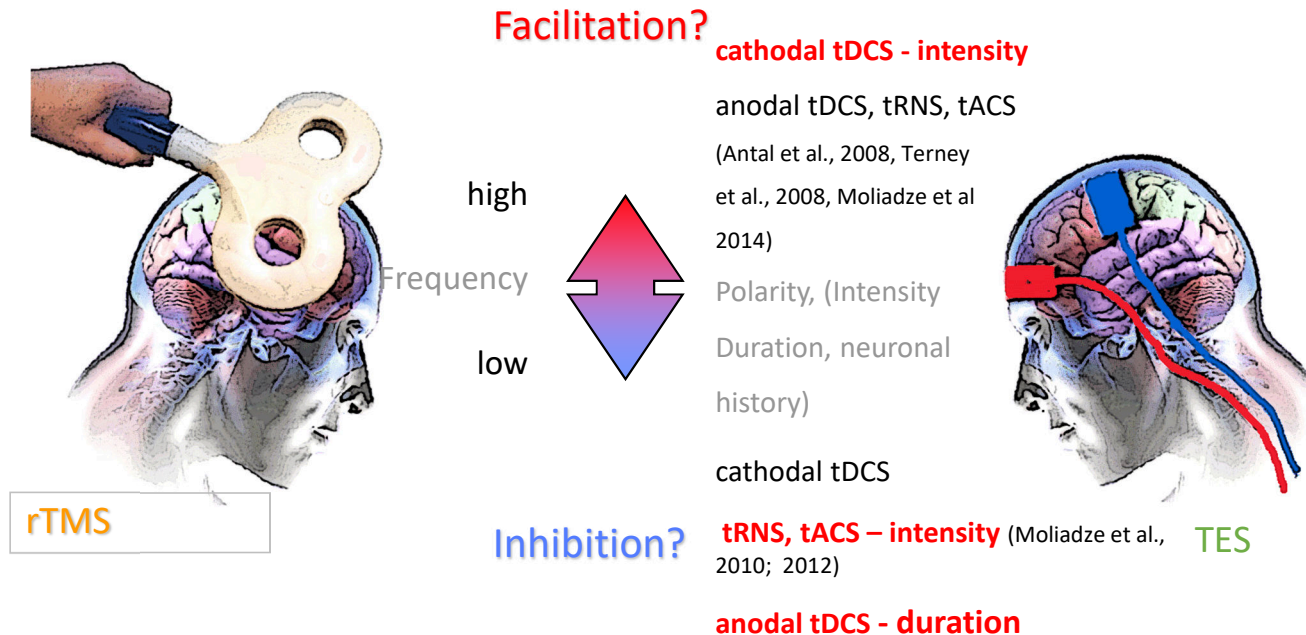
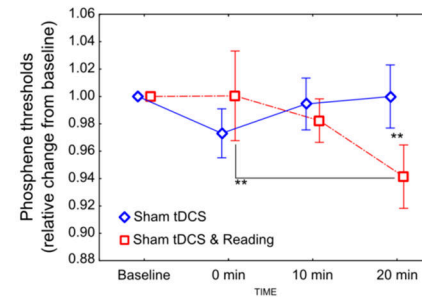
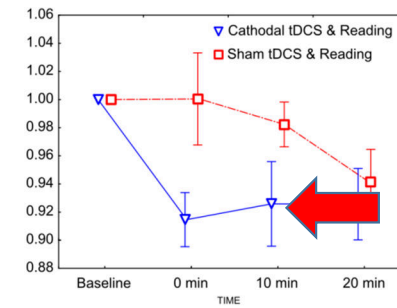
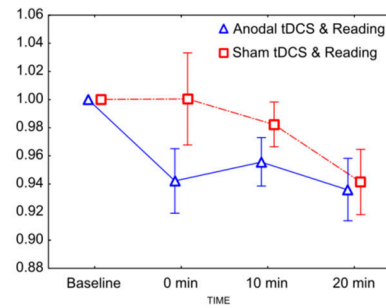
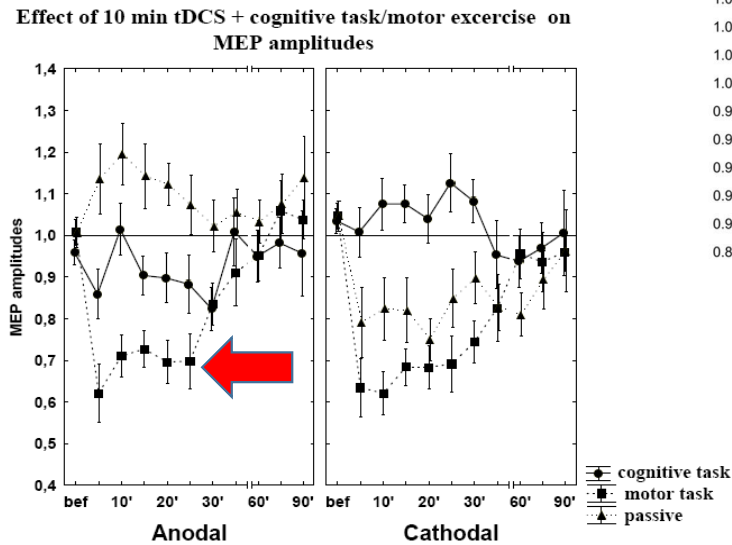


Development of new paradigms and protocols: rTMS and low intensity TES in health and disease



Bipolar effect: only in rest – motor cortex



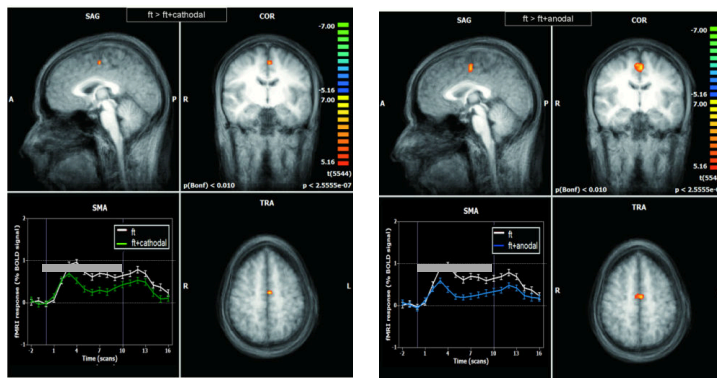
Antal et al., 2007

Antal et al., 2014

State dependency: what is inhibitory and what is excitatory?

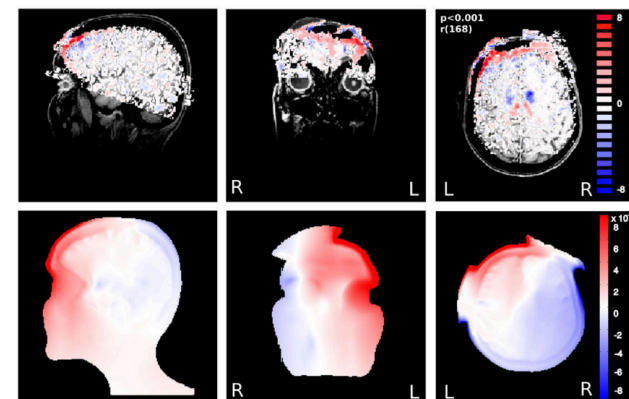
Effect of tDCS on Activity Evoked by Voluntary Finger Tapping

Differential effects of tDCS (over M1) in supplementary motor area



FT > FT + Cathodal tDCS

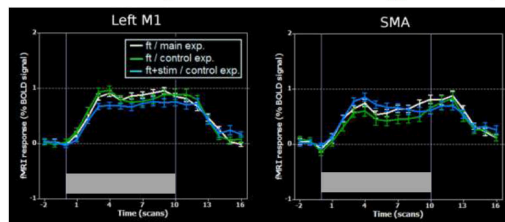
FT > FT + Anodal tDCS



fMRI

Modelling

No Effect of tDCS in Primary Motor Cortex and in Supplementary Motor Area



Control: Electrodes over Occipito-Temporo-Parietal Junctions

Antal et al., 2011

High-resolution individualized modeling of current flow and induced static magnetic fields suggested a strong coincidence of the change EPI signal with regions of large current density and magnetic fields

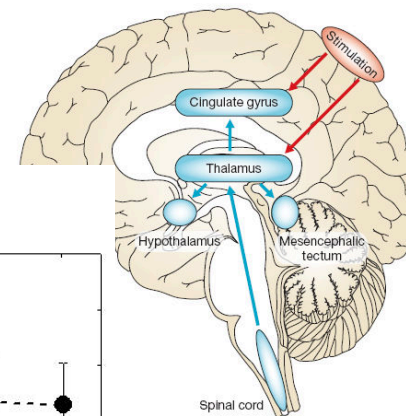
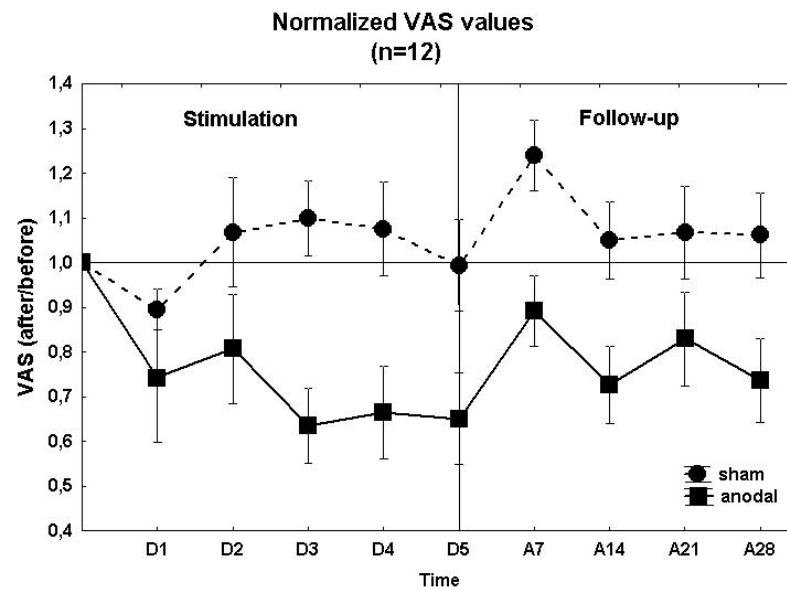
Antal et al., 2012

Chronic pain

12 patients
with different
types of
chronic pain

Sham or
anodal tDCS,
1 mA, 20 min
over M1 for 5
days

Significant
pain
improvement
after anodal
tDCS, reduced
SICI



Antal et al., 2010

Cathodal transcranial direct current stimulation of the visual cortex in the prophylactic treatment of migraine

Andrea Antal¹, Naomi Kriener¹, Nicolas Lang², Klara Boros¹ and Walter Paulus¹

Cephalalgia
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Prophylactic treatment in menstrual migraine: A proof-of-concept study

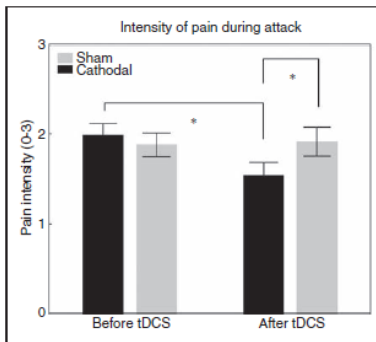
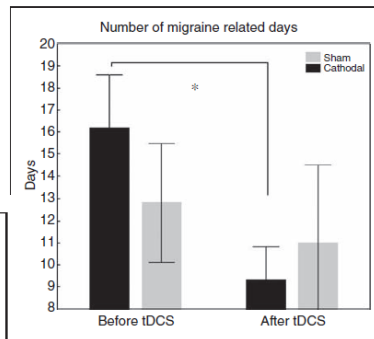
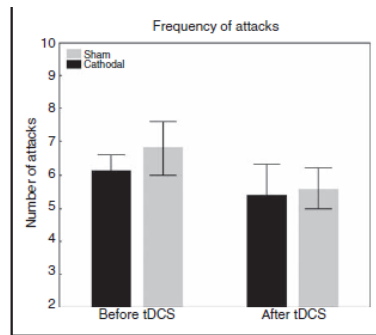


Franziska Wickmann, Caspar Stephani, Dirk Czesnik, Florian Klinker, Charles Timäus, Leila Chaieb, Walter Paulus, Andrea Antal*

26 patients with migraine (min 2 attacks/months)

15 minutes cathodal or sham tDCS over Oz with 1 mA for 3 days/week for 6 weeks (5 x 7 cm), parallel groups

Pain diary for 6 months



20 patients anodal or sham tDCS over the V1

2 mA for 20 min, 5 consecutive days for three months

