Dissociable mechanisms underlying individual differences in Working Memory Capacity

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**QUESTION**
The ability to control attention to minimize distraction is the primary factor determining working memory capacity (WMC)\(^2\), a characteristic that strongly correlates with cognitive abilities, including intelligence\(^1\). We tested whether superior attention control abilities exhibited by high-WMC individuals are mediated by
- stronger suppression of irrelevant information,
- enhancement of relevant information,
- or both?

**RESULTS**
**Behavioral performance**

**Attentional modulation of SSVEPs**

- Both WMC groups: increased attention to the target compared to the flankers;
- Different strategies to obtain the same signal-to-noise ratio: The low-WMC increased attention to the target, whereas high-WMC suppressed attention to the flankers.

**Conflict-related theta-band (3-7 Hz) power**

- Increase in theta-band (3-7 Hz) power in peri-response time window (-200 - 100 ms) in frontocentral electrodes
- Main effect of congruency \((F(1,31) = 8.96, p = .005)\)

**Strategic WMC-related differences in both target and distractor processing**

**Control analysis**

Statistically significant group differences in SSVEP amplitudes were observed only in occipital electrodes that showed strong SSVEPs.

**DISCUSSION**

- WMC is related to the control of attention to both relevant and irrelevant information. High-WMC individuals inhibit distractors more strongly, whereas low-WMC individuals enhance targets. Two different strategies can result in similar behavioral performance, yet suppression might be more neurally efficient\(^4\).
- In a frequency-tagged version of the Eriksen flanker task, as in a standard version\(^5\), conflict-related theta power was increased. However, frontal midline theta did not show WMC-related differences.
- General implications for the use of SSVEPs to study cognitive processes. SSVEPs can be successfully applied to cognitive tasks with small stimuli and relatively short stimulus presentation times.

**REFERENCES**

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