Neuroplasticity

What:

- ***Internal effects*** (e.g., recovering from an injury due to stroke, stress hormones, psychoactive drugs)

- ***External effects*** (e.g., behavioral treatment, task learning and sensory-motor experiences, cortical stimulation).

How?

- It is achieved by neuronal morphology, glia, vascular, and metabolism changes.

- It involves morphological dendritic changes and adaptations in the number of synapses, synapse size, and metabolic activity (Fridriksson & Smith, 2016).

Outcome?

- It triggers structural changes, such as modifying existing connections or generating new circuits at the neuronal level.
- Two types: Adaptive (Improve) and Maladaptive (Worsen) changes

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Behavioral Therapy - Melodic Intonation Therapy (MIT)

- The target is the right hemisphere, which is associated with the melody.
- Diffusion Tensor Imaging (DTI) was used to explain changes in the volume and number of fibers that interconnect brain areas involved in language
- Intense, long-term MIT leads to remodeling of the right Arcuate Fasciculus and may provide an explanation for the sustained therapy effects.

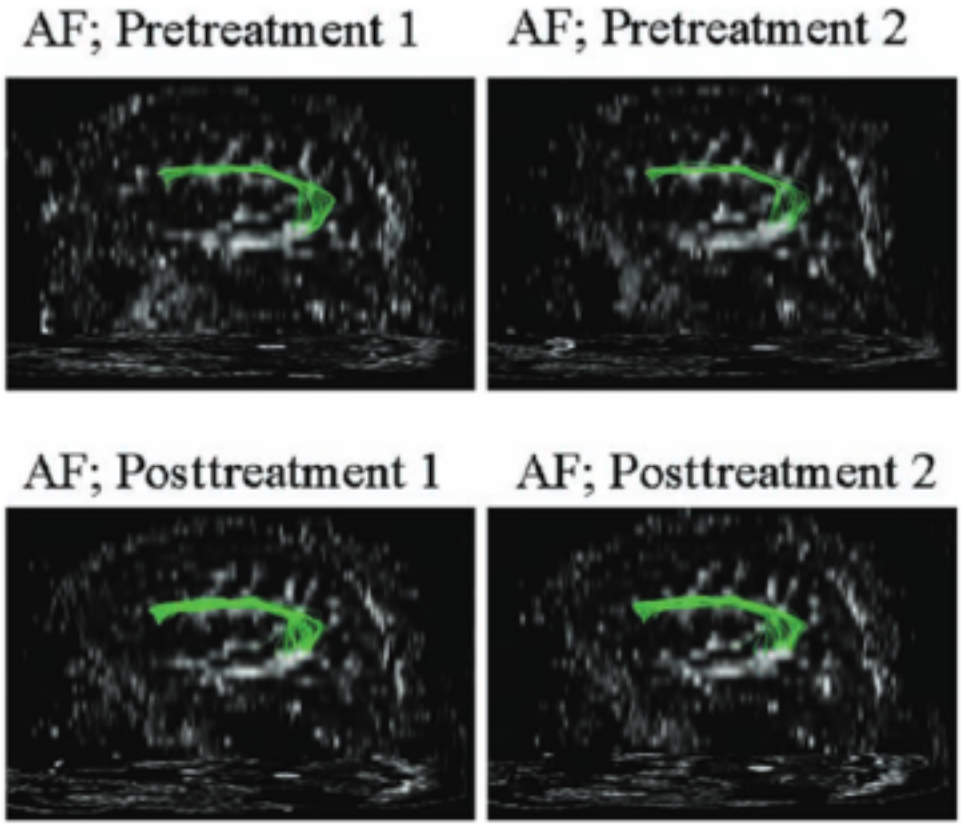

Figure 2. Right AF in one patient with two scans before therapy and two scans after 75 sessions of melodic intonation therapy. The scan-to-scan variability is minimal before therapy and a clear difference in the number of fibers and fiber volume can be seen in comparing the AF before and after therapy. (In color in *Annals* online.)

Schlaug, G., Marchina, S., & Norton, A. (2009). Evidence for plasticity in white-matter tracts of patients with chronic Broca's aphasia undergoing intense intonation-based speech therapy. *Ann N Y Acad Sci*, *1169*, 385-394. https://doi.org/10.1111/j.1749-6632.2009.04587.x