Updating ambiguous word meanings: a role for the language-selective fronto-temporal network

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Background

Word meaning access challenged by semantic ambiguity

note

An effective comprehension system can:

- * use contextual cues
- * adapt in response to recent experience

Is challenging word meaning access supported by: the domain-specific **Language Network**^[1], and/or the domain-general **Multiple Demand Network**^[2]?

Lesion-Network overlap

Networks defined from fMRI data in healthy adults^[3]

Volunteers (n=18) with adult-onset chronic cortical lesions recruited from the Cambridge Cognitive Neuroscience Research Panel (CCNRP).

Two-phase experiment

1. Use of contextual cues during word meaning access

Coherence Judgement Task

2. Adaptation in response to recent experience

Word Association Task

(counterbalanced across participants)

Data analysed with mixed effects models using the 'lme4' package^[4] in R.

Lesion-behaviour associations

Individual participant Word Meaning Priming (est. using model residuals):

- * negatively associated with damage in Language Network, but not MD Network or whole brain.
- * not associated with Ambiguity Effect (est. using model residuals) from sentence coherence judgment task.

Sentence coherence judgements

High accuracy (>90%) and discriminability (d' -prime >2) for all participants. Response time Ambiguity Effect unaffected by lesion location or extent.

Word association responses

Word Meaning Priming Effect^[5], which did not differ between groups.

Discussion

1. Volunteers with lesions to Language and MD Networks. successfully used context to access appropriate lower-frequency ambiguous word meanings during sentence comprehension.
2. Increase in preference for lower frequency word meanings following recent experience (Word Meaning Priming Effect).
3. Extent of adaptation (Word Meaning Priming) was dependent on the Language Network, but not the Multiple Demand Network.

References

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