

BACKGROUND

When listeners estimate the age of speakers from their speech alone, correlation between speaker's chronological age and perceived age is very strong (e.g. Shipp & Hollien, 1969).

Effects of Listener Age

- Listeners are good at estimating the speakers in their age bracket (Hollien & Tolhurst, 1978).
- Listeners (especially older listeners) overestimate the age of young speakers (Huntley et al, 1987).
- Listeners (especially younger listeners) underestimate the age of older speakers (e.g., Ptacek & Sander, 1966; Huntley et al., 1987).
- It is also reported that older listeners underestimate the speakers in their own age group (Huntley et al., 1987).

Effect of Language Familiarity

- Age estimation is better for the native speakers than foreign speakers (Nagao, 2006).

Effect of the amount of information

- Age estimation improved as the contextual information became richer (Nagao, 2006).

RESEARCH QUESTIONS

Q1 Does the amount of information affect the age estimation in elderly listeners?

- 1a) Correlations between perceived age and chronological age.
- 1b) Age estimation accuracy.

Q2 Does the speaker language affect the age estimation in elderly listeners?

Q3 Do older and young listeners have the same age categories?

METHODS

Speakers

* English native speakers

- Young:** 10 speakers (5 m & 5 f), Age 24 to 30, Average age 25.8 years.
- Middle-age:** 10 speakers (5 m & 5 f), Age 54 to 60, Average age 57.0 years.
- Elderly:** 10 speakers (5 m & 5 f), Age 80 to 86, Average age 82.1 years.

* Japanese native speakers

- Young:** 10 speakers (5 m & 5 f), Age 25 to 30, Average age 27.6 years.
- Middle-age:** 10 speakers (5 m & 5 f), Age 55 to 60, Average age 56.7 age years.
- Elderly:** 10 speakers (5 m & 5 f), Age 80 to 86, Average age 82.5 years.

- No history of speech and language problem
- No history of stroke or any other neurological disorders.
- Long residence history within the native dialect regions
- Normal hearing for their age
- Ambulatory

Stimuli

- Vowel stimuli** 500 millisecond of the sustained vowel /i/.
- Phrase stimuli** The target phrase "BCC" cut out from the carrier sentence in speaker's native language.
- Sentence stimuli** Reading of the second sentence of *The North Wind and the Sun* in speaker's native language.

Listeners

- * **Elderly listeners**
15 participants (5 m and 10 f) in Bloomington, IN.
Age 67 to 84, Average age 73.5 years.
- * **Young listeners**
24 participants (9 m and 15 f) in Bloomington, IN
Age 18 to 28, Average age 20.6 years.

- Normal hearing for their age
- Native speakers of the same variety of American English
- No knowledge of Japanese language

Task

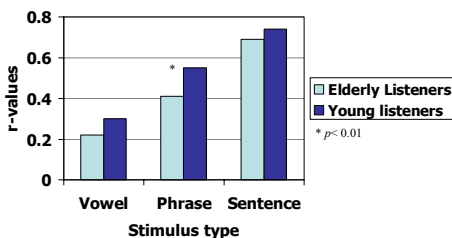
- Listen to each stimulus through headphones, and estimate the age of a talker in years.
- Each stimulus can be replayed up to three times.
- One response per stimulus.
- Total number of stimuli was 180 (60 speakers x 3 types of stimuli)

Analysis

- Correlation between perceived age and the actual age.
- Fisher's r to z transformation test was used for comparing two correlation values.
- Data was compared with the perception results collected from the young listeners from previous study.
- Perceived age of 60 sentences stimuli were rank-ordered for each listener, and categorized into 9 age groups.

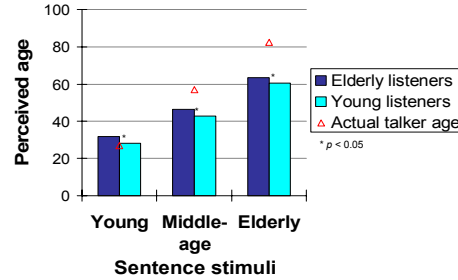
RESULTS

1a. Correlation between chronological age and perceived age for the phrase stimuli was lower in the elderly listeners than in the young listeners.

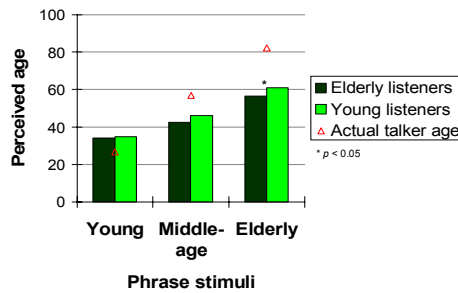


RESULTS (continued)

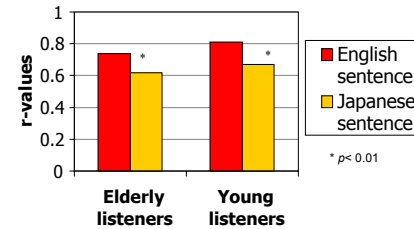
1b. When listeners judged the sentence stimuli (richest context):
More accurate age estimation for elderly speakers in the elderly listeners.
More accurate age estimation for young speakers in the young listeners.



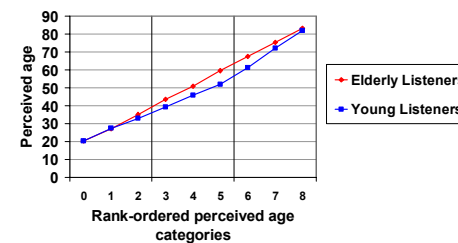
When listeners judged the phrase stimuli:
Age estimation accuracy decreased in the elderly listeners.



2. Age estimation is better for speakers in their native language.



3. Both listener groups used the similar range for age estimation (20-82 yrs old). However, the age scale is evenly distributed in the elderly listeners (Avg. 7.8 yr). Young listeners showed finer scale for younger age categories (Avg. 6.3 yr span between 0 and 5) and more coarse scale for older age categories (Avg. 10.0 yr span between 6 and 8).



SUMMARY & IMPLICATIONS

1. Overall performance was similar in both listener groups.
2. The amount of information in the phrase stimuli might not be rich enough for the elderly listeners to estimate the age of speakers.
3. Listeners are good at estimating the age of speakers in their own age and language group.
4. Age categories for older age groups may not be finely represented in the young listeners as in the elderly listeners.

Acknowledgements

Supported by Nemours Biomedical Research. Many thanks to Katie McCurdy (Indiana University) for her help to locate participants.

References

Hollien & Tolhurst (1978). The aging voice. In B. Weinberg (Ed.), Transcripts of the seventh symposium care of the professional voice, part II: Life span changes in the human voice (pp. 67-73). New York: Voice Foundation.
 Huntley, R., Hollien, H., & Shipp, T. (1987). Influences of listener characteristics on perceived age estimations. *Journal of Voice*, 1, 49-52.
 Nagao, K. (2006). Cross-language study of age perception. Doctoral dissertation, Indiana University, Bloomington.
 Ptacek & Sander. (1966). Age recognition from voice. *Journal of Speech and Hearing Research*, 9(2), 273-277.
 Shipp, T. & Hollien, H. (1969). Perception of the aging male voice. *Journal of Speech and Hearing Research*, 12(4), 703-710.