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Decomposing age effects on speech motor planning

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Background

- Earlier research (Tremblay et al., 2018) showed an age-related decline in the planning or execution of speech movements in cognitively healthy adults
- Reaction time paradigms provide a means to distinguish planning from execution stages in speech production (Maas & Mailend, 2012; Klapp, 1995)
- How do age groups (younger vs. older adults) differ in speech production processes that can or cannot be prepared in advance?

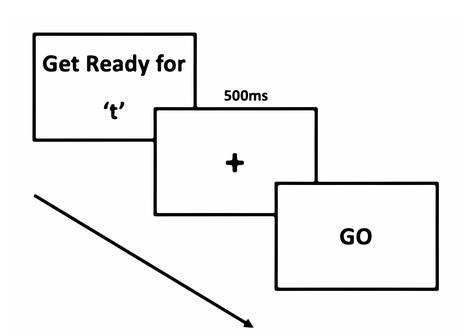
Research Question

Which aspect of speech production (planning/programming OR execution of articulation) is more susceptible to age-related slowing?

Methods

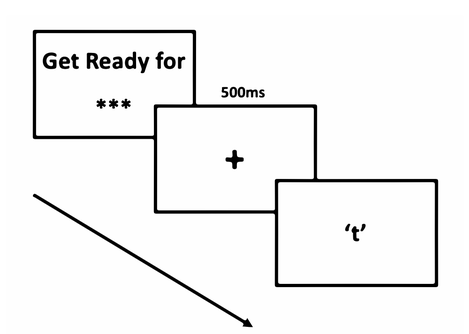
30 healthy younger and **25** healthy older adults produce monosyllabic (/tu/, /ka/, /bi/) & disyllabic (/tuka/, /kabi/ and /bitu/) nonsensical target words in:

Simple Condition



target item pre-programmed

Choice Condition



target item **not yet** pre-programmed

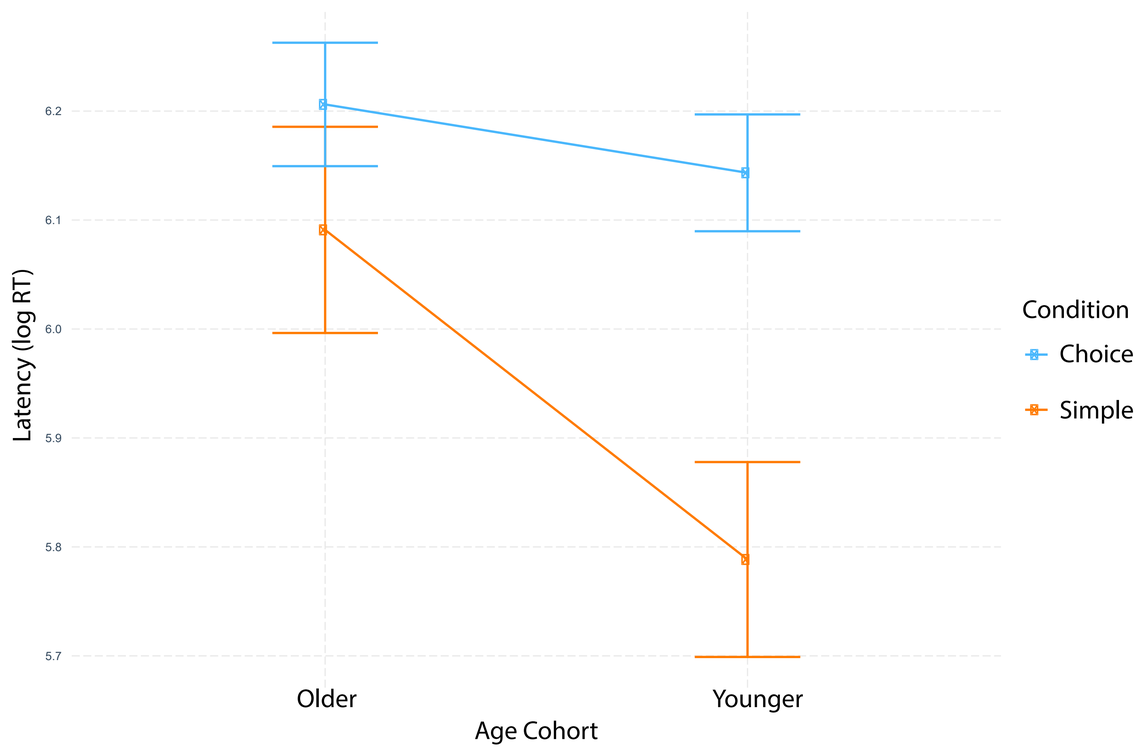
Speaking Latency

RTs (of correct productions) measured as the interval between the onset of the visual cue (either GO in simple condition or initial phoneme in choice condition) and speech onset

Linear mixed-effects models

- Latency RT (correct productions) as *dependent variable*
- Age (younger vs. older), Condition (simple vs.choice), Stimulus Length (monosyllabic vs. bisyllabic), and their interactions as *fixed predictors (with random Participant intercepts, and by-Participant Condition slopes)*

Results



Condition ✓

faster responses in the simple (prepared) than (unprepared) choice condition

Length x Condition ✓

faster responses for monosyllabic targets than disyllabic targets (particularly in the choice condition)

Age x Condition ✓

RT difference between Age cohorts was larger in the simple condition than in the choice condition

Conclusion

Speech production of healthy younger and older adults may differ more in production aspects that cannot be prepared (retrieving and sequencing of motor movements) than on internal speech planning aspects.

This project has received funding from EU's H2020 research and innovation programme under the MSCA GA 675324

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