Introduction
- Previous data have shown that SPL is more sensitive to 10 Hz delay-period rTMS than is PFC (Hamidi et al., submitted).
- rTMS has been shown to alter neuronal oscillations (Fuggetta et al., 2007).
- Retention of information in working memory has been associated with an increase in α-band (8.5-13.5 Hz) power (Jensen et al., 2002).

EEG
- Data were recorded with a 60-electrode TMS-compatible cap (Nexstim, Helsinki).
- Data acquired at 1450 Hz, filtered (0.1 to 500 Hz) and down-sampled to 500 Hz.

Task
- Targets: 4 abstract shapes (Amock and Atmowan, 1995) presented one at a time (for 1 sec) at random locations, one in each quadrant of the screen.
- Probe: required /N-recognition decision; matched a target location or shape with p=0.5.
- Location and object memory trials were randomly intermixed.

TMS Artifact Removal
- Artifact removal performed separately for each brain area targeted and for each subject.
- Residual rTMS-related artifact removed through two rounds of ICA.
- 1st round ICA performed on entire data set.
- Components associated with eye blinks, channel noise, and rTMS identified and removed.
- 2nd round ICA performed on delay-period data only and any components associated with residual rTMS artifact were identified and removed.
- If any channels still contained rTMS artifact, the channel was removed and reconstructed using interpolation of surrounding channel values.

Source localization
- LORETA-RT (Pascual-Marqui, et al., 1999) software used to produce source estimates of delay-period oscillatory activity.
- Source estimation performed in middle 2 secs of 3-sec delay-period.

Results
- N = 14

Delay-Period Source Estimate
- Change with rTMS

Correlation with RT
- r = 0.703, p < 0.005, RT decreases (faster response) with an increase in power.
- r = 0.703, p < 0.005, RT increases (slower response) with an increase in power.

Correlation with Accuracy
- r = 0.703, p < 0.005, RT decreases (faster response) with an increase in power.
- r = 0.703, p < 0.005, RT increases (slower response) with an increase in power.

Conclusions
- With rTMS to SPL, change in α-band power is positively correlated with slower performance.
- Consistent with functional inhibition interpretation of α-band oscillations.
- 10 Hz delay-period rTMS affects power at α, μ, and γ bands.
- Effect is often distant to the location of stimulation.
- Effect varies across subjects.
- Effect differs with the type of information being kept in mind.
- 10 Hz delay-period rTMS to the SPL leads to a general decrease in cross-channel coherence, most prominently in the γ band.
- rTMS-evoked change in α-band coherence correlates with change in task performance.
- The direction of this correlation differs with spatial vs. object memory.
- rTMS-induced change in α-band power is positively correlated with slower performance.
- Consistent with functional inhibition interpretation of α-band oscillations.
- These results suggest a method for untangling the correlation of oscillations at various frequencies to working memory performance.