

Age effects on timing perception of altered sentence rhythms

Dylan V. Pearson^{1*#}, Yi Shen¹, J. Devin McAuley², Gary Kidd¹

¹Speech and Hearing Sciences, Indiana University – Bloomington, Bloomington, IN

²Department of Psychology, Michigan State University, East Lansing, MI

dylpears@iu.edu, [262-685-2181](tel:262-685-2181)

Speech perception can be facilitated by listeners' ability to anticipate the temporal onset of linguistic units in continuous speech. This can be particularly important for perceiving speech-in-noise, a listening environment that provides specific challenges for older listeners. The present study investigated age effects in listeners' sensitivity to temporal deviations in sentences with both natural and modified speech timing. All listeners recruited were screened for normal hearing and separated into two groups based on age, a younger listener group (18 – 28 years, n = 11) and an older listener group (59 – 82 years, n = 9). Participants were presented sentences in which a portion of speech preceding the final word was replaced by a silent gap. On each trial, an intact sentence was presented, followed by two versions of the sentence with a silent gap: one with the correct timing for the gap (i.e., equal to the duration of the missing speech) and one with altered gap timing (longer or shorter than the missing speech). Listeners judged which of the two versions had the altered timing. An adaptive procedure was used to estimate the duration difference thresholds, with separate adaptive tracks used to calculate thresholds for early-onset (shortened gap) and late-onset (lengthened gap) conditions. In separate conditions, the rhythm of the sentence preceding the gap was either unaltered or modified through a sinusoidal modulation of the speaking rate that altered rhythmic predictability while preserving the total duration.

Results showed that overall thresholds for older listeners' gap duration judgements were not significantly different from those for younger listeners. However, differential sensitivity to speech timing between the age groups were revealed by interactions with age, which showed that only the younger listeners were affected by altered sentence timing or by early vs. late onsets of the final word. Younger listeners had significantly lower thresholds in the early-onset condition compared to the late-onset condition and their ability to judge gap timing was adversely affected by the altered rhythmic contexts, older listeners showed no significant sensitivity to rhythm condition. These results demonstrate a difference in sensitivity to sentence timing between older and younger listeners that is not accounted for by audiometric differences. Further, the insensitivity to altered sentence rhythm may indicate that older listeners are less able to make use of the temporal envelope to anticipate onset of future events and may utilize a different strategy than younger listeners.

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