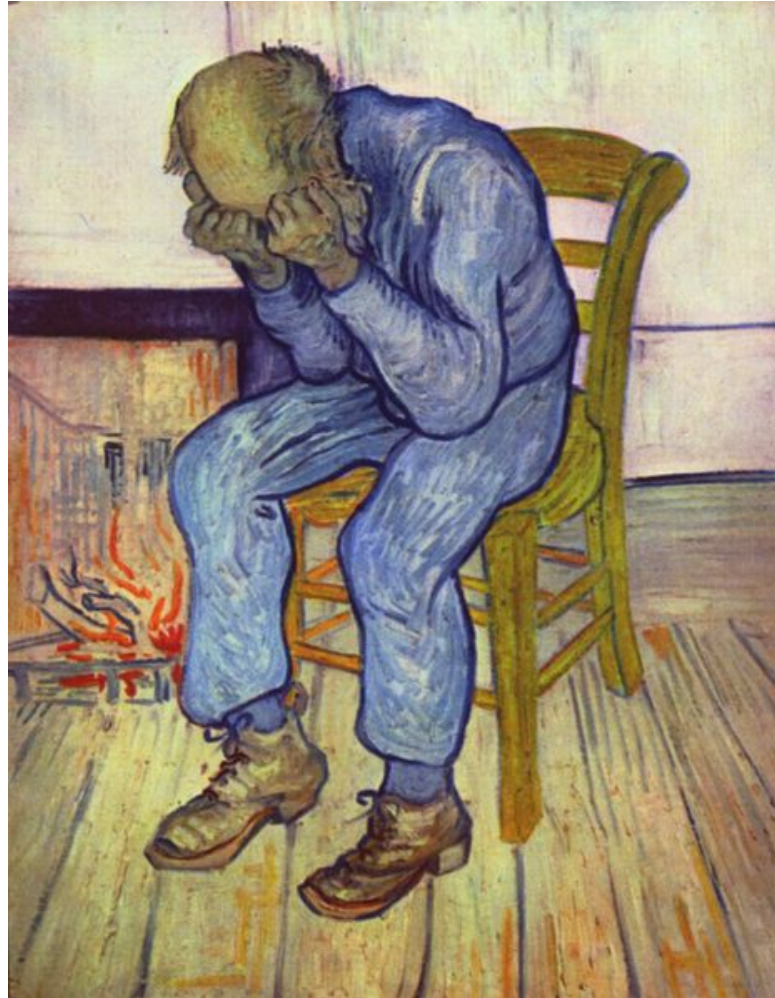


# Depression: Voluntary or involuntary?

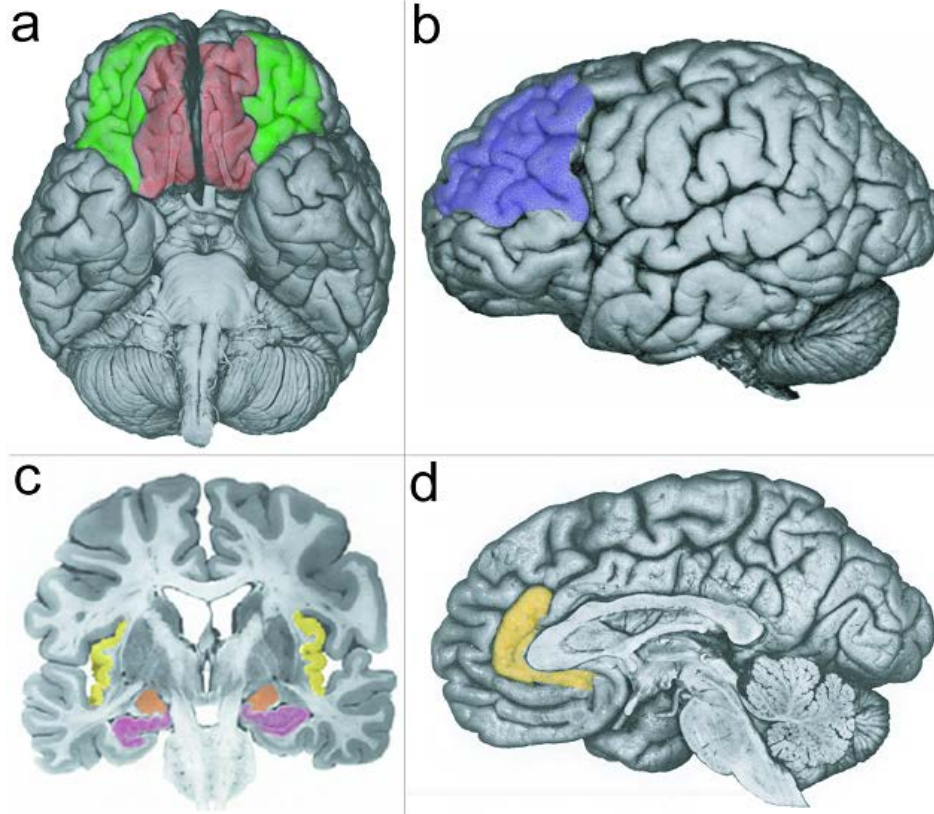


# *(Involuntary)* Emotional Cognition in Depression

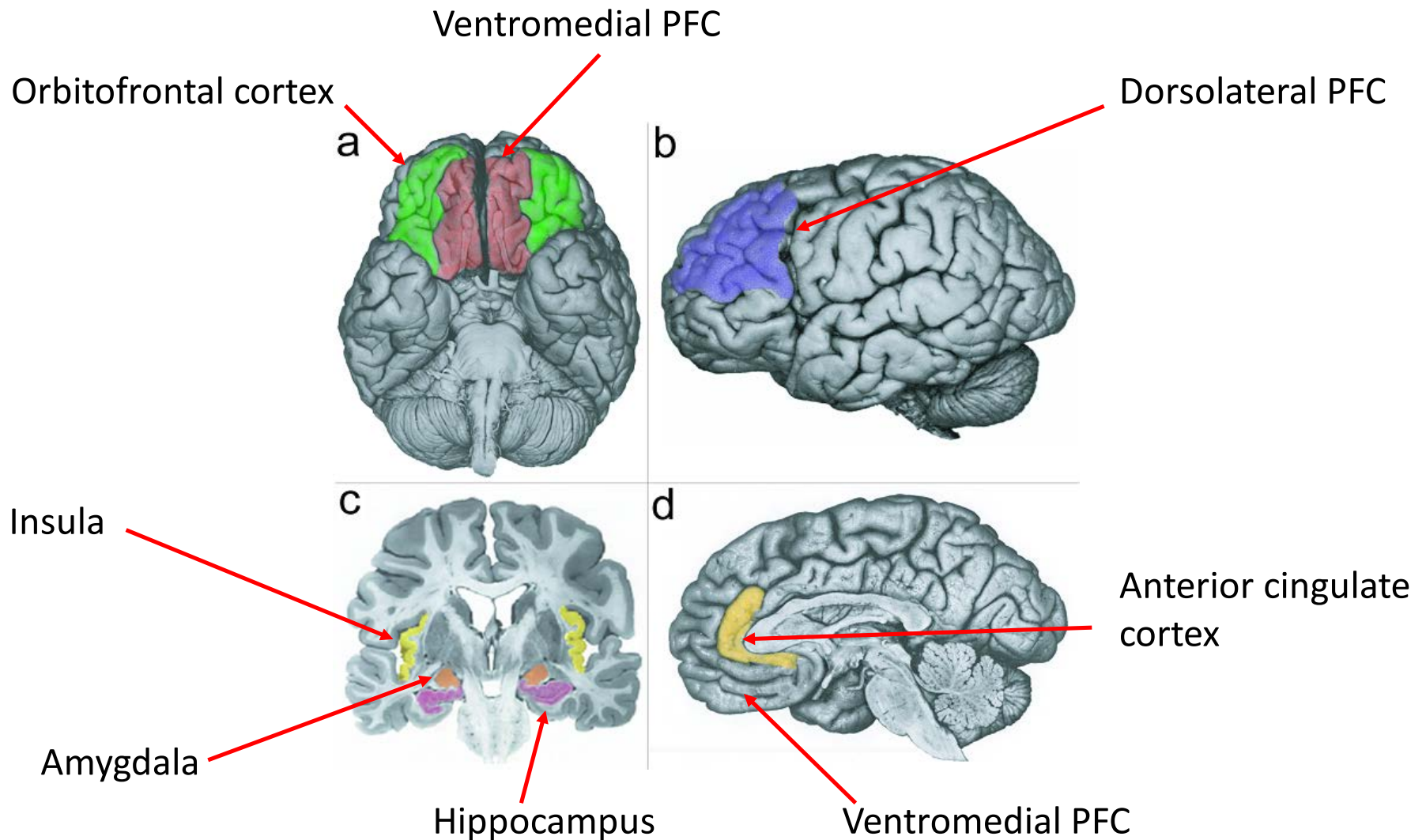


- Inward-focused attention
- Difficulty with cognitive reappraisal & emotion regulation
- Mood-congruent cognitive bias
  - Interpretation bias
  - Memory bias

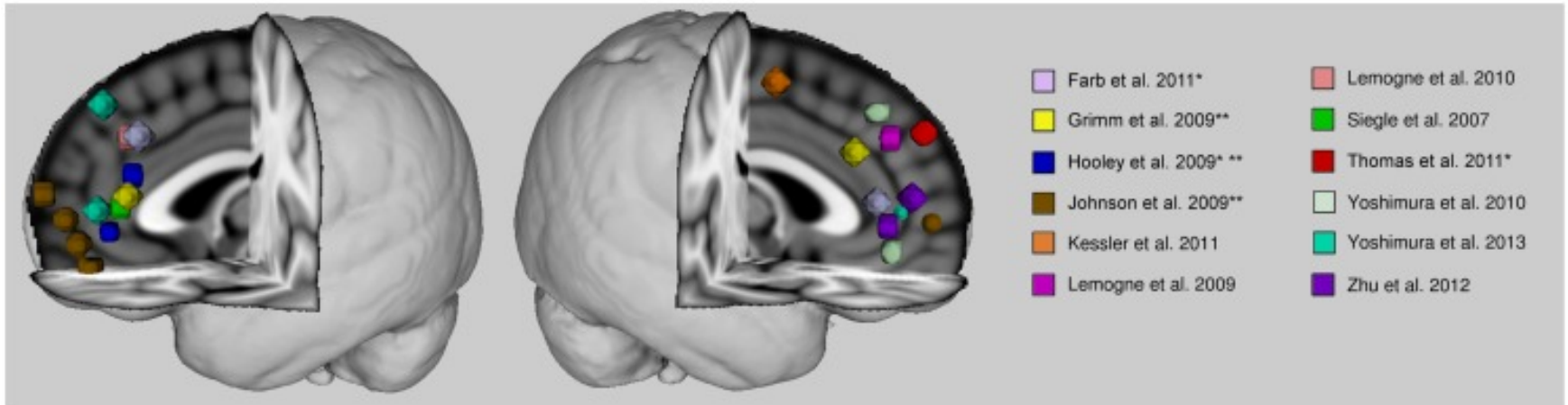
# Functional Neuroanatomy of Emotion



# Functional Neuroanatomy of Emotion



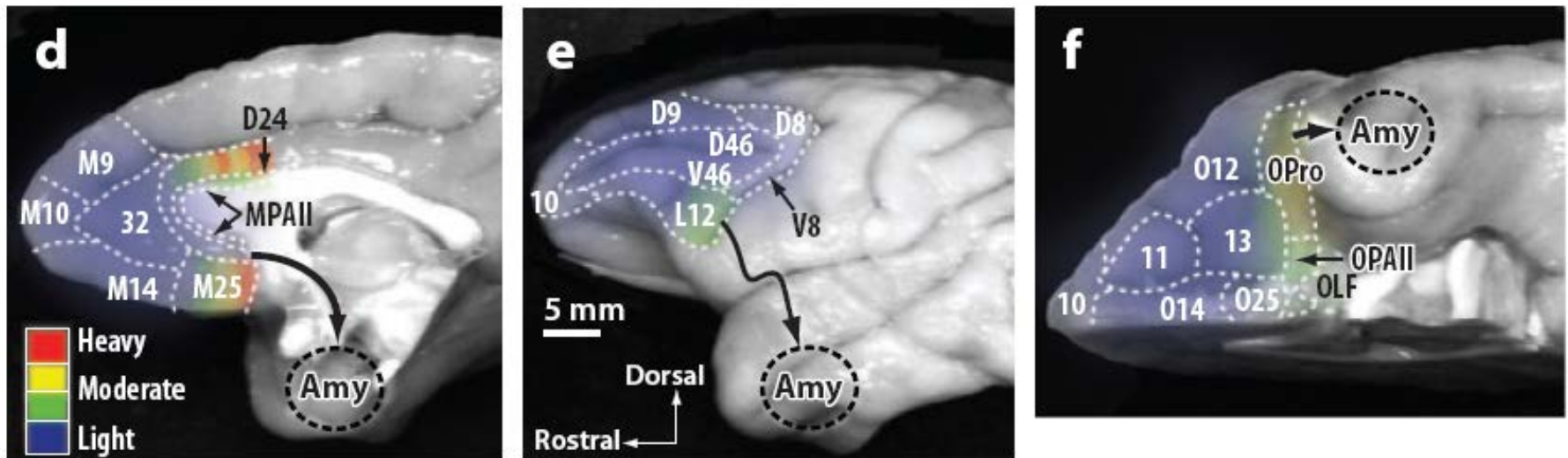
# self-related processing and anterior cortical midline in depression



Nejad, Fossati, & Lemogne (2013) Front Hum Neurosci.



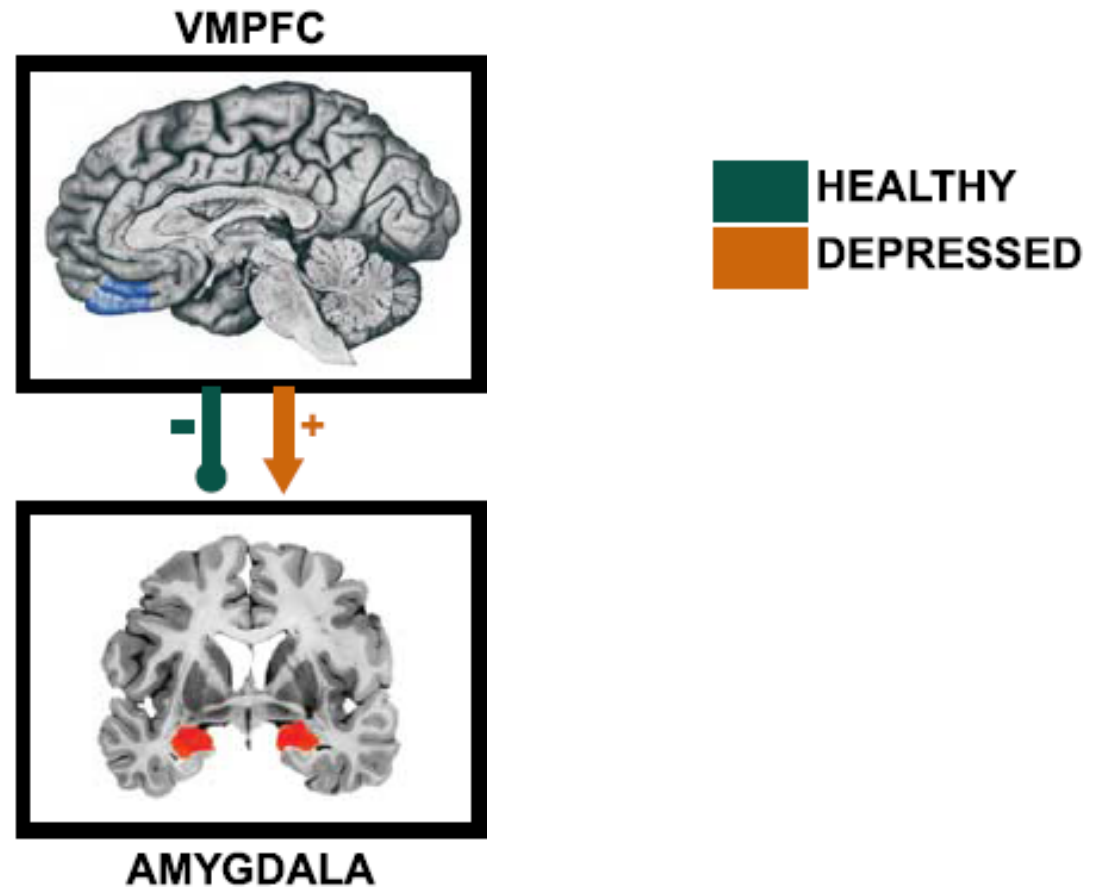
# Anatomical projections from PFC to amygdala in rhesus monkeys



Ghashghaei, HT (2007) Neuroimage.

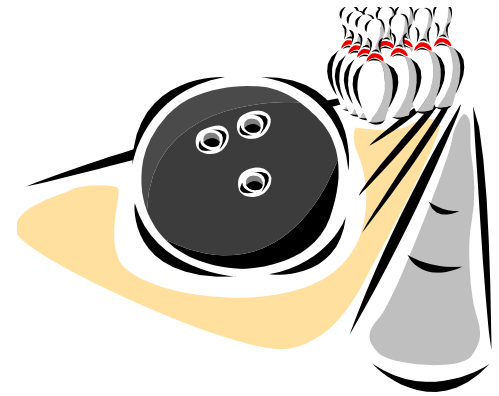
Also see Salzman & Fusi (2010) Annual Review Neurosci.

# Loosening of regulatory control of PFC over amygdala



Johnstone et al. (2007) *J Neuroscience*.

# Depressogenic cognitions: The mental gutter

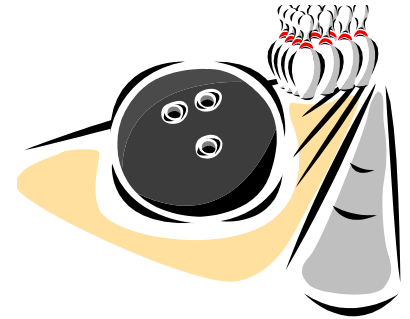


THIS WAS THE SECOND GIRL WHO TURNED ME  
DOWN. I WILL NEVER SUCCEED IN FINDING A  
GIRL! \_\_\_\_\_



# 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



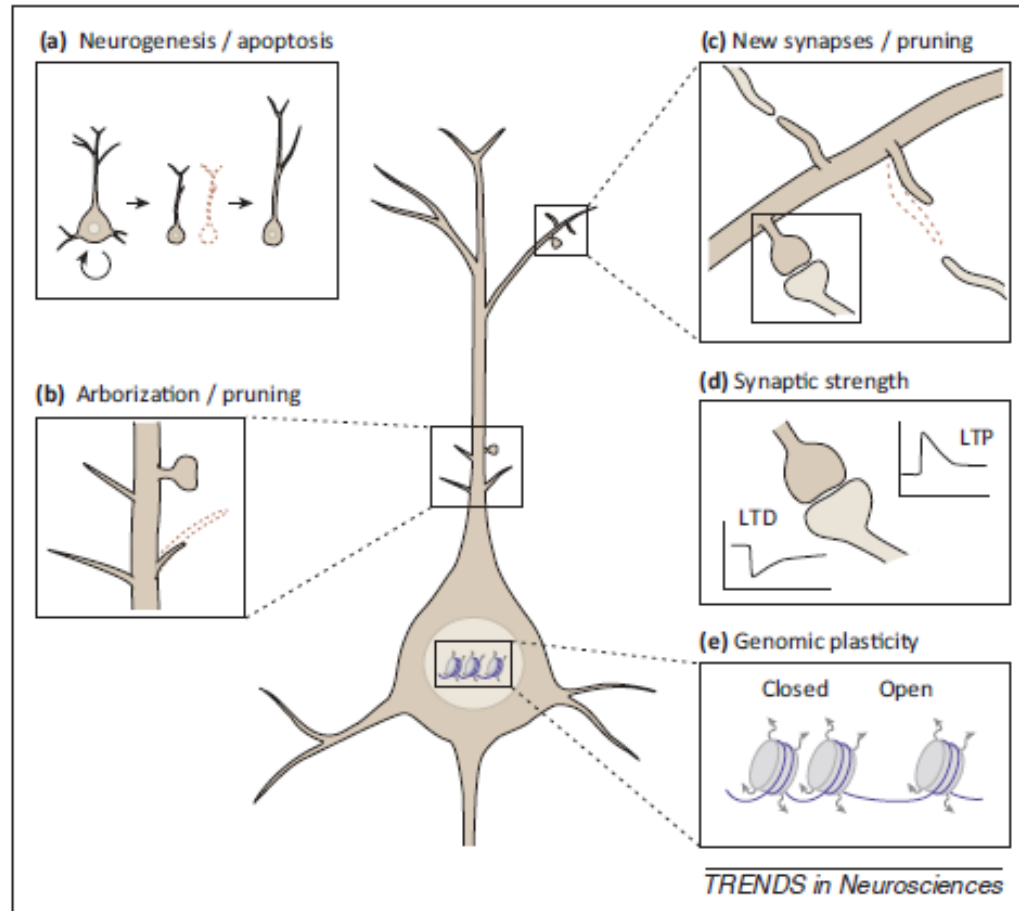
# Practice, Repetition, & Learning

- 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

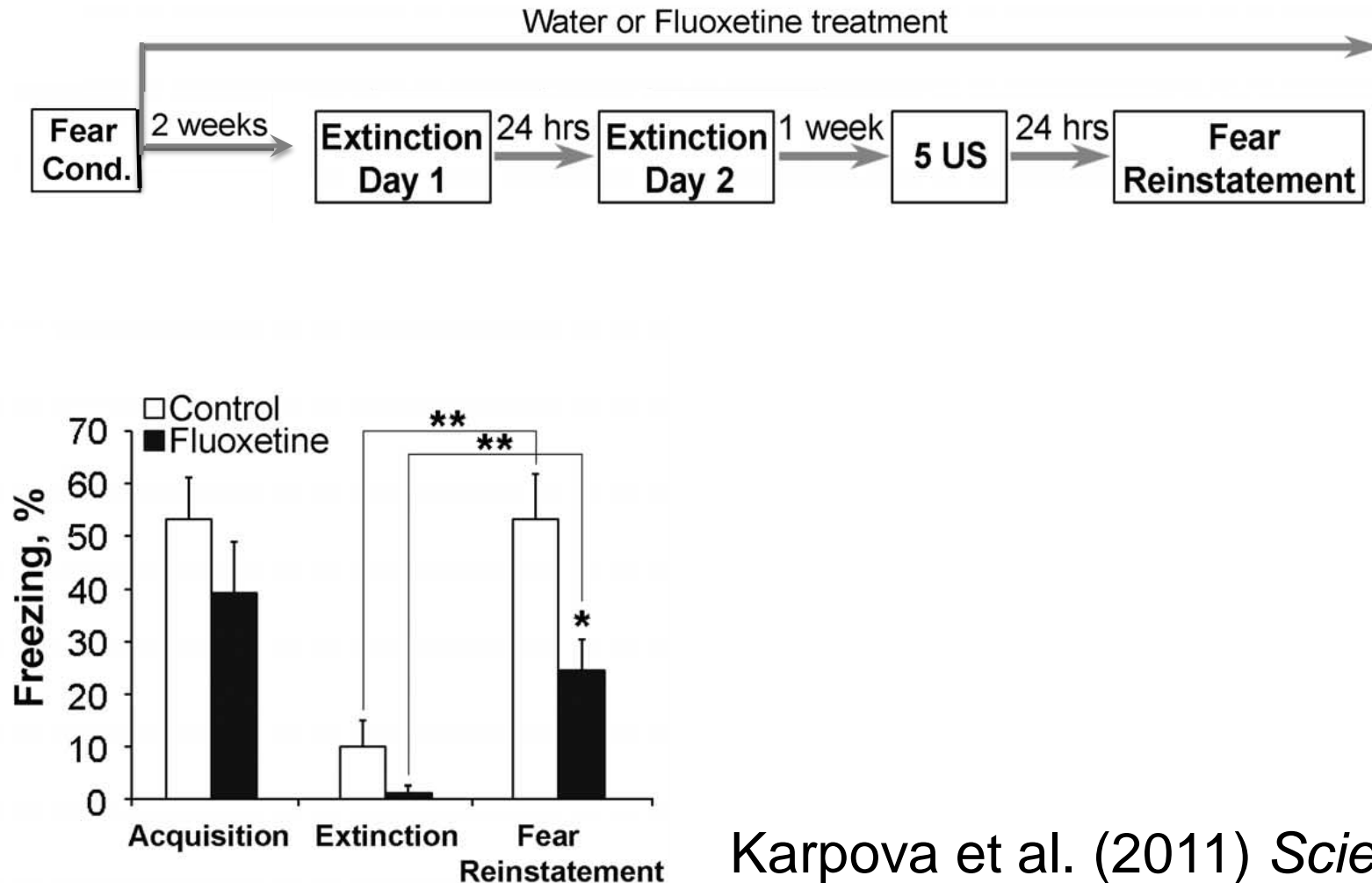
- Psychotherapy
- Antidepressant medications
- Somatic & neuromodulatory techniques
  - electroconvulsive therapy
  - deep brain stimulation
- Other
  - physical exercise
  - omega 3 fatty acids

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.



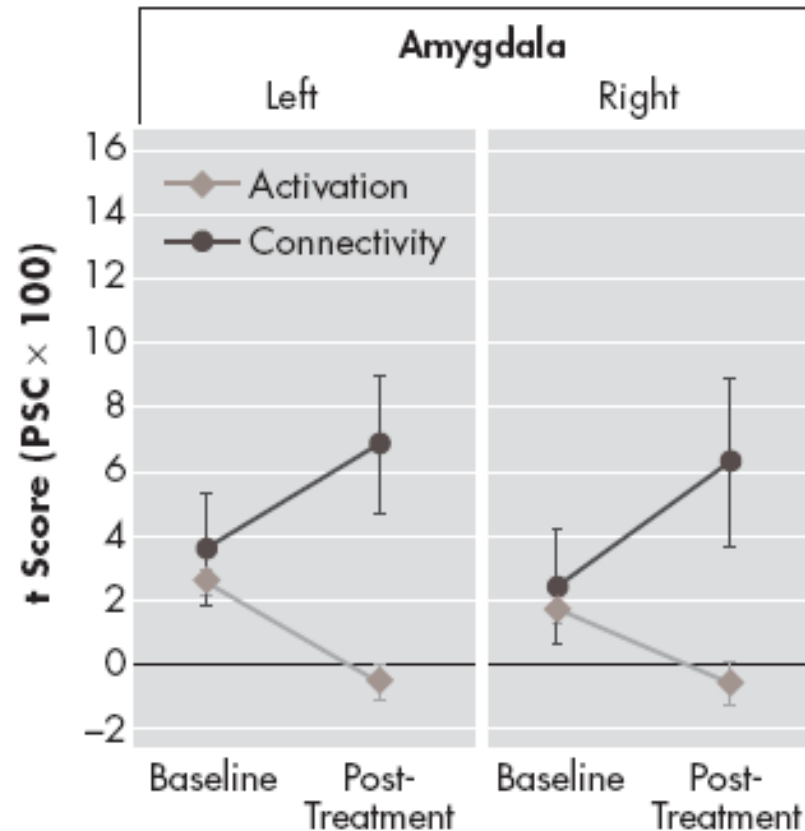
Karpova et al. (2011) *Science*.

“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



Anand, et al. (2007) *J Neuropsychiatry & Clin Neurosci.*

# 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