

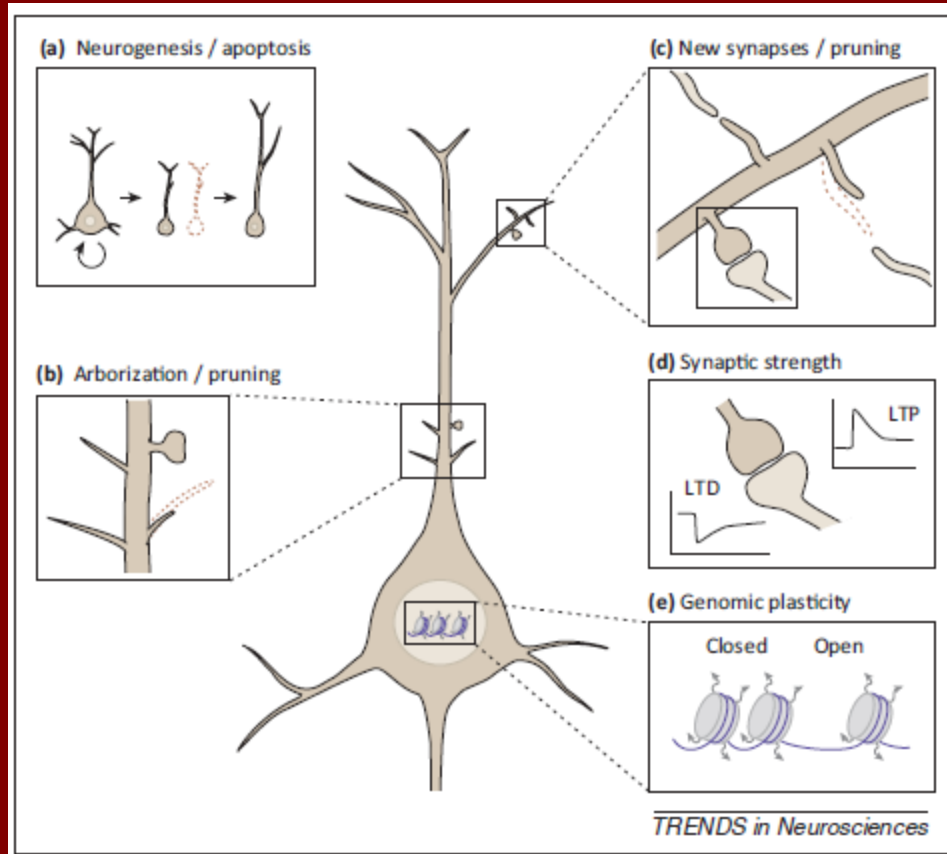
# Therapeutic learning in depression

- Effective antidepressants stimulate neuroplastic mechanisms
- Biologically-informed behavioral interventions
  - Promote therapeutic learning
  - “Sculpt” neural circuits
  - Importance of practice and repetition

# Treatment modalities for depression stimulate neuroplastic mechanisms

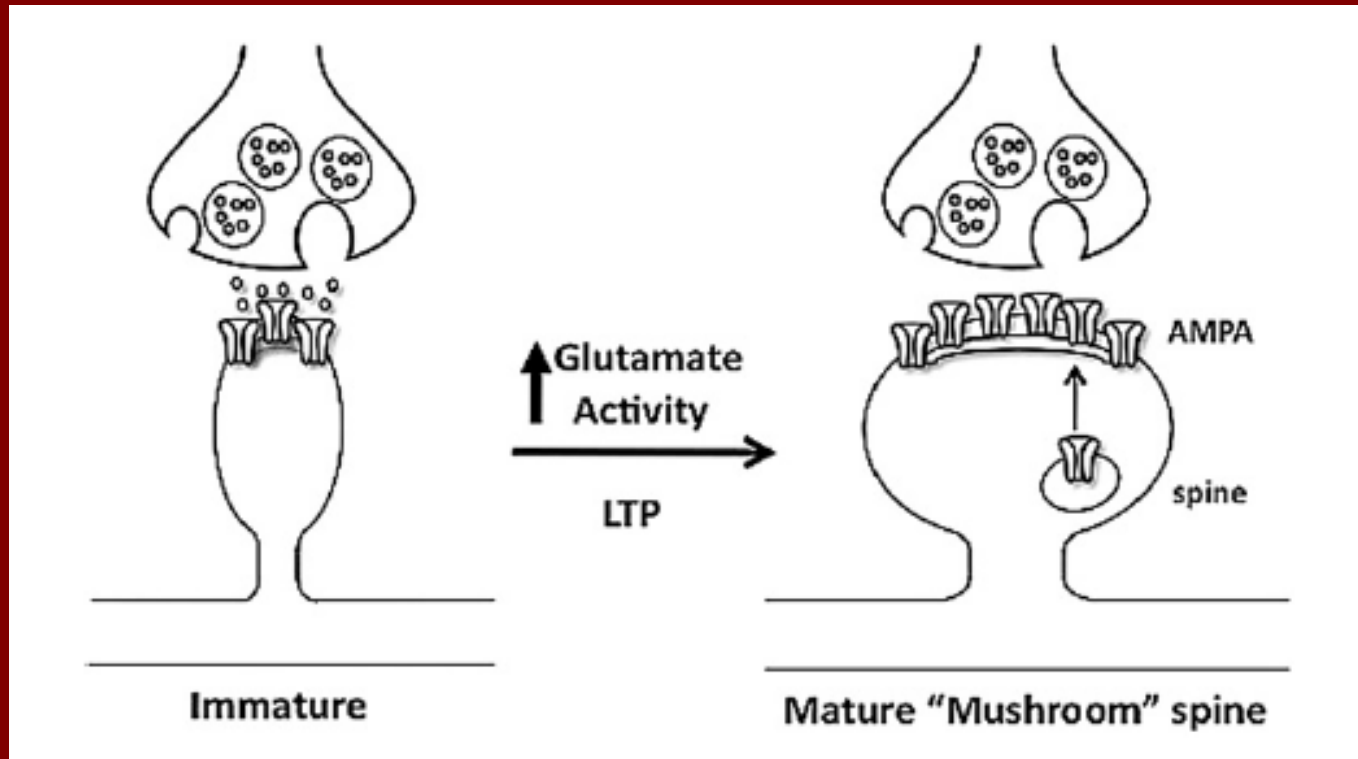
- Psychotherapy
- Antidepressant medications
  - modulation of serotonergic, noradrenergic and/or dopaminergic systems
  - (ketamine)
- Somatic & neuromodulatory techniques
  - electroconvulsive therapy
  - deep brain stimulation
- Other
  - physical exercise
  - omega 3 fatty acids

# Antidepressants alter many neuroplastic mechanisms



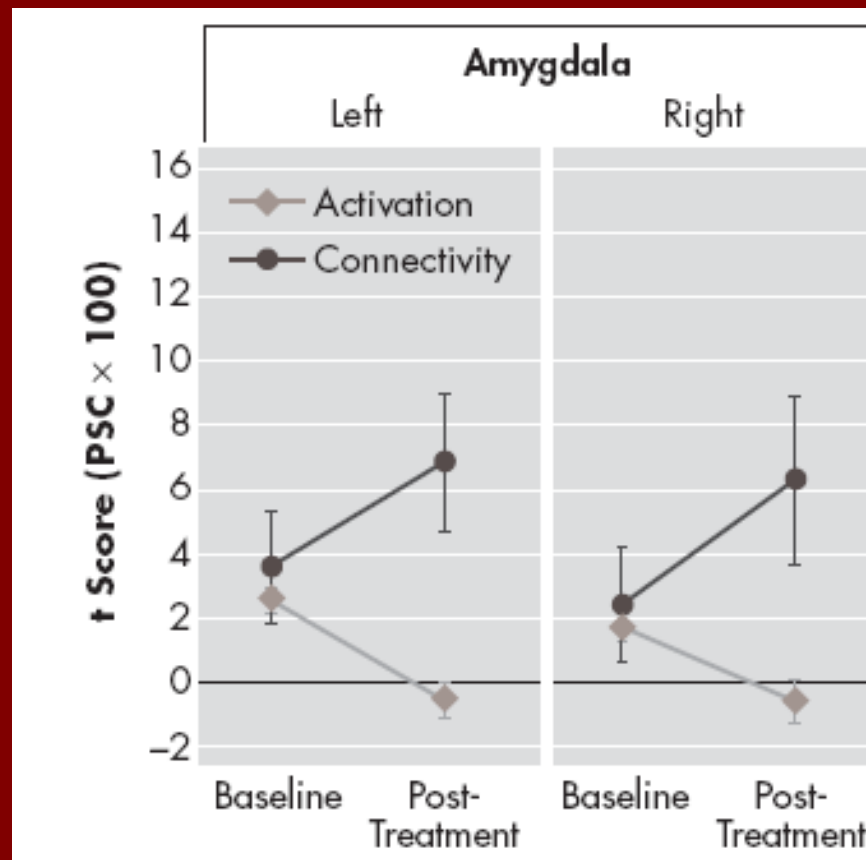
From Castren & Hen (2013) *Trends in Neurosciences*.

# Ketamine increases synaptic and structural plasticity



Duman et al. (2012) *Neuropharmacology*.

# Increase in PFC-amygdala functional connectivity with 6 wks sertraline



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

Do these neural effects  
of antidepressants change the person's  
behavior and subjective experience?

“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*.

# Practice & Repetition

- Behavior-induced structural brain changes occur
- Building new neural circuits requires REPETITION of the new behavior
- “Behavior” refers to thought as well as action
- How does this apply to CBT?

# Emotional cognition (mental ruts) in depression

- Inward-focused attention
- Rumination
- Difficulty with cognitive reappraisal & emotion regulation
- Negative cognitive bias
  - Interpretation bias
  - Memory bias

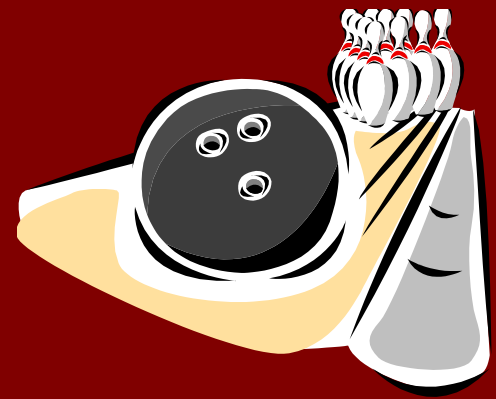




# Depressogenic cognitions: The mental gutter

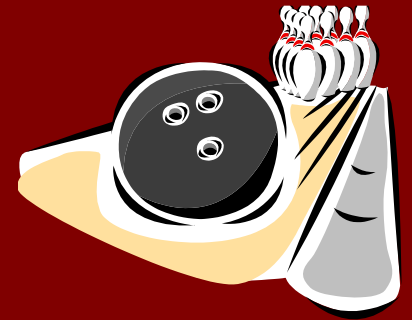


THIS WAS THE SECOND GIRL WHO TURNED ME  
DOWN. I WILL NEVER SUCCEED IN FINDING A  
GIRL!



# Cognitive Behavioral Therapy: Practice & Repetition

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



## Changing behavioral and *mental* habits requires PRACTICE

- Insight re: the automatic thought or habit is not particularly useful unless the new skill is practiced repeatedly



# Depression: Voluntary or involuntary?



# Therapeutic Learning & Neuroplasticity

- Insight not enough; must practice new thoughts & behaviors
- Medication may promote neuroplasticity in crucial neural circuit, but functional adaptation may require practicing new thoughts/behaviors