

A study of speech sound sequencing errors due to delayed auditory feedback

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Our capacity for fluent speech depends on monitoring our ongoing productions via incoming sensory feedback. Delayed auditory feedback (DAF) is created by artificially extending the time between speech output and the arrival of signal feedback to the ears. This intervention, which was introduced over a half century ago, severely disrupts fluency in most speakers. While it is clear that some errors under DAF impact the serial order of sound output, these effects are not well-studied. Here we sought to systematically characterize the types and frequencies of errors involving discrete sound units that speakers make under DAF. Ten healthy adults repeated short nonword syllable sequences with pseudorandomly presented delays. They were provided a visual pacing signal to discourage the reduction of speaking rate under DAF. Productions were recorded and transcribed into a machine-readable format, then coded and quantified. We found that the frequency of syllable and vowel repetitions was strongly influenced by DAF, and that these errors occurred most often at longer delays. More generally, the increase in sequencing errors due to DAF suggests that temporal misalignment of perception and production buffers can disrupt phonemic sequencing. The current data thus provide a challenge to current models of speech production and monitoring.