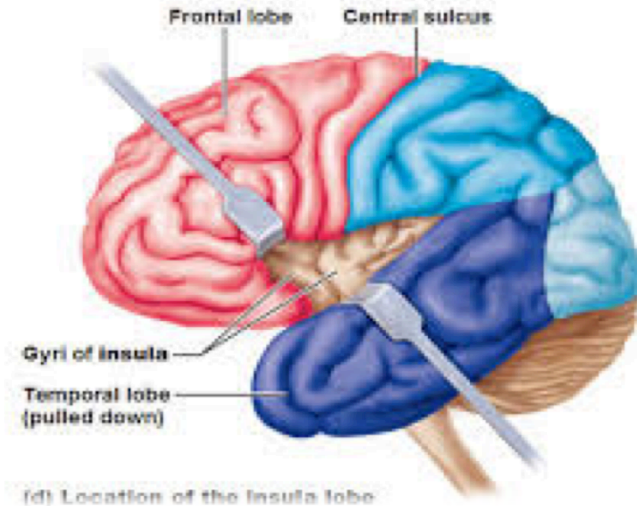
Temporal Lobe







### The Cerebral Hemispheres – one more lobe



- Antonio Damasio conducted research on the insula and proposed that most of this structure consists of somatic markers that map bodily states associated with our emotional experiences, thus giving rise to conscious feelings.
- This is the school of thought known as embodied cognition, according to which conscious rational thought cannot be separated from emotions and their incarnation in the rest of the body.

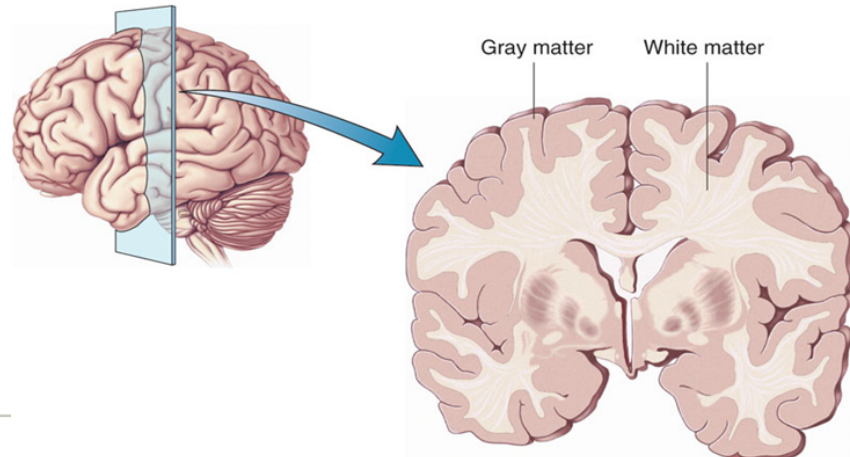
# Brodmann Area Brain Map





# Grey & White Matter

- Grey matter—closely packed neuron cell bodies contains specialized regions that involved in muscle control, sensory perceptions such as seeing, hearing, memory, emotions & speech
- White matter—neuronal tissue containing long myelinated axons situated between brainstem & cerebellum---relay of information from the body to the cerebral cortex

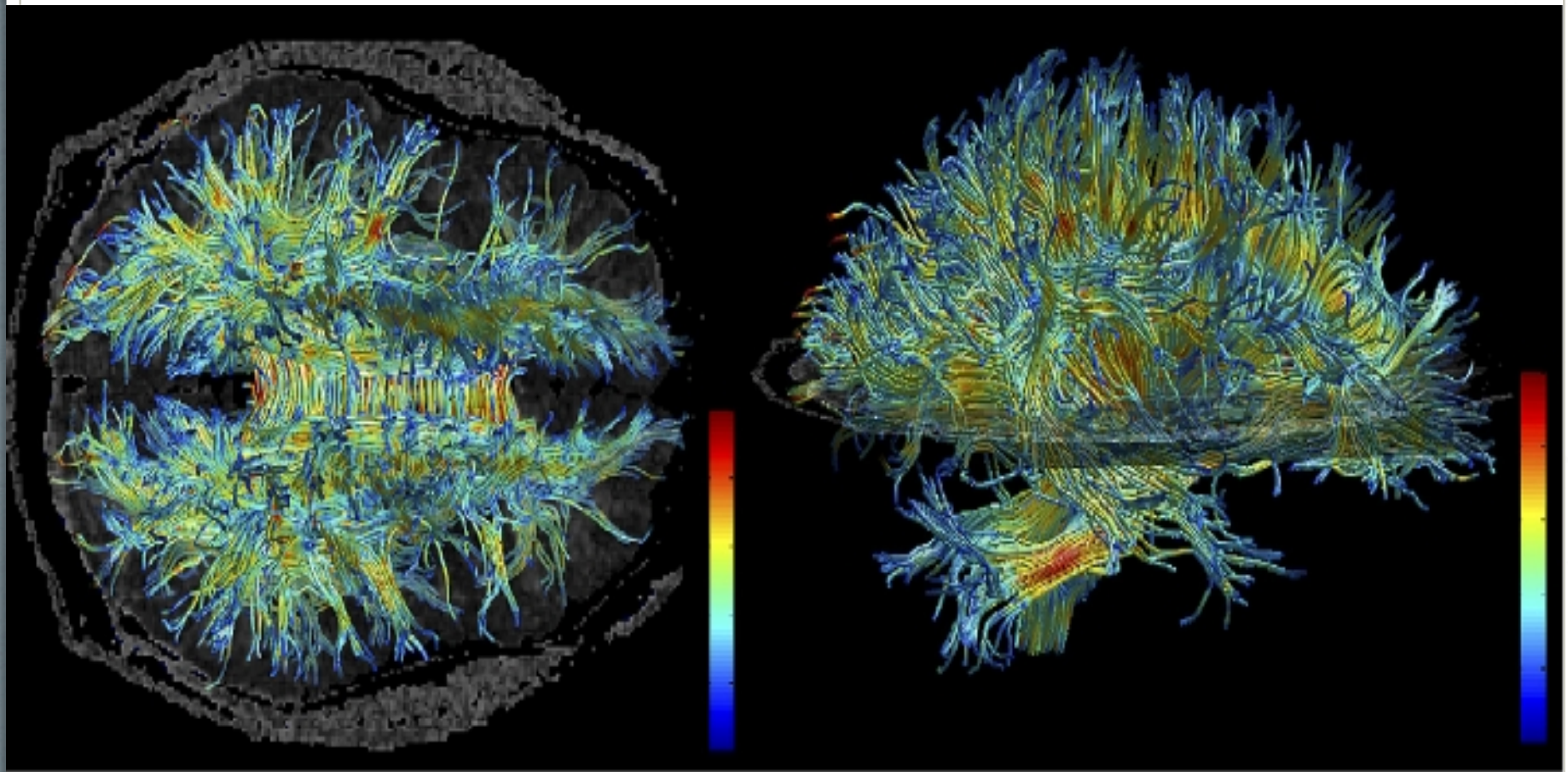


# The Human Connectome Project

<http://www.humanconnectomeproject.org/>

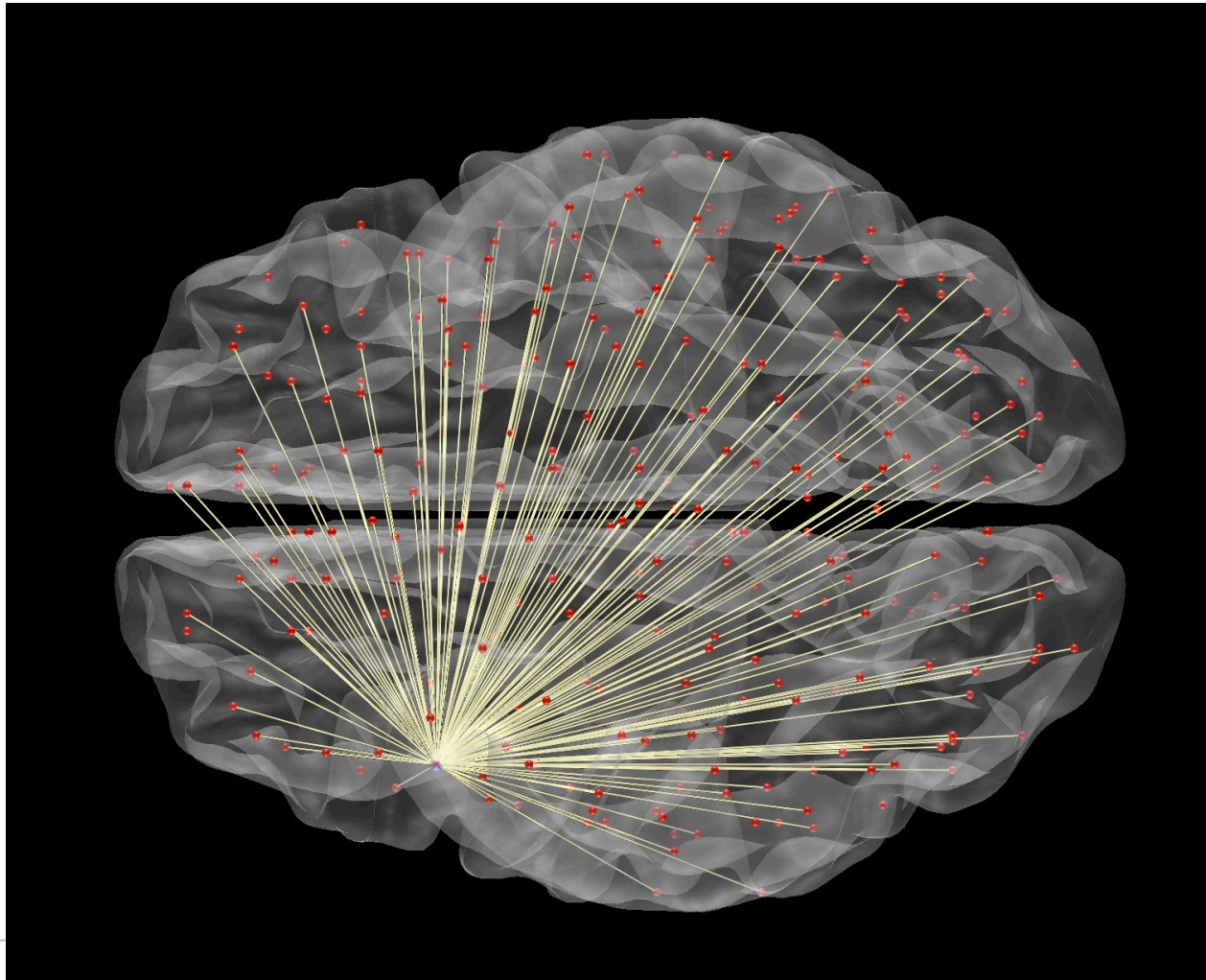




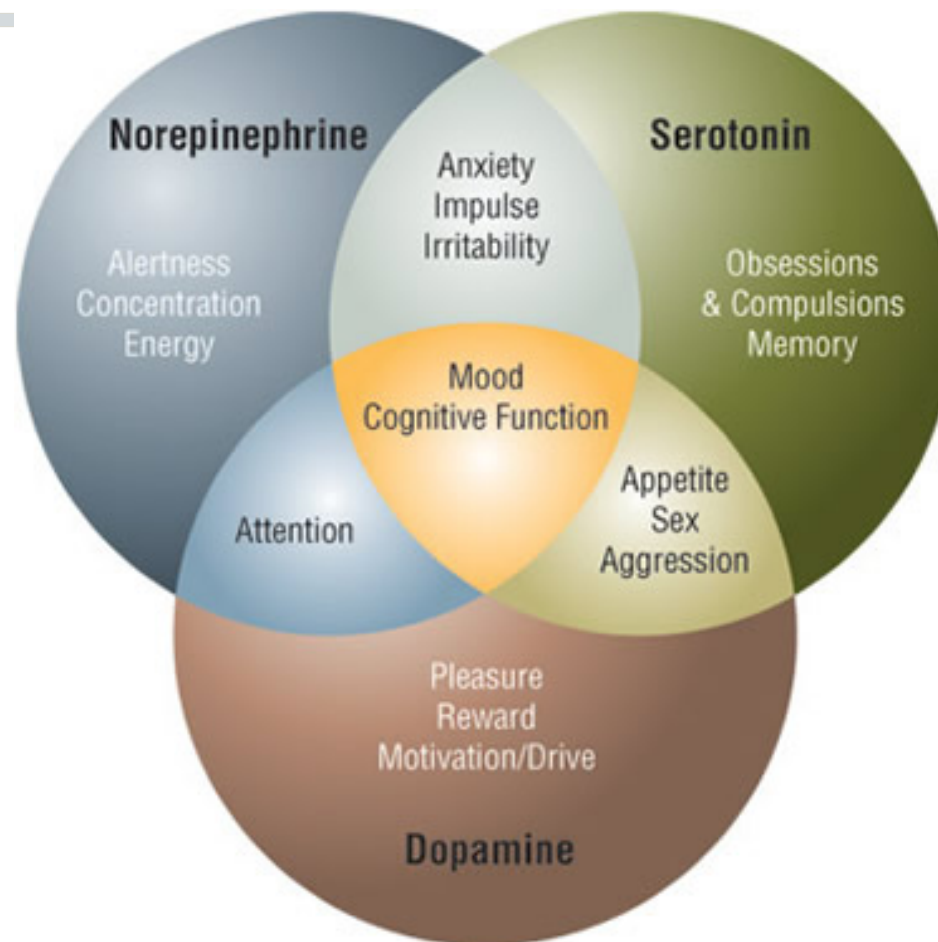


Kubicki M., McCarley R.W., Westin C-F., Park H-J., Maier S.E., Kikinis R., Jolesz F.A., Shenton M.E. A review of diffusion tensor imaging studies in schizophrenia. *J Psychiatr Res.* 2007 Jan-Feb;41(1-2):15-30. PMID: 16023676. PMCID: PMC2768134.

# Speech Connectome



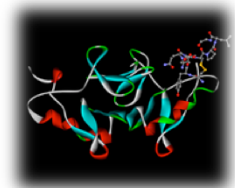
# Neurotransmitters





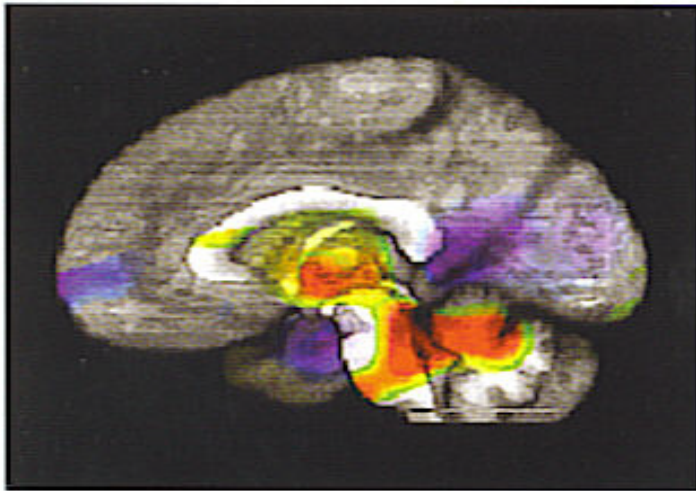
# Neuromodulators/hormones

- Neurotransmitter---specialized junctions between neurons
- Neuromodulator—messenger released from neuron that affects groups of neurons through secondary messengers and has long-lasting effects
  - e.g. histamine, norepinephrine
- Neurohormone—released by neurons to distant peripheral targets
  - E.g. oxytocin, growth hormone, releasing hormones

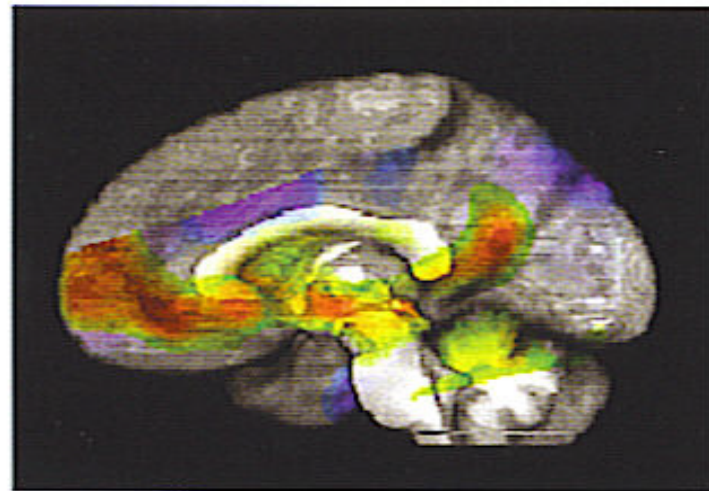


Damasio, 2007

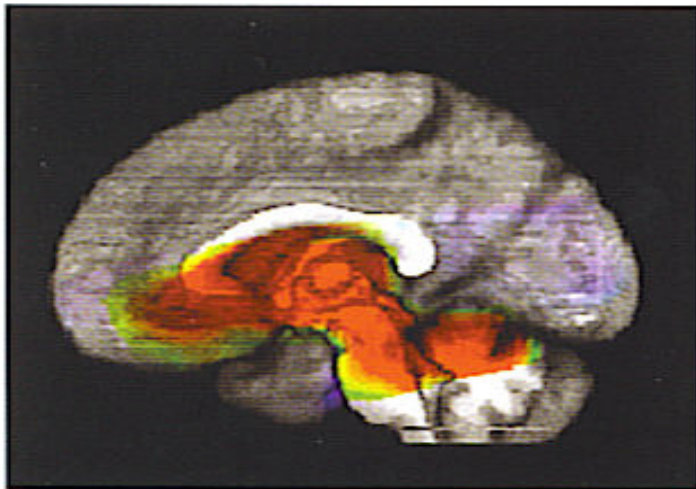
# PET Scans of 4 emotions



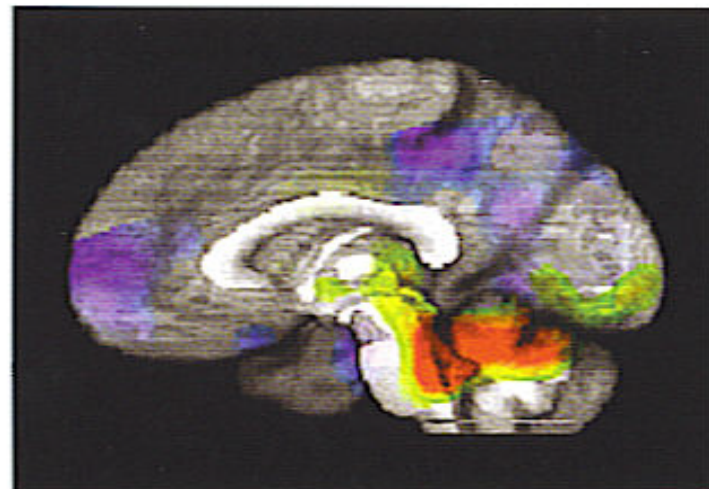
Anger



Happiness



Sadness



Fear

# Functional Brain Map





Occipital Lobe

SEE



Frontal Lobe

Executive/motor



Parietal Lobe

SENSE/feel



Temporal Lobe

HEAR/Language

