Uncovering the process of reprioritizing weaker meanings in human brain

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Research background & aim

Unexpectedness (Context)

The children went outside to ...

play. [expected]

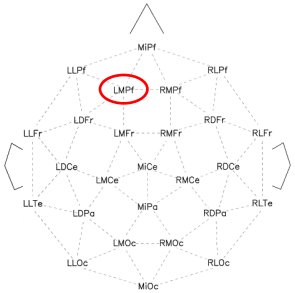
look. [unexpected]

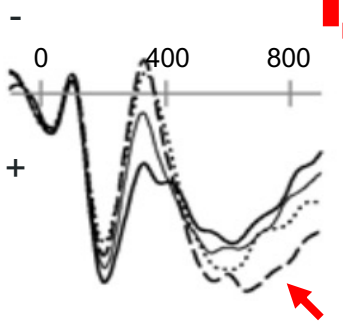
Ambiguous words (Form)

watch

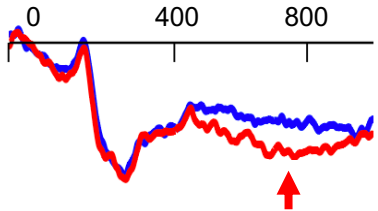
[dominant]

[subordinate]

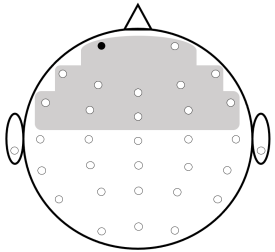




frontal positivity



frontal positivity



Expected

Unexpected

Dominant

Subordinate

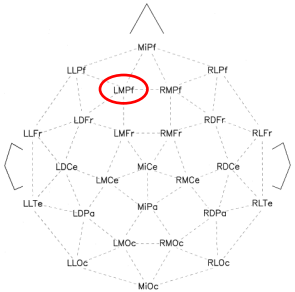
Federmeier, Wlotko, De Ochoa-Dewald, & Kutas (2007)

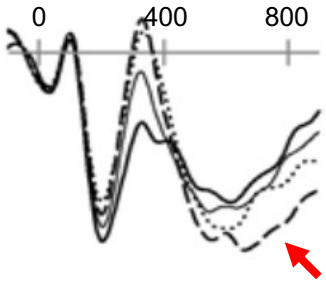
Chen, Federmeier, & Lee, in prep.

Research background & aim

- The downside of Electroencephalography (EEG) is bad spatial resolution.
- In the present project, we take advantage of Magnetoencephalography (MEG) to investigate the neural substrates of meaning reprioritization.

Unexpectedness (Context)





Expected

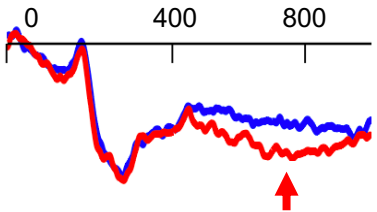
Unexpected

frontal positivity

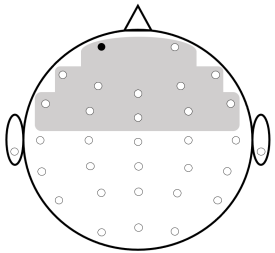
Federmeier, Wlotko, De Ochoa-Dewald, & Kutas (2007)

meaning reprioritization

Ambiguous words (Form)



frontal positivity



Dominant

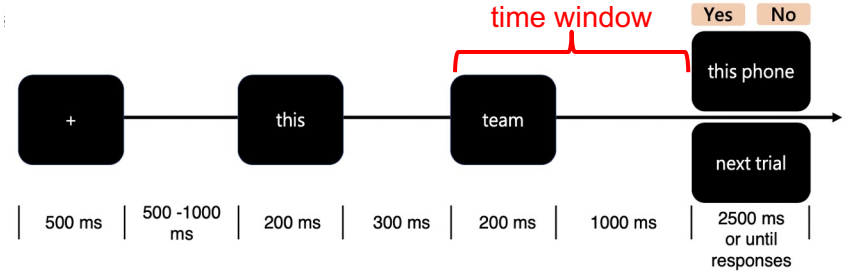
Subordinate

Chen, Federmeier, & Lee, in prep.

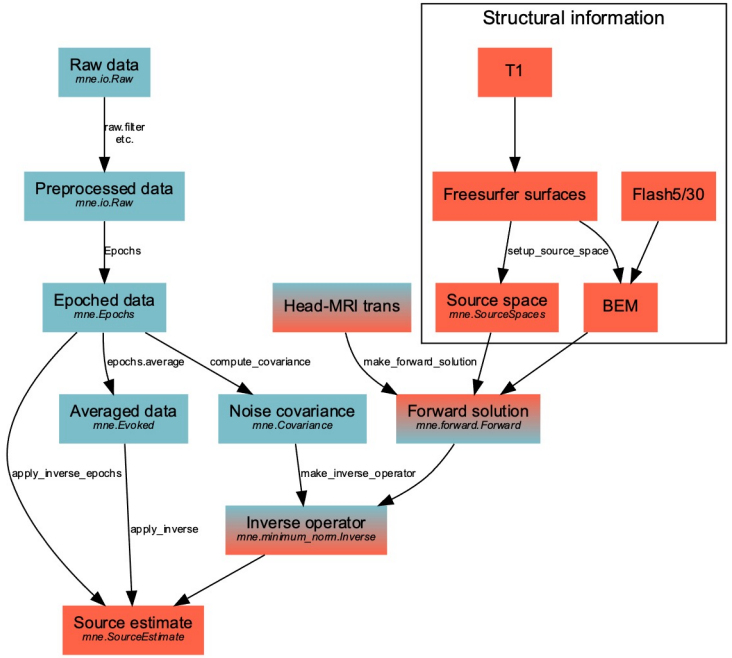
Methods

- MEG data were collected from 26 young participants while they read short phrases in Taiwan Mandarin.

Word type	Condition	Context	Target
Unambiguous words	Unambiguous	這支 ‘this’	球隊 ‘team’
Homographs	Dominate usage	一套 ‘a set of’	制服 ‘uniform’
	Subordinate usage	一同 ‘together’	制服 ‘subdue’



- Data will be analyzed at sensor level and source level following the Workflow of the MNE-Python software.



Objectives and keywords

- To familiarize myself with the analyses of MEG data and set up a pipeline of doing these analyses via MNE-Python package
- To better understand the neural substrates of the process of meaning reprioritization (indexed by the frontal positivity in past EEG studies)
- Keywords: lexical ambiguity, frontal/anterior positivity, EEG/ERP, MEG

References

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2. Gramfort, A., Luessi, M., Larson, E., Engemann, D. A., Strohmeier, D., Brodbeck, C., ... & Hämäläinen, M. S. (2014). MNE software for processing MEG and EEG data. *Neuroimage, 86*, 446-460.

3. MacGregor, L. J., Rodd, J. M., Gilbert, R. A., Hauk, O., Sohoglu, E., & Davis, M. H. (2020). The neural time course of semantic ambiguity resolution in speech comprehension. *Journal of Cognitive Neuroscience, 32*(3), 403-425.

4. Rodd, J. M., Johnsrude, I. S., & Davis, M. H. (2012). Dissociating frontotemporal contributions to semantic ambiguity resolution in spoken sentences. *Cerebral Cortex*, *22*(8), 1761-1773.