

# The impact of speech rate on anticipatory eye movements in L1 aging and in L2 speakers

Leigh Fernandez<sup>1</sup>, Paul Engelhardt<sup>2</sup>, Angela Giovanna Patarroyo<sup>3</sup>, Shanley Allen<sup>1</sup>

<sup>1</sup> Technische Universität Kaiserslautern, <sup>2</sup> University of East Anglia, <sup>3</sup> Technische Universität Braunschweig

leigh.fernandez@sowi.uni-kl.de

Mittwoch,  
04.03.2020  
17:00–17:30  
ESA1 O 121

Research has shown that suprasegmental cues in conjunction with visual context can lead to anticipatory (or predictive) eye movements. However, the impact of speech rate on anticipatory eye movements has received little empirical attention. To date, only one study has investigated the impact of speech rate in the VWP (Huettig et al. 2019). Across three studies, they found that participants made anticipatory eye movements when sentences were presented at a “slow” rate but only made anticipatory eye movements at a “normal” speech rate when the visual array was available for an extended period of time. In that study, and like most VWP research, the actual speech rate is somewhat unclear, and given that normal speech rates have been reported anywhere from 2-8 syllables per second (Hertich et al. 2013; Wilshire 1999) it is hard to quantify what is “slow” and “normal”. The purpose of the current study was twofold. Methodologically, we tested the impact of speech rate on anticipatory eye movements by systematically (using Praat) varying speech rate (3.5, 4.5, 5.5, and 6.0 syllables per second) in the processing of filler-gap dependencies. Theoretically, we examined two groups thought to show fewer anticipatory eye movements, and thus, are likely to be impacted by speech rate. Experiment 1 compared younger and older adults, and Experiment 2 compared L1 vs. L2 speakers after hearing a story (1) and a question containing a filler gap dependency (2). We analyzed the weighted empirical logit (log-odds ratio of looks to the target object relative to looks to the non-targets) in a 1000ms time window from 200ms following the onset of the verb (e.g., *tickle* in 2). Results showed that all groups made anticipatory eye movements. However, L2 speakers only made anticipatory eye movements at 3.5 syllables per second, older adults at 4.5 syllables per second, and younger adults at 5.5 syllables per second. At the fastest speed, all groups showed a marked decrease in anticipatory eye movements. This work highlights group-level performance differences in filler-gap prediction, and the importance of speech rate on anticipatory eye movements.

(1) One day a bride and groom were walking in the mall. The bride was feeling playful, so the bride tickled the groom. A clerk was amused.

(2) Who<sub>i</sub> did the bride tickle t<sub>i</sub> in the mall.

**References:** Hertrich, I., Dietrich, S. & Ackermann (2013). How can audiovisual pathways enhance temporal resolution of time-compressed speech in blind subjects? *Frontiers in Psychology*, 4, 1–11. Huettig, F. & Guerra, E. (2019). Effects of speech rate, preview time of visual context, and participant instructions reveal strong limits on predication in language processing. *Brain Research*, 1706, 196–208. Wilshire, C. (1999). The “tongue twister” paradigm as a technique for studying phonological encoding. *Language and Speech* 42, 57–82.