Default Mode Network Connectivity Response to Transcranial Magnetic Stimulation in Smokers: A Preliminary Evaluation

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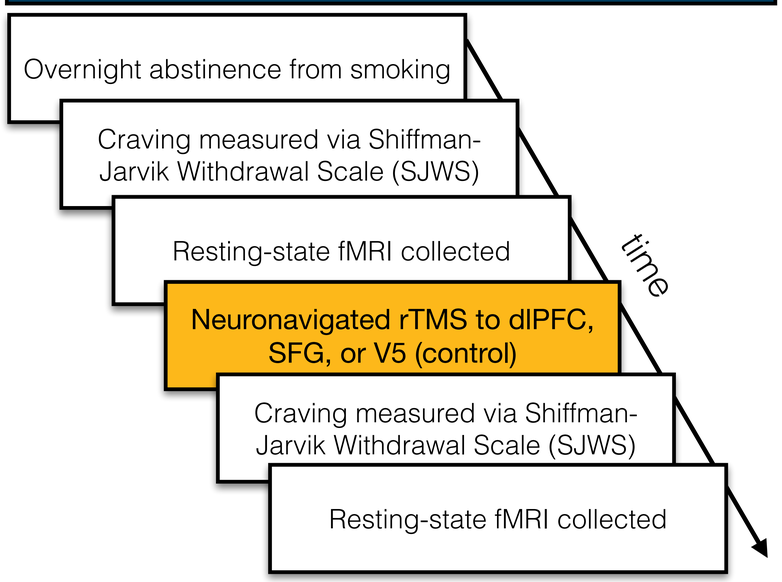
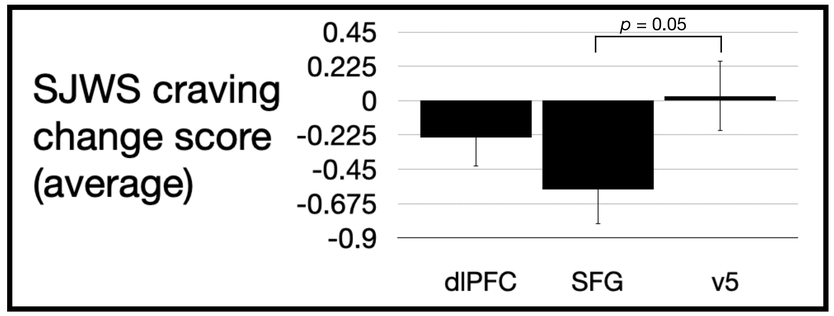
Repetitive transcranial magnetic stimulation (rTMS) is a potential smoking cessation therapy

rTMS to the dorsolateral prefrontal cortex (dlPFC) and superior frontal gyrus (SFG) has reduced cigarette craving in previous studies.	The neural mechanism supporting this is not known, and a mechanistic understanding may lead to more efficacious interventions.	We attempted to replicate these findings, and test the hypothesis that they are the result of modulating default mode network (DMN) connectivity.

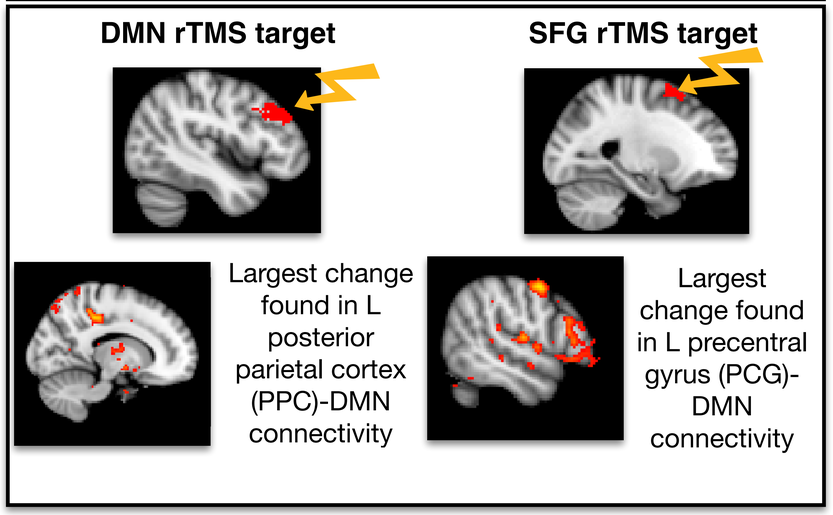
We measured rTMS-induced changes in craving and connectivity



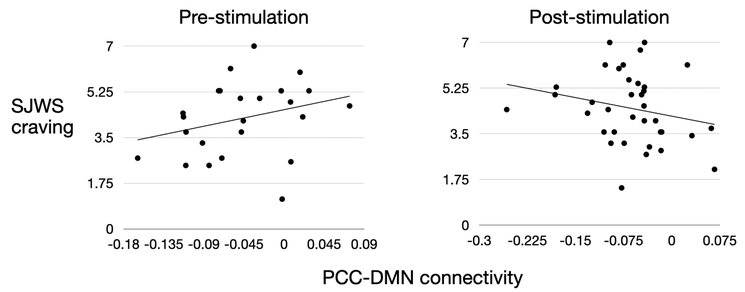
We confirmed previous findings showing craving reduction after SFG stimulation



Then identified the largest changes in DMN connectivity for dlPFC and SFG

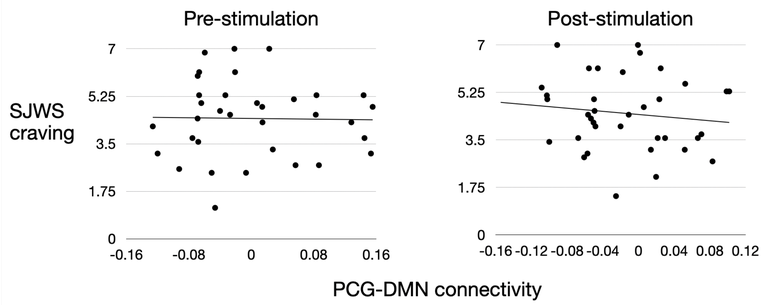


PCC-DMN connectivity correlated with craving for all sites, but the directionality changed after stimulation



PCC-DMN connectivity x time interaction p = 0.02

While PCG-DMN connectivity did not correlate with craving



PCG-DMN connectivity x time interaction p = 0.74

Exploring the largest changes in DMN connectivity illuminated a potential route through which dlPFC stimulation reduces craving, but failed to do so for SFG stimulation. SFG stimulation remains relatively untested, but appears to alleviate craving more than the well-explored dlPFC. Investigating the SFG-containing salience network may uncover connectivity-based explanations of craving reduction.

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