Behavioural and electrophysiological markers of integration in learning of novel names for novel concepts

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EPS meeting
University College London, UK
January 4, 2023

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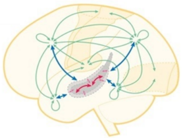

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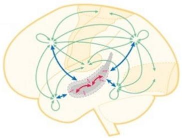

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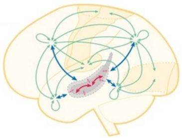

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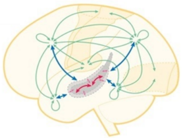
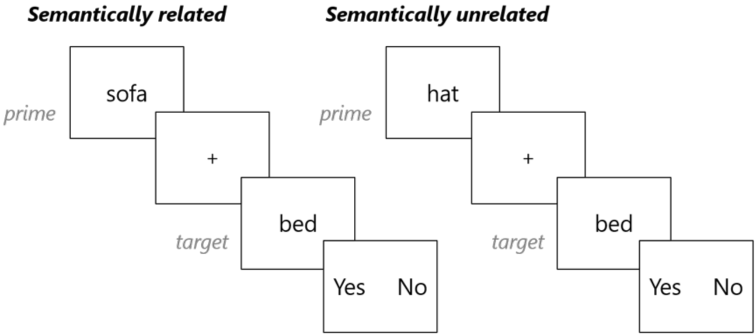


→ In tasks that require activation flow over multiple pathways, only integrated novel words can interact with each other during selection

Semantic priming paradigm



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- ...and whether they are subserved by automatic or controlled processes

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   - N400 responses for familiar vs. trained novel vs. untrained novel words
   - Only targets preceded by unrelated primes considered

Methods

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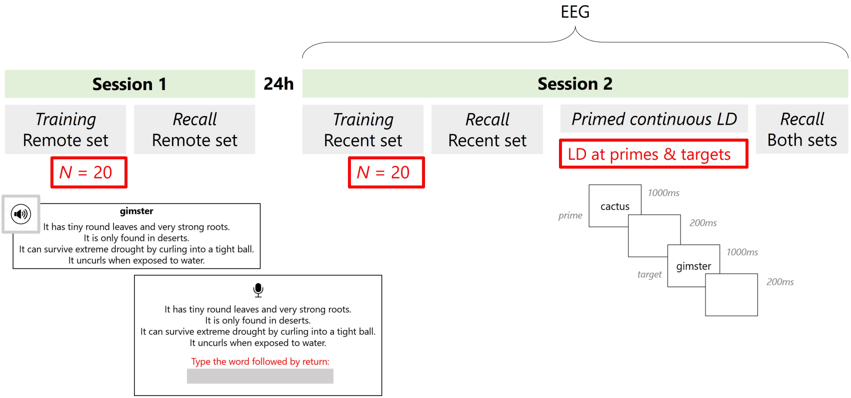

- 71 monolingual speakers of Aus English
- 27 males, 44 females
- Age: $\mu = 20.94$, $\sigma = 3.87$

Analysis

Behavioural data

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- Sensitivity analysis with 4 sets of priors
  1. $\approx$ 1 ms (no effect)
  2. $\approx$ 10 ms (small effect)
  3. $\approx$ 20 ms (medium-sized effect)
  4. $\approx$ 30 ms (large effect)

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  - testing for differences between the conditions across the whole scalp and at every time point

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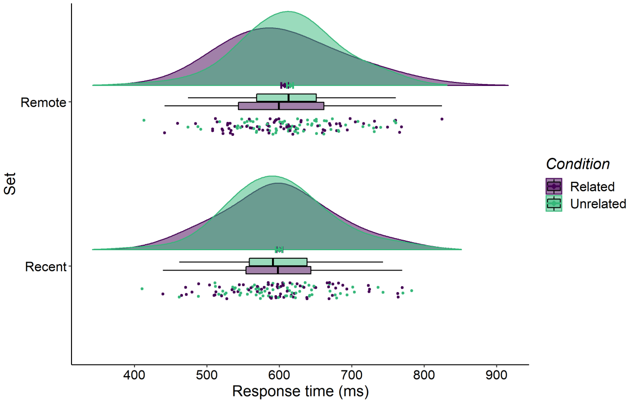

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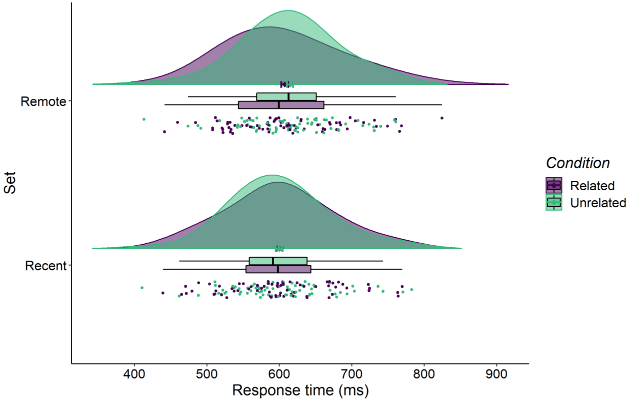

- Faster RTs for Recent: $-11\,\text{ms}$, $CrI = [-18.78, -1.41]$, $BF_{10} = 5.04$

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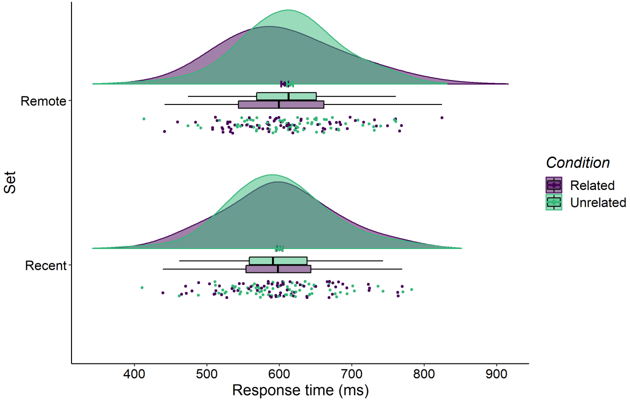

- Faster RTs for Recent: $-11\,\text{ms}$, $CrI = [-18.78, -1.41]$, $BF_{10} = 5.04$
- No priming for Recent, a small priming effect for Remote: $-8\,\text{ms}$, $CrI = [-10.02, 6.17]$, $BF_{10} = 179.41$

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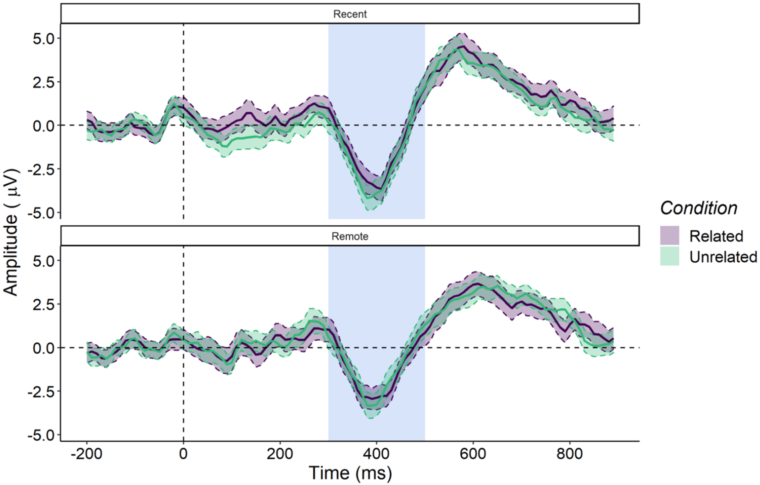
EEG data: priming effects, N400 spatiotemporal window



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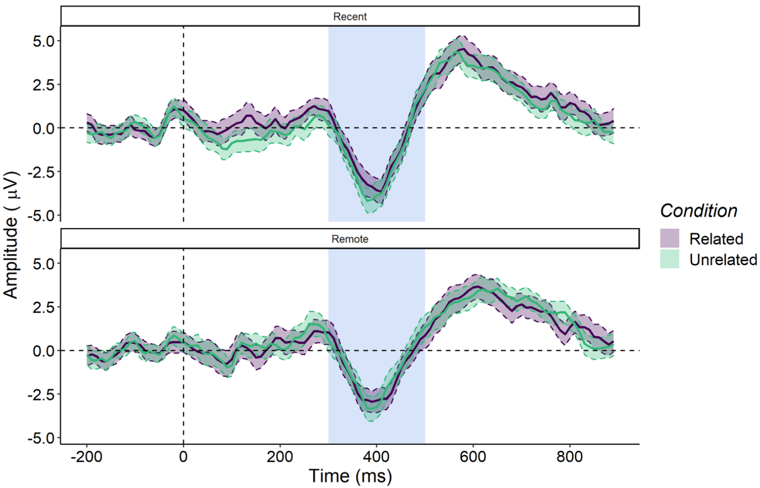

Evidence against all main effects and interaction

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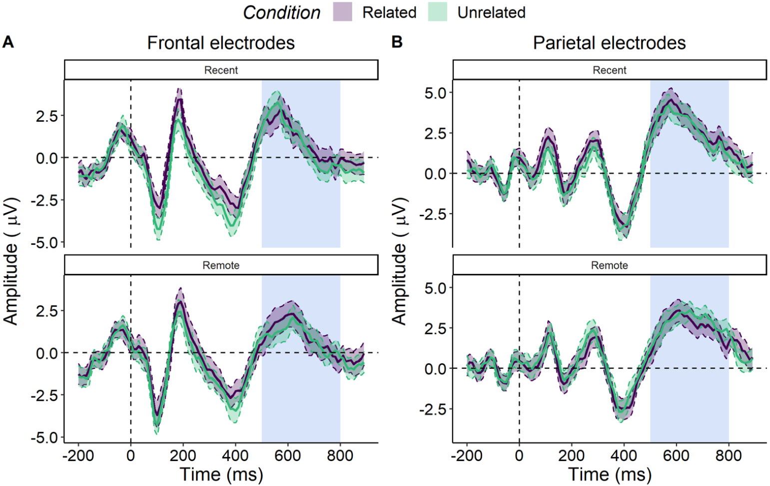

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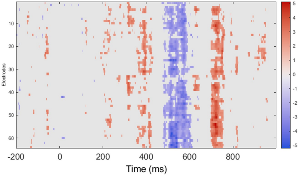
Remote vs. recent,
sig. t-values before correction



Unrelated vs. related,
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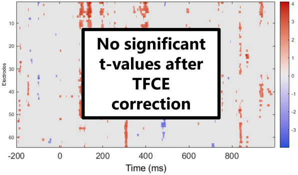

Remote vs. recent,
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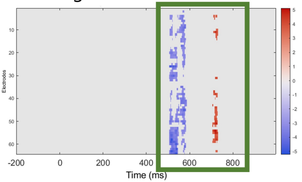

Interaction,
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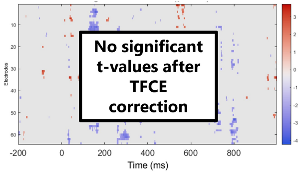

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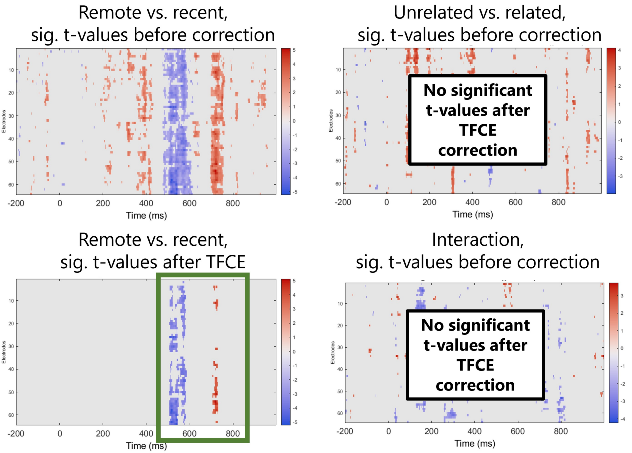

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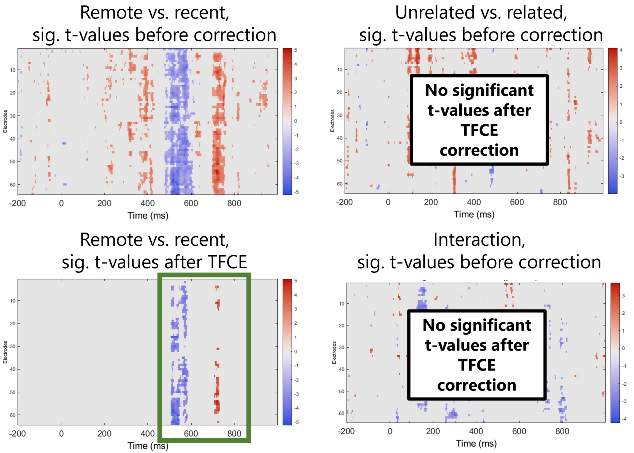

Remote vs. Recent:

- more negative btw. 506 – 588 ms & more positive btw. 700 – 735 ms

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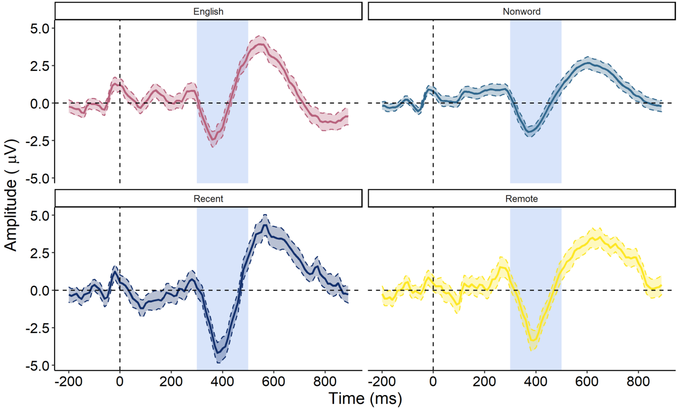

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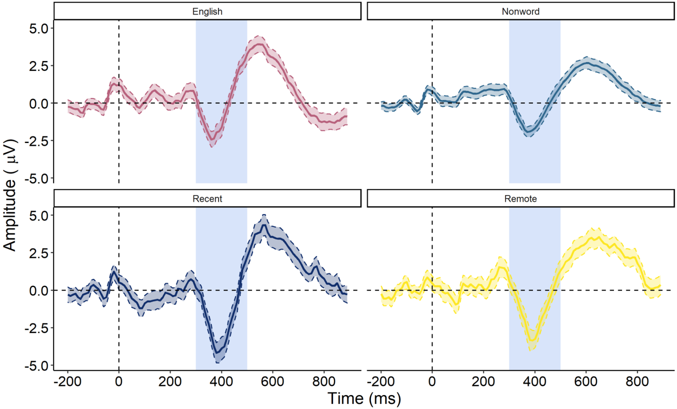

- *Recent vs. English*: more negative, $-1.43\,\mu V$, $CrI = [-0.93, -0.41]$, $BF_{10} = 159.30$

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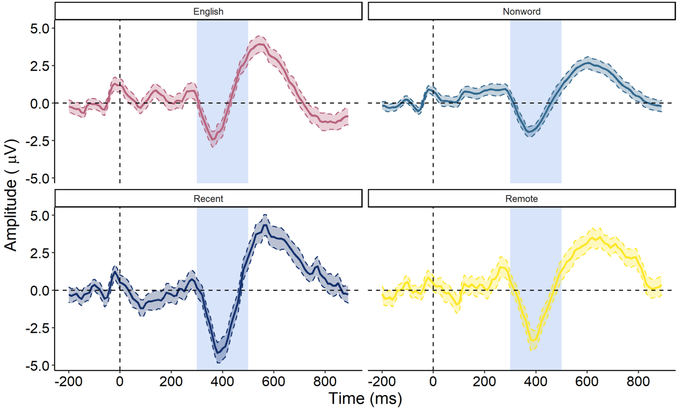

- *Recent vs. English*: more negative, $-1.43\,\mu V$, $CrI = [-0.93, -0.41]$, $BF_{10} = 159.30$
- *Recent vs. Untrained*: more negative, $-0.97\,\mu V$, $CrI = [-0.71, -0.23]$, $BF_{10} = 1334.37$

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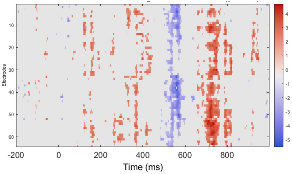

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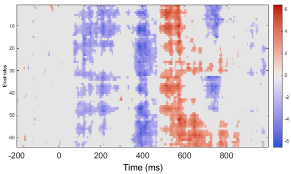

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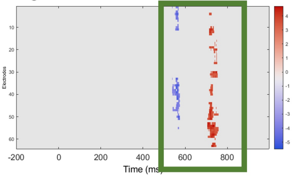

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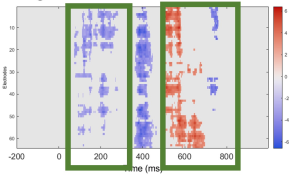

	Remote	**Untrained**
Recent	more positive btw. 538 – 577 ms more negative btw. 707 – 758 ms	more negative btw. 74 – 286 ms & 711 – 759 ms more positive 486 – 698 ms

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→ *24h after exposure (Remote set), the system still relies on controlled processes subserved by episodic memory to distinguish between these words and those learned more recently (Recent set)*

Thank you!

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