Caught Between Rumours and the Road II

Decoding the Interaction of Emotional Speech Processing and Attentional Control during Simulated Driving

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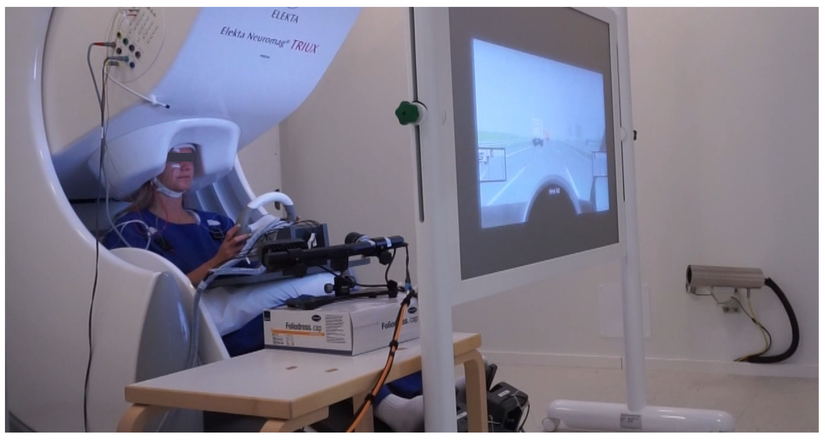
1 RESEARCH QUESTION

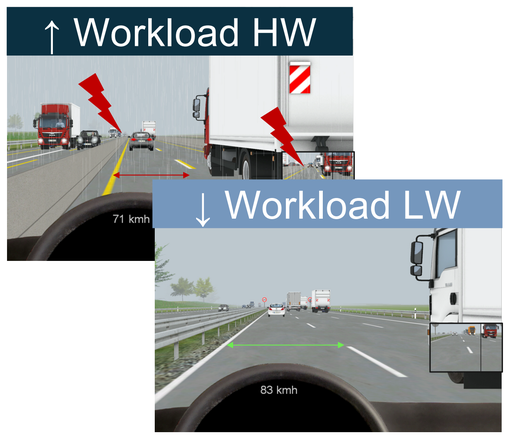
Do **valence of emotional speech** and **workload** during **visuo-spatial cognition** co-modulate neural information processing in multisensory realistic environments? Which neural signatures regulate emotional interference?

2 METHODS

Magnetoencephalography & eyetracking
N = 48 subjects (M_{age}= 25.25 ± 4.01)



Simulated driving in a within-subject design with two factors:



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Negative (LV) Emotional speech

Positive (HV) Emotional speech

Hypothesised role of **frontal γ** in **cognitive control [1-3]**

4 **Multivariate pattern analysis** with common spatial patterns and linear discriminant analysis [4-5]

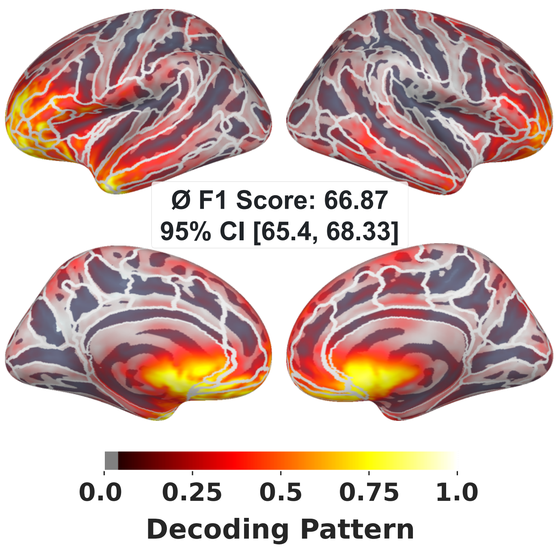
5 **Mass-univariate permutation-based spatial clustering** in source space (MNE)

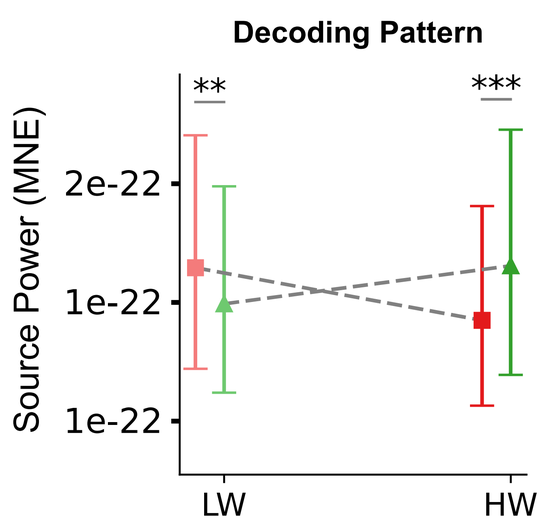
3 RESULTS — SUBJECTIVE RATINGS

Valence and **workload co-modulate** the subjective experience of emotional speech and the simulated driving scenario.

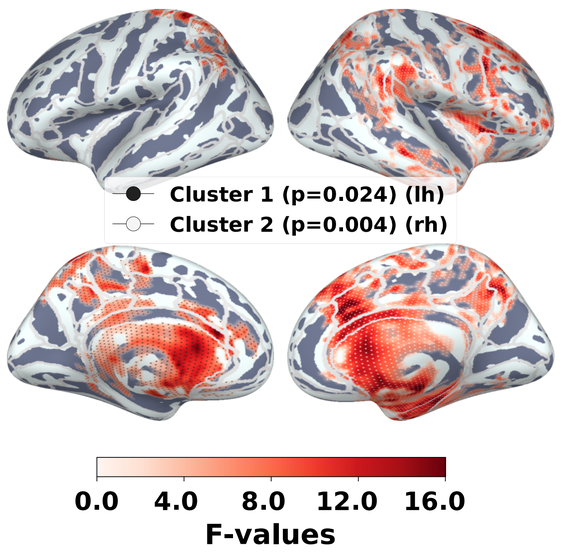
Appraisal of positive valence seems to occur only during drives of **low visuo-spatial workload** [6].

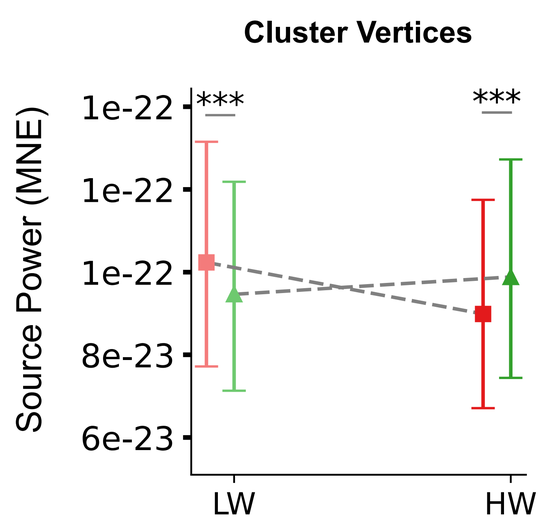
4 MULTIVARIATE PATTERN ANALYSIS





5 PERMUTATION-BASED CLUSTERING





6 CONCLUSION

Our findings indicate that **fronto-temporal gamma-band** modulations contribute to **top-down control** of emotional interference.
Cross-over interactions suggest that **positive speech is down-regulated only under high cognitive demand**, whereas down-regulation of negative speech becomes less effective as cognitive workload increases.
We advocate the use of converging methods and multivariate statistics to study brain function in complex, naturalistic environments.

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The research was supported by the Fraunhofer Gesellschaft with the scholarship »Fraunhofer TALENTA« (K. Lingelbach), the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation; RI 1511/3-1; J. Rieger) and the Neuroimaging Unit of the Carl von Ossietzky Universität Oldenburg funded by grants from the DFG (3T MRI INST 184/152-1 FUGG and MEG INST 184/148-1 FUGG).