Title: Assessing the Time Course of Perceptual Learning with Pulse Rate Discrimination Training in Younger and Older Adults

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As we age, detriments to auditory temporal processing are observed in individuals with and without hearing loss. These deficits have been observed in electrophysiological and behavioral tasks; however, whether these deficits can be mitigated through auditory training is unknown. This investigation seeks to understand neural mechanisms that contribute to poorer temporal processing in auditory aging and to remediate these deficits through auditory perceptual training. One key aspect of this investigation is to quantify the time course of perceptual learning among younger and older listeners in a simple temporal rate discrimination task. It is hypothesized that: 1) older listeners will have comparable improvements in perceptual learning as younger listeners, but at a slower rate, and 2) pulse rate discrimination will improve more for listeners who train with pulse rate stimuli (on-task training), as compared to those who do not (off-task training).

Participants are younger normal-hearing (YNH), older normal-hearing (ONH), and older hearing-impaired listeners (OHI), randomized to "Experimental" or "Active Control" training groups. All participants undergo pre-post behavioral measures, and nine training sessions with a pulse rate discrimination (Experimental) or a noise-masked tone detection (Active Control) task. Experimental training stimuli are pulse trains of 300 ms duration for two rates (100 and 300 Hz). Active control training stimuli are 500 Hz tones in wideband noise (noise notch widths of 90, 120, 150 Hz). At pre and post-testing, both groups are tested on pulse rate discrimination at 100, 200, 300, and 400 Hz.

Across training sessions, all YNH listeners in the Experimental group show a rapid degree of improvement in rate discrimination from pre-test to the first training session, with no further change throughout the training period. These early improvements in rate discrimination remained at post-test. This pattern is observed in most ONH and some OHI listeners, albeit with a smaller magnitude of early improvement. All listeners in the Active Control group show no change in tone detection thresholds in all noise conditions across the training period. YNH and ONH listeners in the Experimental group show greater improvements in rate discrimination from pre- to post-test than the Active Control group, both with training and near-generalization stimuli. This finding is not as robust in the OHI listeners.

Improvements in rate discrimination are much greater with on-task training, albeit at a slower rate for older listeners. The on-task training paradigm is effective for most normal-hearing listeners, with greater variability for older listeners with hearing loss.

Acknowledgement of Funding: This research is supported by NIH/NIA grant P01 AG055365.

Poster Only

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