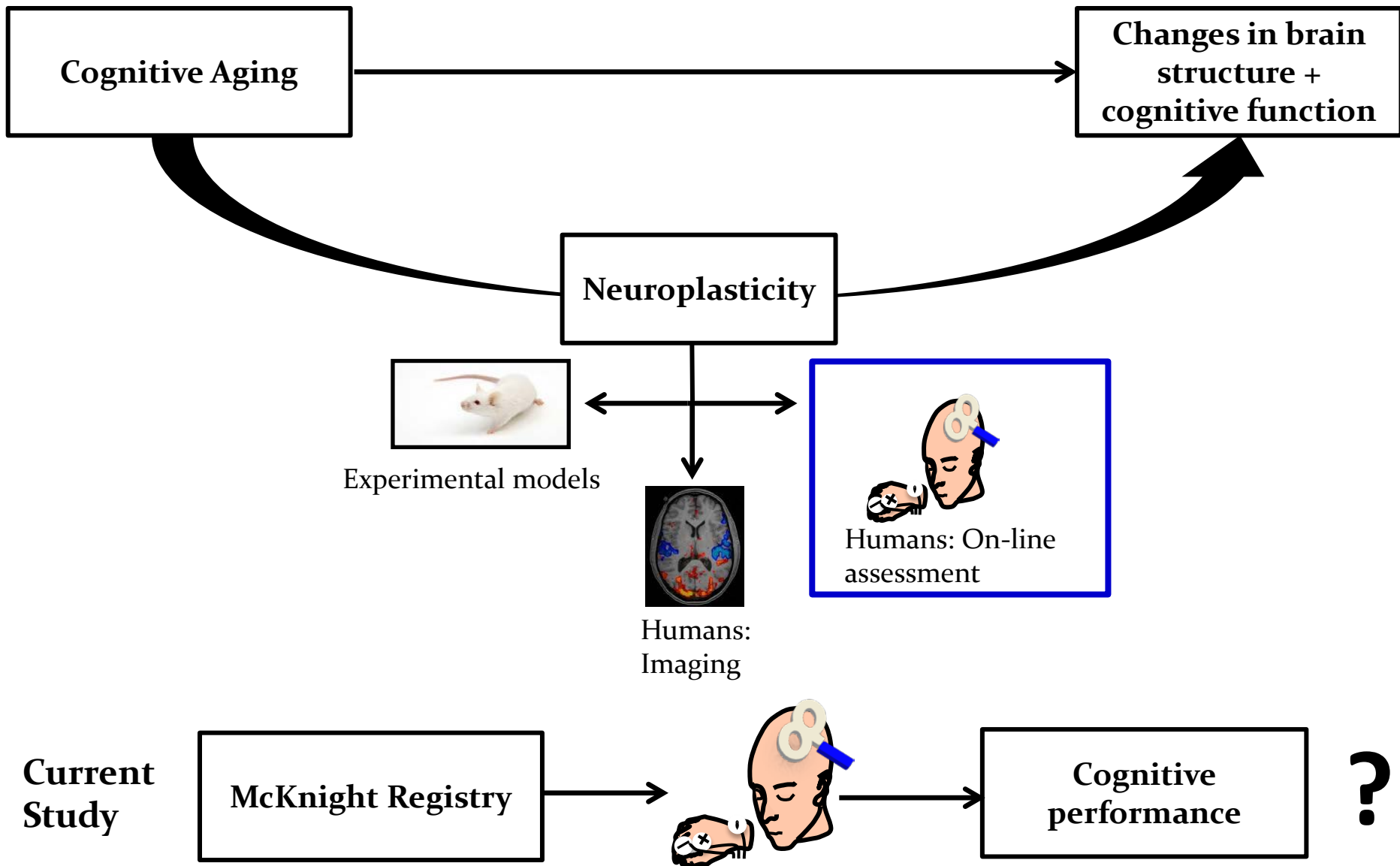


Measuring plasticity using non- invasive brain stimulation--a potential tool for the study of aging.

Joyce Gomes-Osman, PT, PhD

Assistant Professor

Departments of Physical Therapy and Neurology
University of Miami Miller School of Medicine



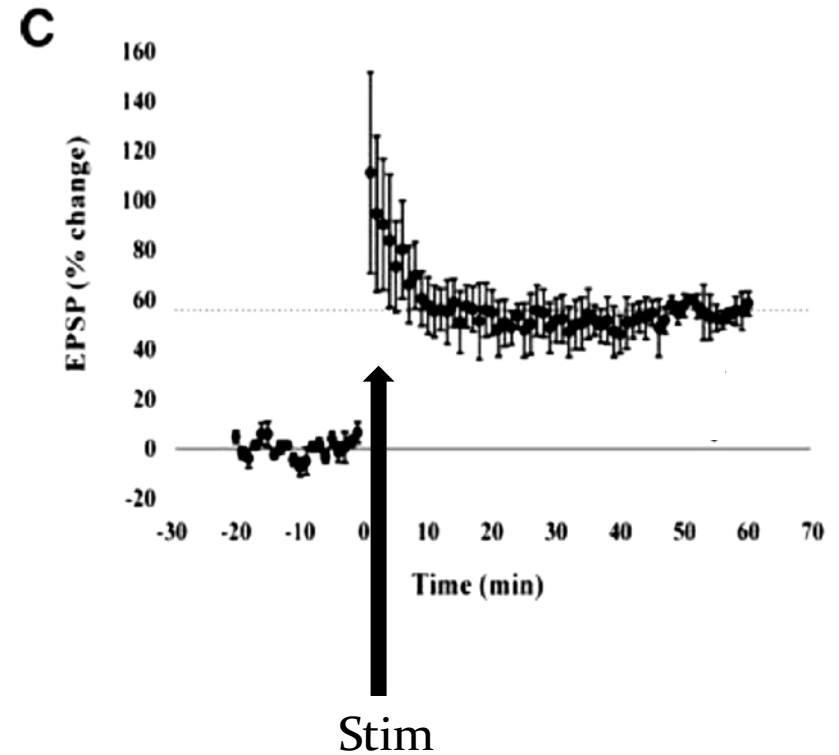
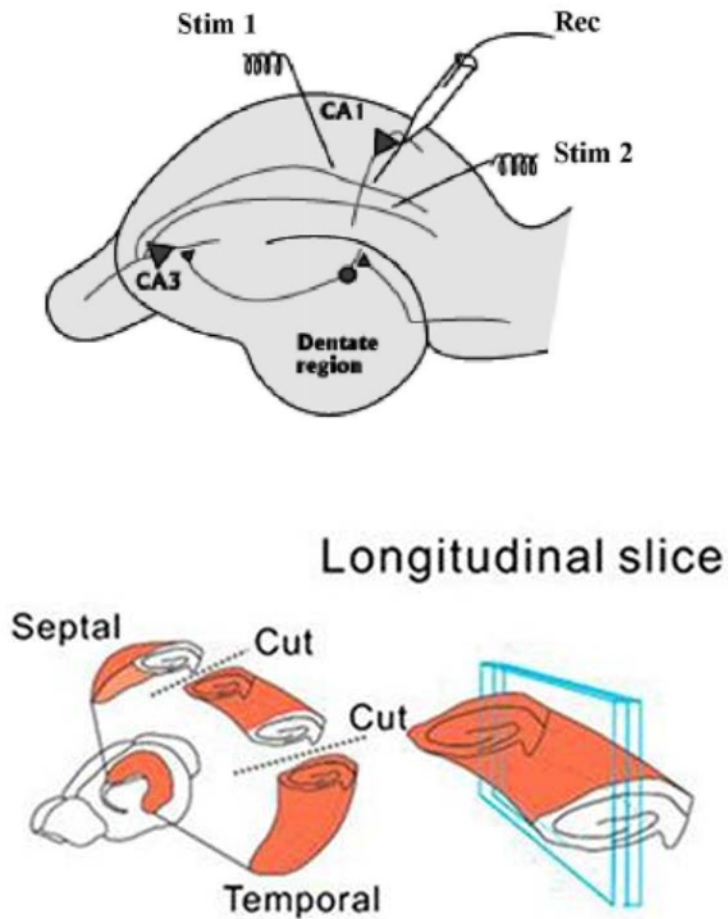
Long-lasting synaptic change (learning/memory, neuroplasticity)



Donald Hebb

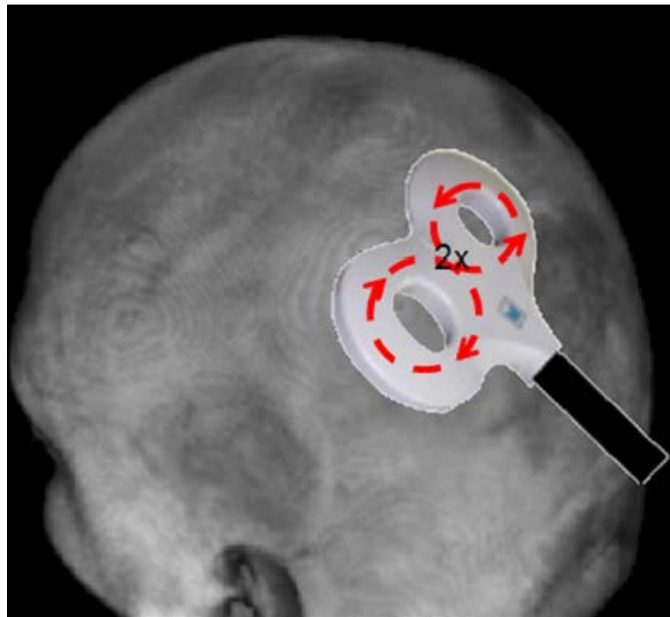
“Repeated activity of specific inputs leads to gradual formation of assemblies of interacting neurons within restricted neural circuits, which persists for some time after the cessation of the stimulus.”

Long-term potentiation: one paradigm to study neuroplasticity

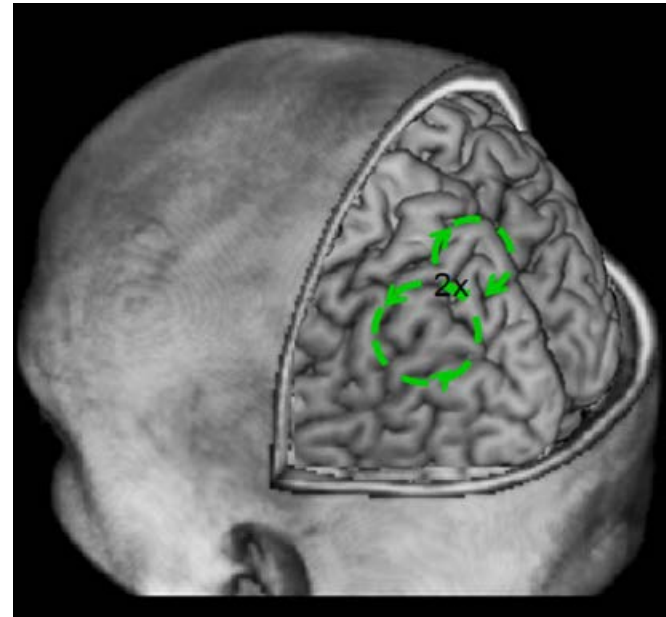


Transcranial Magnetic Stimulation

- Electromagnetic Induction of electrical currents

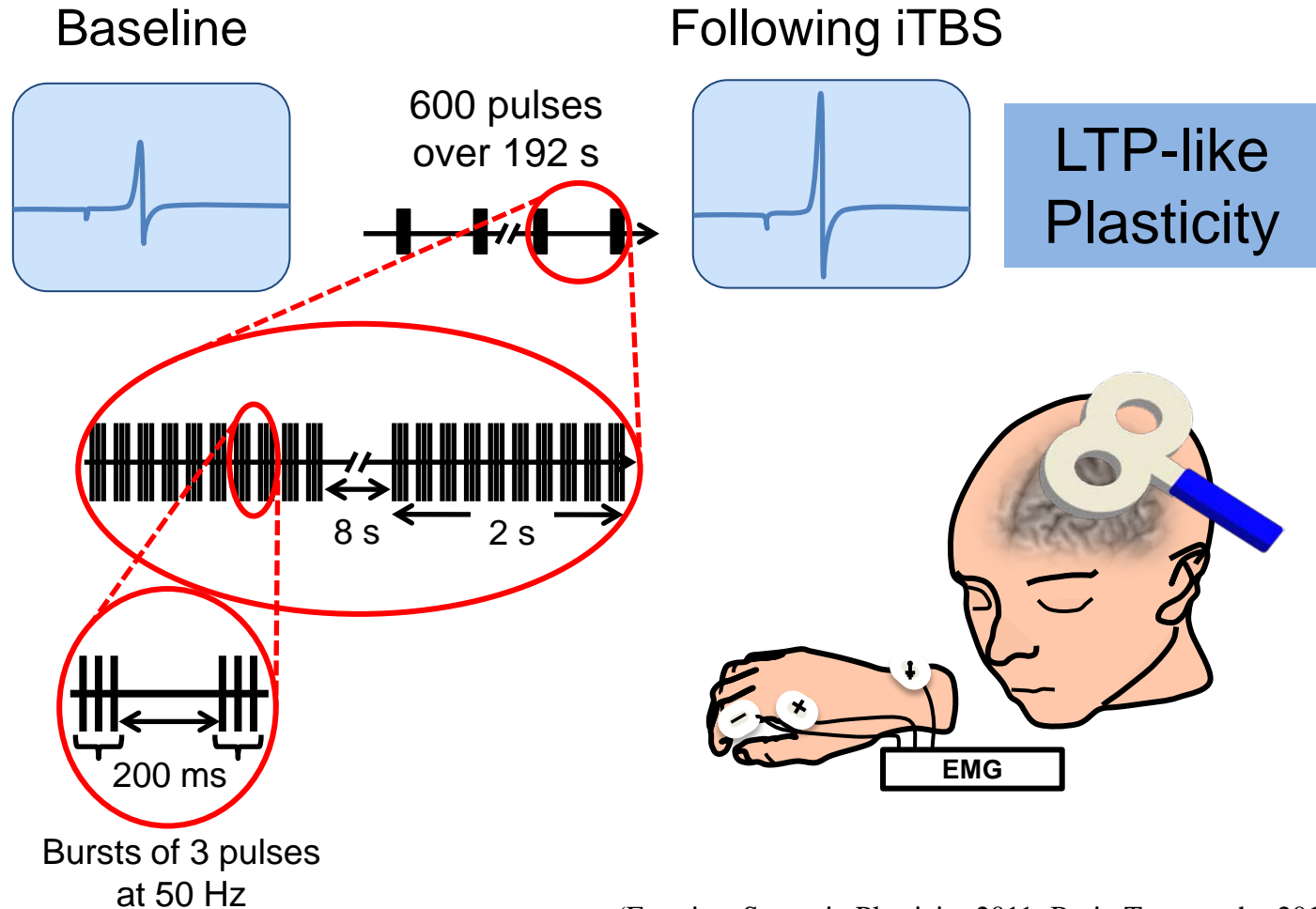


Red: direction of magnetic field

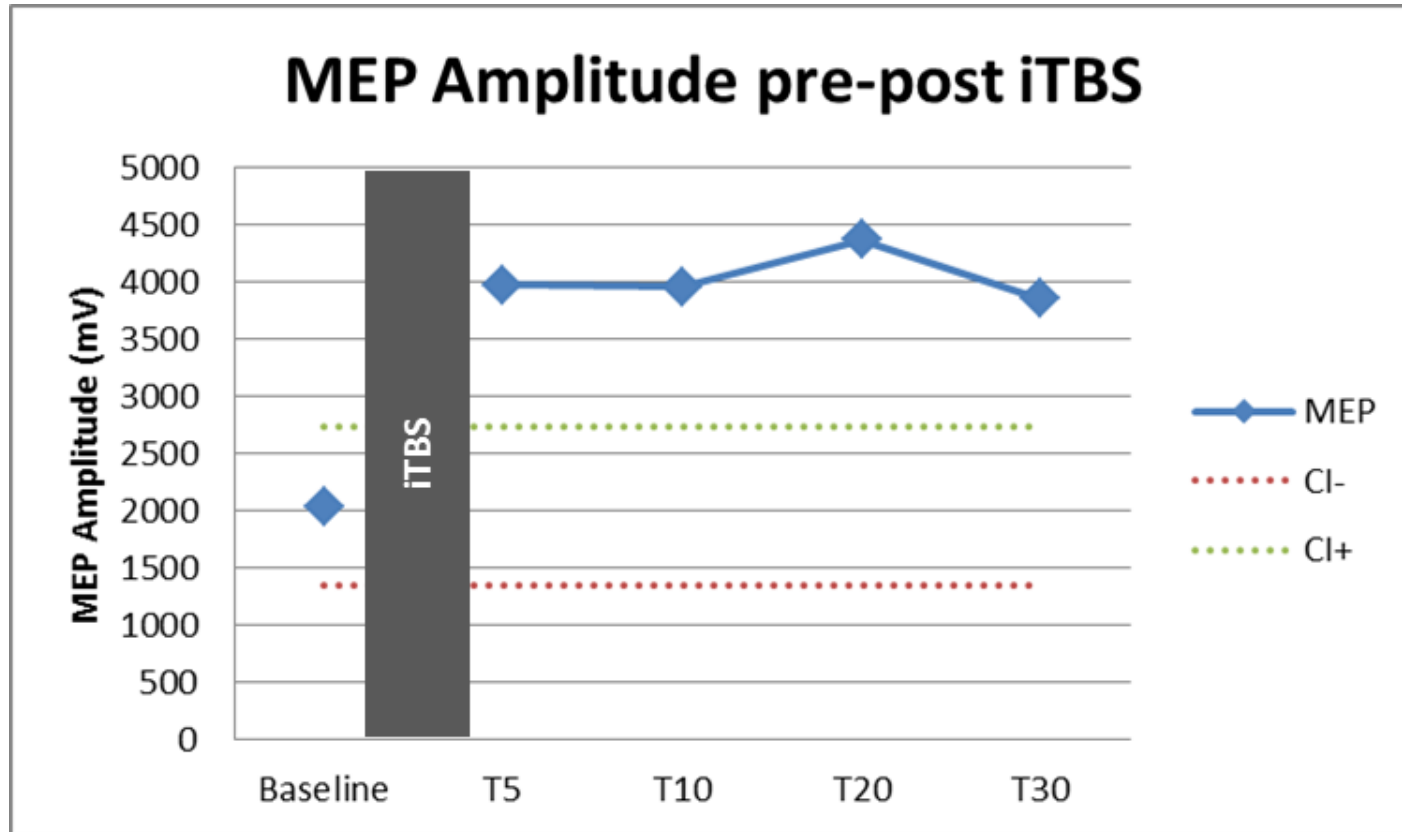


Green: direction of electrical current

Theta Burst Stimulation- non-invasive plasticity measurement

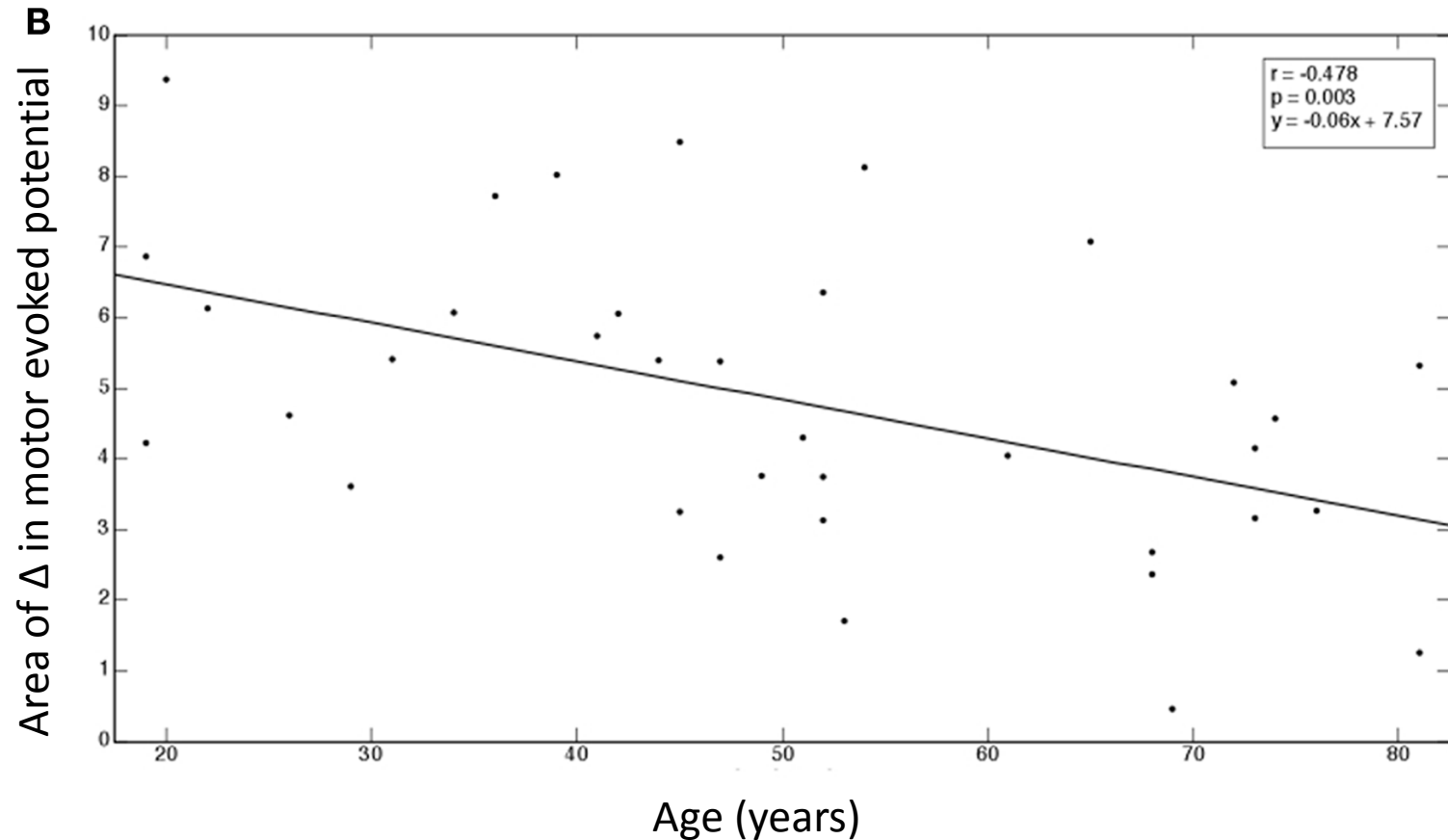


Theta Burst Stimulation- non-invasive plasticity measurement



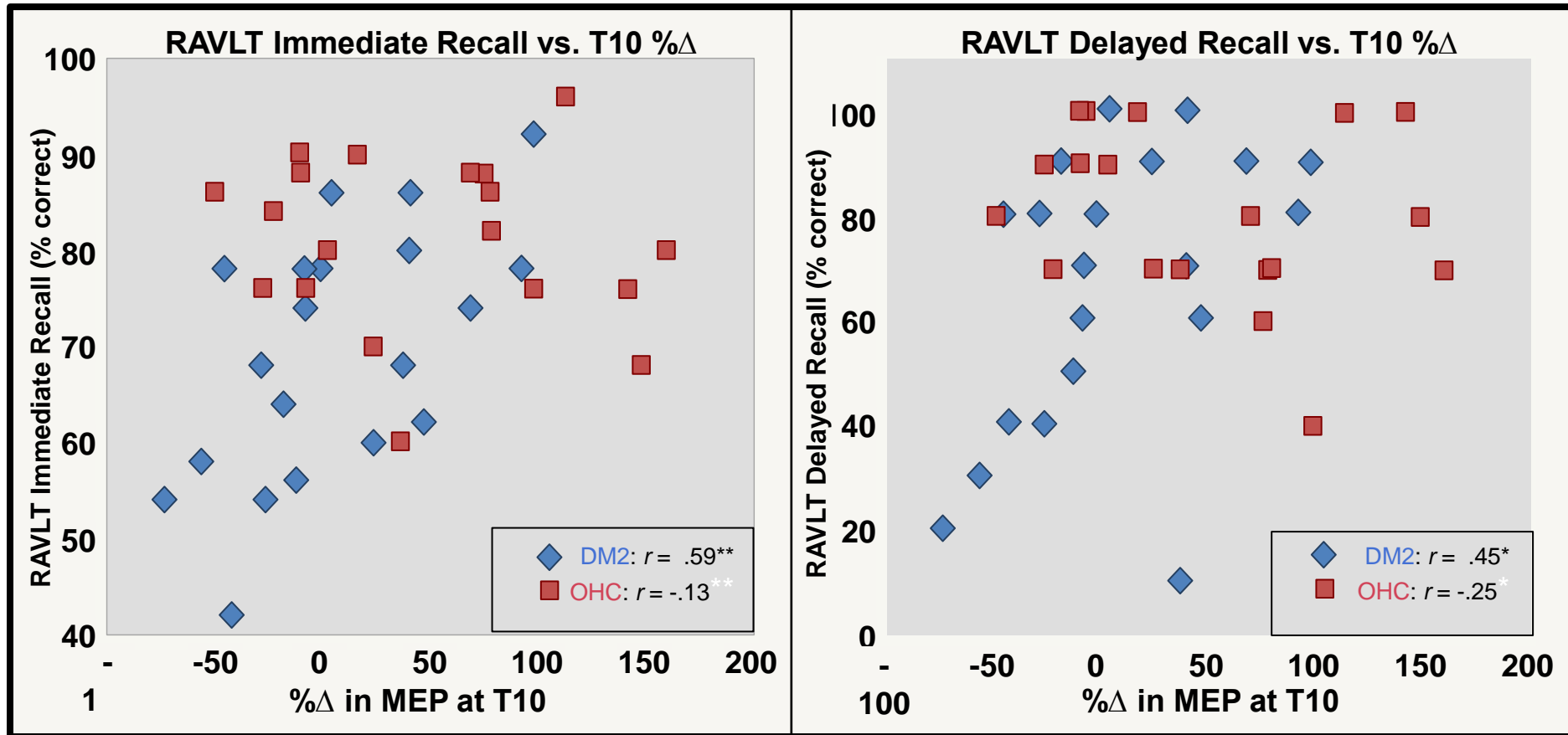
(Gomes-Osman & Pascual-Leone, unpublished data)

Pilot study suggests iTBS-based plasticity decreases with age



(Modified from Freitas et al, 2011)

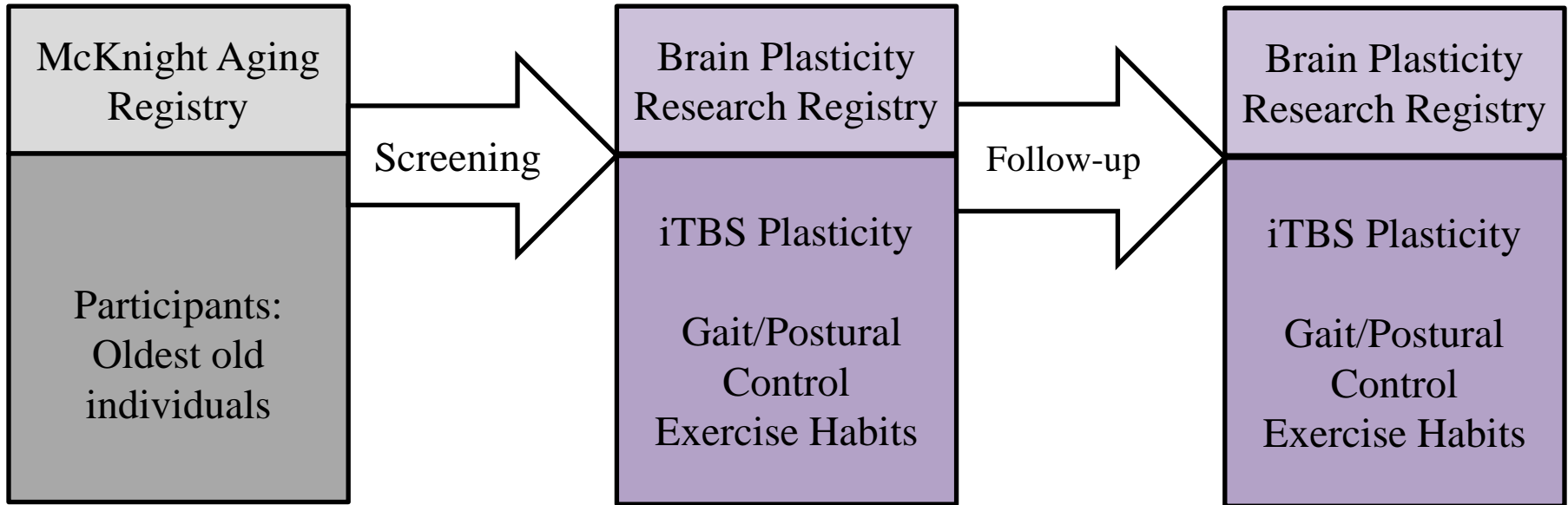
iTBS-based plasticity correlates with cognitive performance



Questions

- What are “normal” and “non-normal” values for TMS-based assessment of plasticity?
- Is there a relationship between iTBS-plasticity and cognitive function (neuropsychological evaluation)?
- Does a greater “neuroplasticity reserve” confer any protection from the development of AD?
 - Responsiveness to training

Experimental Setup



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