

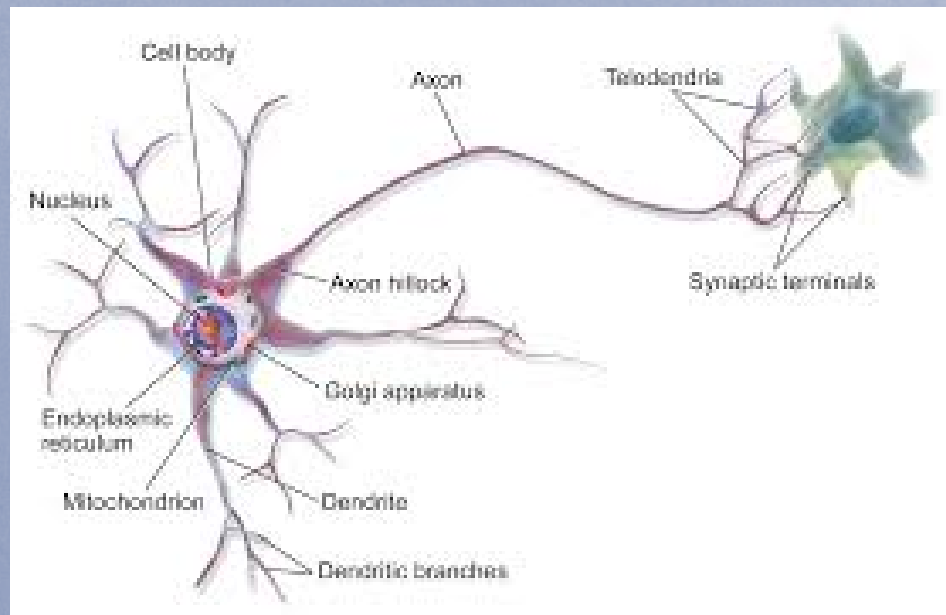
How we utilize Neuroplasticity in Rehabilitation

Taking Advantage of the Plastic Brain

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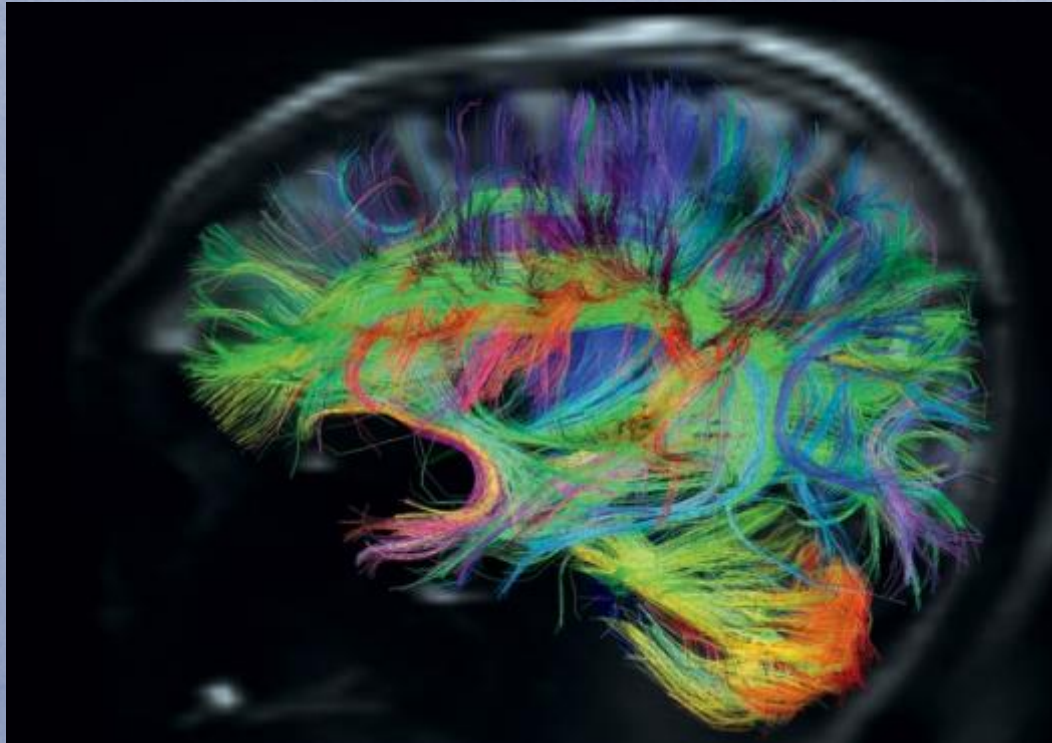
Defining Neuroplasticity

* NEURO- : relating to nerves or the nervous system



Defining Neuroplasticity

- * -PLASTICITY:the adaptability of an organism to changes in it's environment



For your brain...



Neuroplasticity = Learning

Motor Learning

* Principles to Enhance Motor Learning

- * Intensity

- * Repetition

- * Task Specificity

- * Problem Solving

Who Benefits?



midbrain
dopamine neurons

Parkinson's
Disease

Problem Solving

- * How to do YOU enhance problem solving in your “student”
 - * **FEEDBACK:**
 - * Attention (Internal vs External)
 - * Motivational Property
 - * Self-Control
 - * **TIME:**
 - * The teacher needs to be patient and be QUIET
 - * **SALIENCE:**
 - * The student needs to care about the task

Focus of Attention

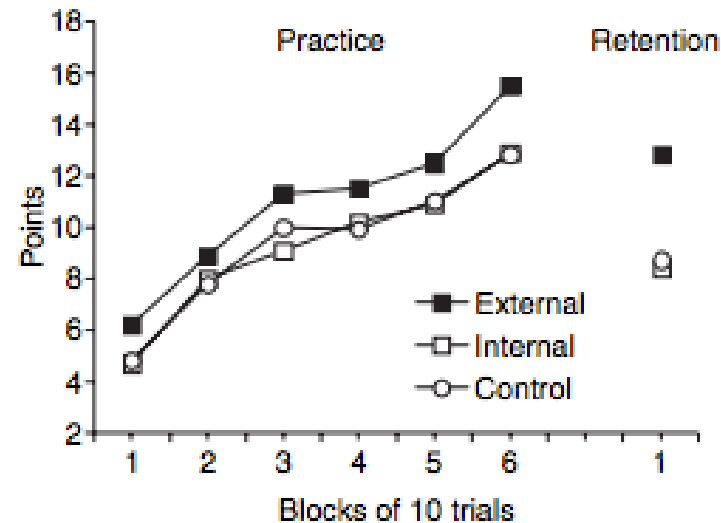


Figure 2 Accuracy scores (higher scores indicate greater accuracy) produced by novice golfers (Experiment 1, Wulf and Su 2007²⁸). Participants in the external focus group were instructed to focus on the swing of the club, whereas internal focus participants were instructed to focus on the swing of their arms. The control group was not given attentional focus instructions. During 2 days of practice (with focus instructions and reminders) and on a retention test (without instructions) on day 3, the external focus group outperformed the two other groups

Wulf G, Shea C, Lewthwaite R. (2010) Motor skill learning and performance: a review of influential factors. *Medical Education*. 44:75-84.

Gee, you are better than average!

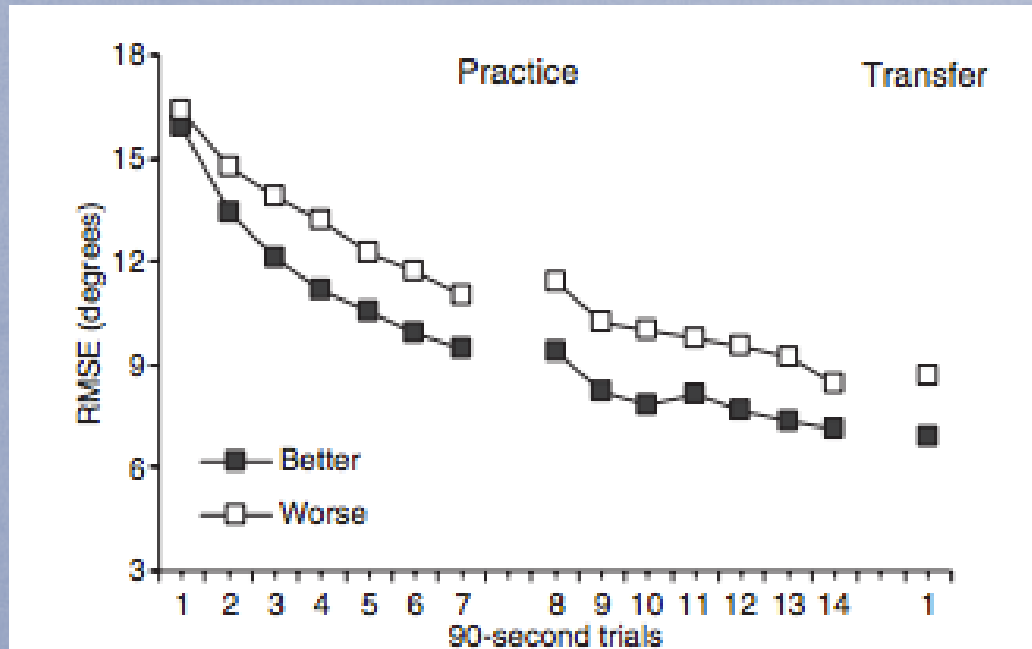


Figure 3 Platform deviations (root mean square error [RMSE]) from the horizontal position for the Better and Worse groups during 2 days of practice, and on the dual-task transfer tests on day 3 in Wulf and Lewthwaite (2009).⁴⁷ The 'Better' group showed more effective balance performance on the transfer test. (Note: smaller RMSEs indicate more effective performance)

Wulf G, Shea C, Lewthwaite R. (2010) Motor skill learning and performance: a review of influential factors. *Medical Education*. 44:75-84.

Feedback...who decides?

* Self-controlled



VS

* Yoked



Who learns better?

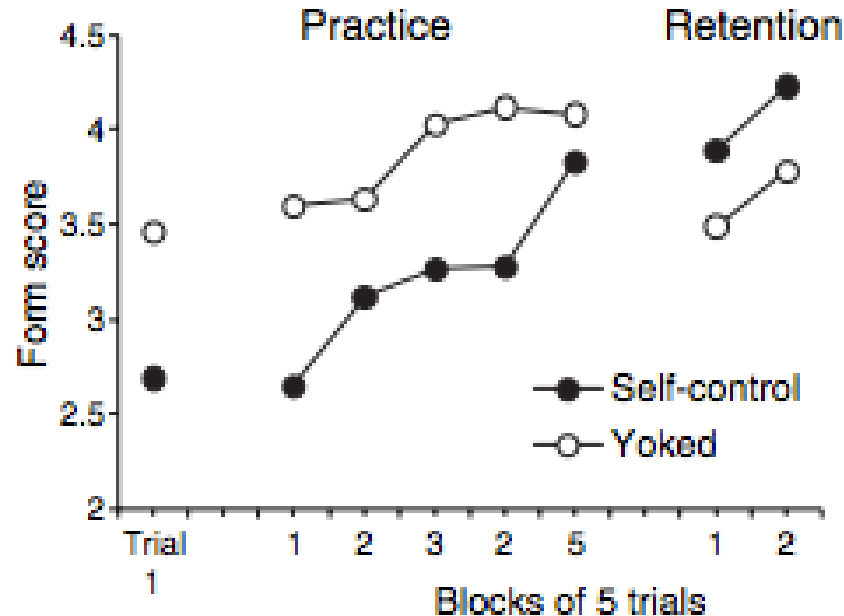


Figure 4 Movement form scores (higher scores indicate more effective form) for basketball jump shots (Wulf *et al.* 2005⁵⁷). Self-control group participants, who had control over the presentation of an expert video model, outperformed yoked group participants – despite an initial disadvantage – on the retention test

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Neuroplasticity = Learning

Learning enhances brain health





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