Depression:
Voluntary or involuntary?
(Involuntary) Emotional Cognition in Depression

- Inward-focused attention
- Difficulty with cognitive reappraisal & emotion regulation
- Mood-congruent cognitive bias
  - Interpretation bias
  - Memory bias
Functional Neuroanatomy of Emotion
Functional Neuroanatomy of Emotion

Dorsolateral PFC
Orbitofrontal cortex
Ventromedial PFC
Anterior cingulate cortex
Insula
Amygdala
Hippocampus
Ventromedial PFC
Dorsolateral PFC
Anterior cingulate cortex
self-related processing and anterior cortical midline in depression

Anatomical projections from PFC to amygdala in rhesus monkeys

Loosening of regulatory control of PFC over amygdala

Depressogenic cognitions:
The mental gutter

THIS WAS THE SECOND GIRL WHO TURNED ME DOWN. I WILL NEVER SUCCEED IN FINDING A GIRL!
Psychotherapeutic Learning: Practice & Repetition

- 1. Notice automatic thoughts and habits
- 2. Self-validation
- 3. Apply new skill

Changing behavioral and *mental* habits requires PRACTICE

- Insight alone is only somewhat useful
- Psychotherapeutic learning requires repeated practice of new behaviors and/or cognitions
Practice, Repetition, & Learning

• Behavior-induced structural brain changes occur
• “Behavior” refers to thought as well as action
• Building new neural circuits requires REPETITION of the new behavior
• Does this apply to CBT and other forms of psychotherapy?
• Do my depressed patients believe that practicing behavioral and cognitive coping affects neurobiological aspects of their depression?
• How about synergistic effects with medical treatment for depression?
Treatment modalities for depression stimulate neuroplastic mechanisms

- Psychotherapy
- Antidepressant medications
- Somatic & neuromodulatory techniques
  - electroconvulsive therapy
  - deep brain stimulation
- Other
  - physical exercise
  - omega 3 fatty acids
Antidepressants alter many neuroplastic mechanisms that underlie “cells that fire together wire together”

From Castren & Hen (2013) *Trends in Neurosciences*.
In the absence of extinction training, fluoxetine (Prozac) did not alter the amount of fear behavior (freezing) in mice. Rather, fluoxetine added durability to extinction learning.
“The pharmacological effects of antidepressants need to be combined with psychological rehabilitation to reorganize networks rendered more plastic by the drug treatment.”

Karpova et al. (2011) *Science*. 
Increase in PFC-amygdala functional connectivity with 6 wks sertraline

Therapeutic learning in depression

• Effective treatments for depression stimulate neuroplastic mechanisms

• Biologically-informed behavioral interventions
  – Promote therapeutic learning
  – “Sculpt” neural circuits
  – Importance of practice and repetition