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Compensatory movement of the tongue following a mechanical perturbation during speech (poster session)

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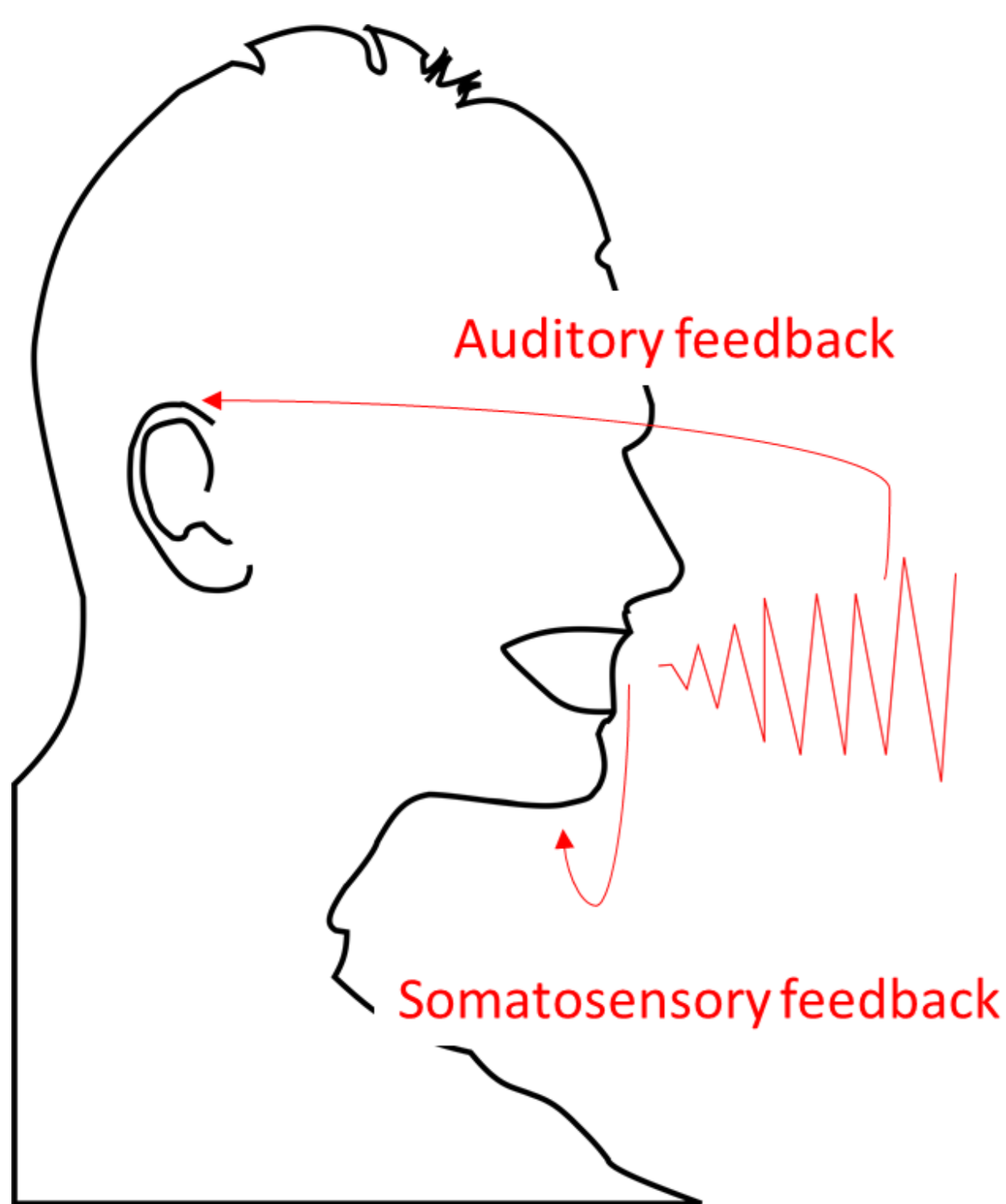
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Introduction

Sensory feedback for speech production

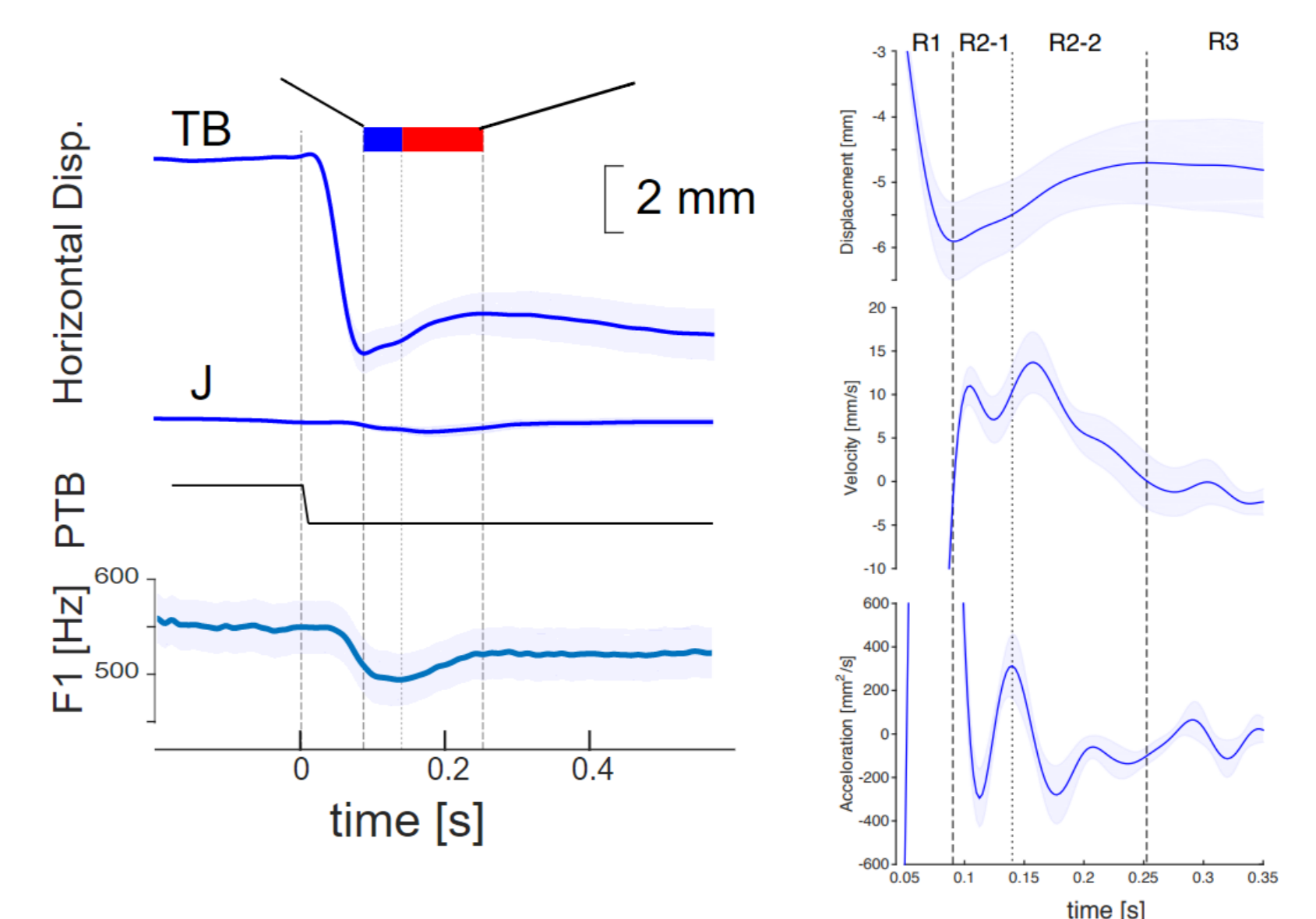


Somatosensory and auditory inputs play an important role in the production of speech sounds (Guenther and Hickok, 2015).

Somatosensory goal can be achieved during speech production even in the absence of auditory error (Tremblay et al 2003).

Compensatory movement of the tongue

The tongue showed quick compensatory response working for both stabilizing the tongue contour and maintaining the resultant produced sound (Ito et al 2020)



This compensatory response may be driven by somatosensory feedback alone.

Objective

Can the compensatory response of the tongue be induced in the absence of auditory feedback ?

Experiment

Subjects: 5 native French speakers

Speech Task: whispering the vowel /e/ for 3,5 sec

Tongue Perturbation : Step-wise pattern (1 N for 1 s) at TP in randomly selected 1/5 of the trials.

Sensor locations: Tongue Tip (TT), blade (TB), and dorsum (TD), Upper Lip (UL), Lower Lip(LL), and Jaw (J)

Conditions: Perturbation condition (1/5 of the trials), Pink Noise, Silence

Auditory masking (AM) and no masking (NM) conditions were tested in random order.

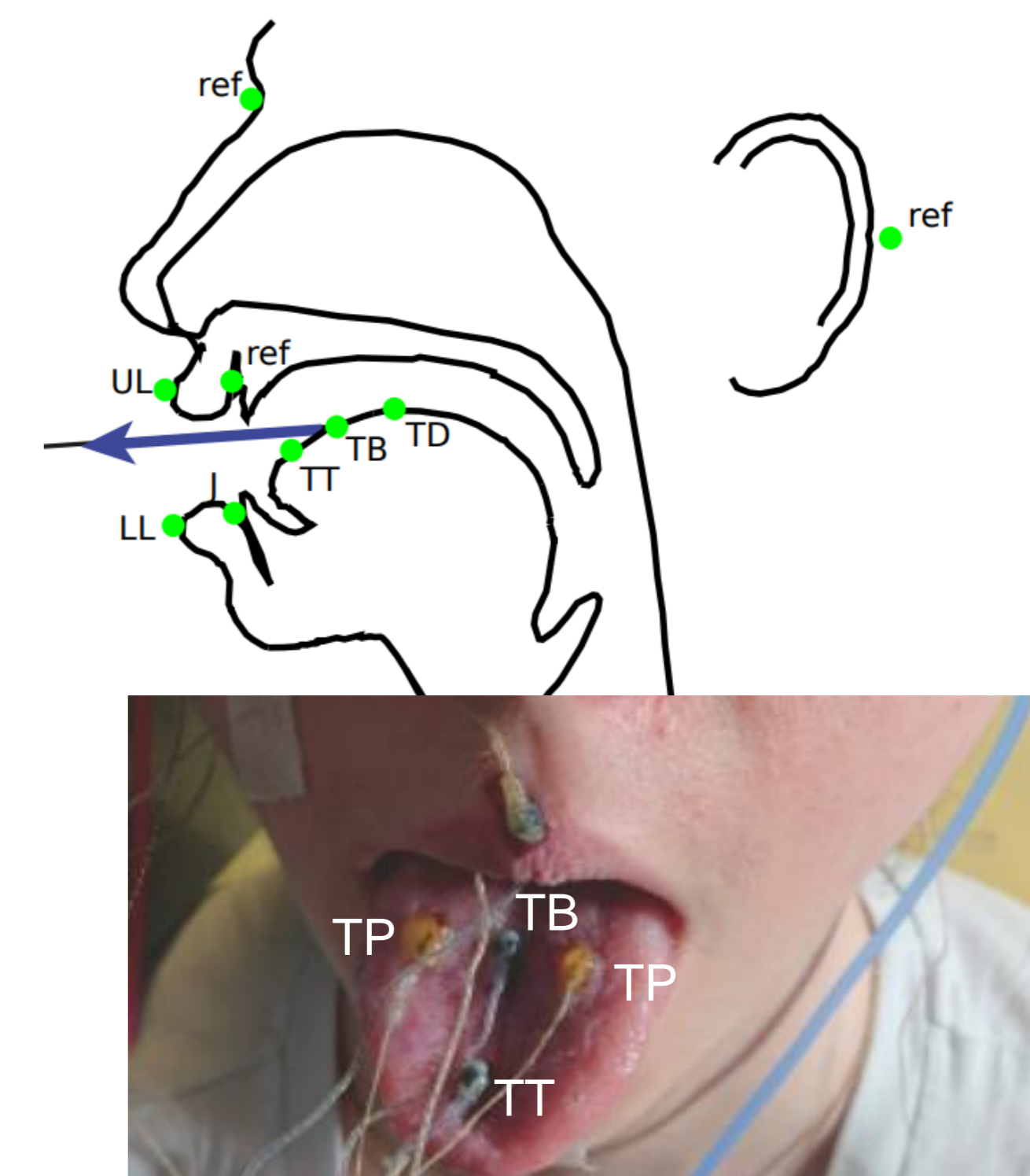
Subjects: 5 native French speakers

Speech Task: whispering the vowel /e/ for 3,5 sec

Tongue Perturbation : Step-wise pattern (1 N for 1 s) at TP in randomly selected 1/5 of the trials.

Sensor locations: Tongue Tip (TT), blade (TB), and dorsum (TD), Upper Lip (UL), Lower Lip(LL), and Jaw (J)

Ito et al, 2020



Results

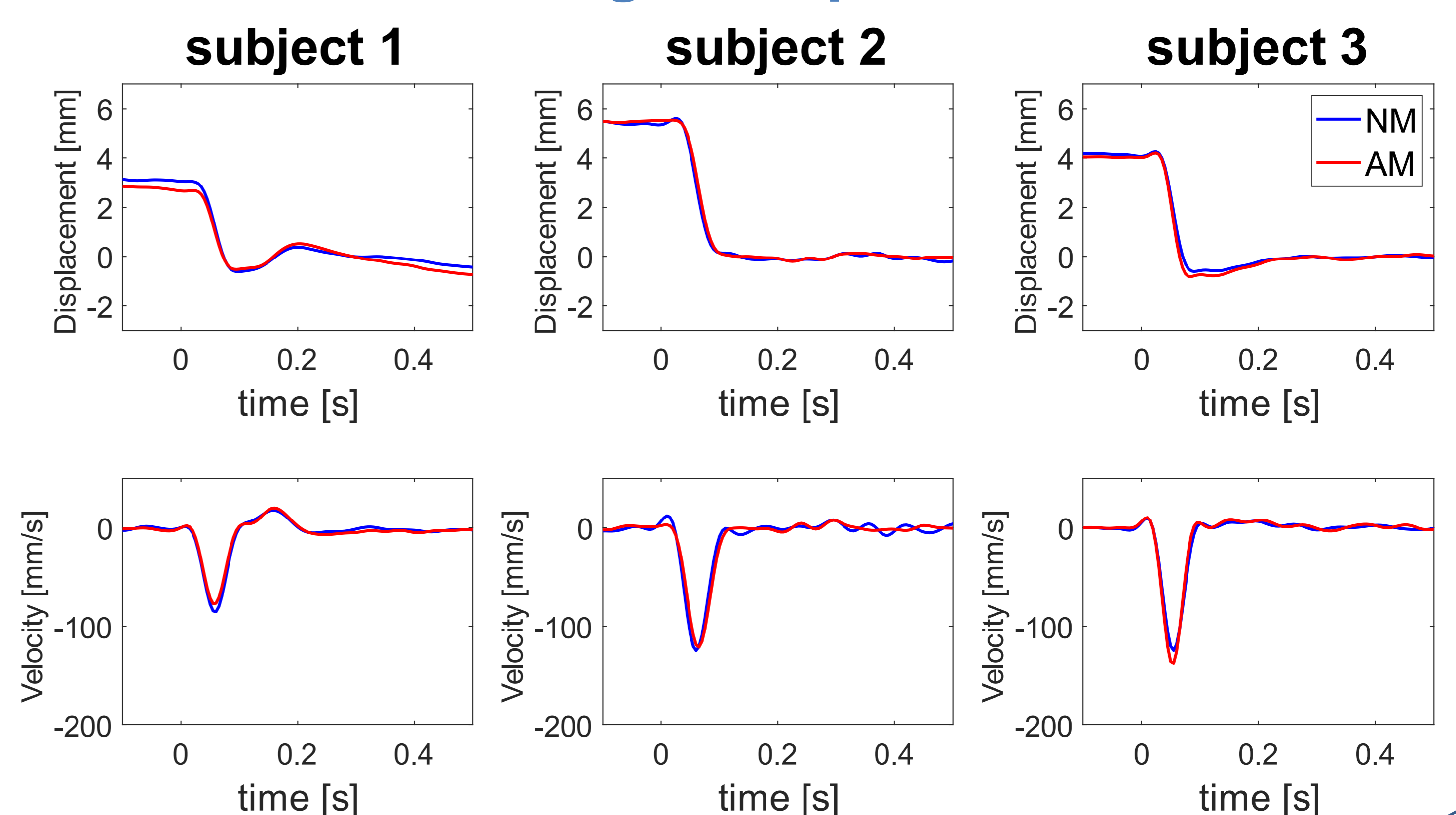
Three subjects' data were currently analysed. Data were aligned at perturbation onset and were averaged across trials.

Two of three participants showed compensatory responses, which were similar to the ones in Ito et al (2020) as follows:

- Consisting of two components, possibly passive and reflex components.
- Response latency

The responses were similar in auditory masking and no masking conditions.

Horizontal tongue displacement at TB



Conclusion & perspectives

- The current compensatory response can be of somatosensory-basis.
- Further investigation (increasing the number of subjects, sound data and additional kinematic analysis) is required.

References

Guenther, F. H., & Hickok, G. (2015). Role of the auditory system in speech production. In Handbook of Clinical Neurology (1st ed., Vol. 129). Elsevier B.V. <https://doi.org/10.1016/B978-0-444-62630-1.00009-3>
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