

## **Neural oscillations track natural but not artificial fast speech: novel insights from an MEG study**

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Neural oscillations contribute to speech parsing via cortical tracking of hierarchical linguistic structures, including syllable rate. Most of the evidence for brain alignment to speech rate variations has come from research using artificially accelerated speech and the important case of natural fast speech has been largely overlooked.

In the present MEG study, we investigate the role played by auditory and motor cortex oscillations by directly compare brain-to-speech coupling between naturally-produced fast speech and artificially compressed speech. We found that listening to naturally-produced speech was associated with cortico-acoustic coupling, both at normal ( $\sim 6$  syllables/s) and fast ( $\sim 9$  syllables/s) rates, with a corresponding shift in peak entrainment frequency. Interestingly, time-compressed sentences did not yield such coupling, despite being generated at the same rate as the natural fast sentences. Additionally, neural activity in right motor cortex exhibited stronger tuning to natural fast rather than to artificially accelerated speech, and showed evidence for stronger phase-coupling with left temporo-parietal and motor areas.

Our findings are highly relevant for our understanding of the role played by auditory and motor cortex oscillations in the perception of naturally produced speech.