

Cross-language study of age perception: A sociolinguistic perspective on talker's sex

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Age perception literature

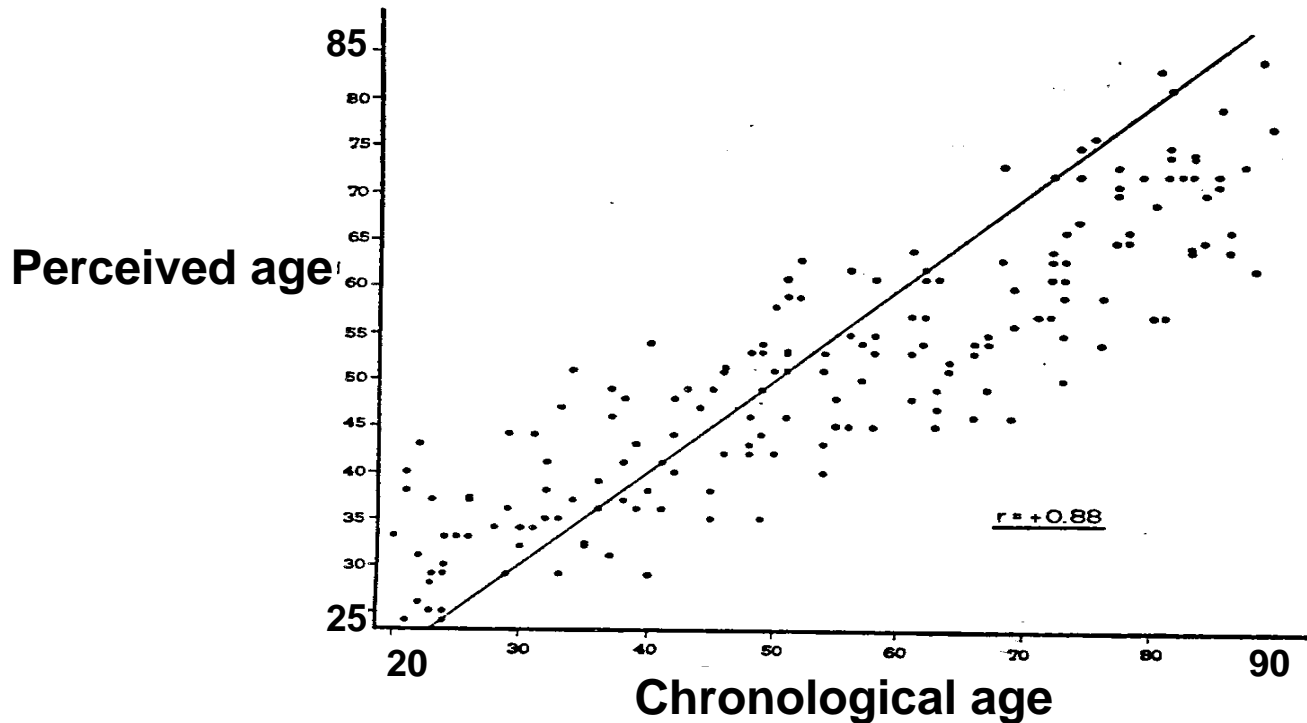
- Listeners can perceive talkers' age quite accurately by listening to speech alone.

(e.g., Ptacek & Sander, 1966; Shipp & Hollien, 1969; Ryan & Burk, 1974).

Age perception literature (cont.)

- Shipp & Hollien (1969)
 - 175 male speakers aged from 20-89.
 - Direct age estimation by 25 listeners.
 - Correlation between the mean perceived age and chronological age was 0.88.

Relationship b/w Perceived age and Chronological age (Shipp & Hollien, 1969)



[Scatter plot of the mean perceived age vs. chronological age of 175 men in Shipp & Hollien (1969).]

Age perception literature (cont.)

- Physiological vs. Sociolinguistic Aging
 - Previous literature assumes that listeners estimate age based on physiologically determined aspects of speech.
- English vs. Japanese
 - Previous literature based mostly on English
 - and none is cross-language.
- Male vs. Female
 - Usually focused on single sex, i.e. males.
 - Previous comparisons of male & female talkers are inconsistent (cf. Neiman & Applegate, 1990; Baker, 1981; Kukol, 1979)

Sex differences related with aging: Physiological aspects

- Men undergo earlier and more substantial age-related physiological changes than women.
 - Pulmonic & Laryngeal structures
 - Hearing sensitivity
- The same tendency can be observed in many language communities.
- ➔ Listeners' age estimation would be better for male talkers.
- ➔ No cross-language differences.

Sex differences related with aging: Social/Demographic aspects

- Women outlive men.
Avg. life expectancy
Male Female
US : 74.5 79.9
- Male-Female ratio decreases with age.
- Similar in many countries.
- ➔ A better estimation for female talkers.
- ➔ No cross-language differences.

Age group	Male-Female ratio(=M/F)
25-34	1.02
55-64	0.92
65-74	0.82
75-84	0.65
85+	0.41

[US Census 2000]

Sex differences related with aging: Social/Demographic aspects (US vs. Japan)

- Avg. life expectancy

	Male	Female
US	: 74.5	79.9
Japan:	78.6	85.6

- Living arrangements

- Elderly who live with their child: 54% (Japan) vs. 15% (US)
- The proportion of three-generation households is higher in Japan than the US.

- Social role of person's age

- Japanese may be more age-sensitive.

➔ Japanese might have an advantage of estimating talker's age.

Sex differences related with aging: Sociolinguistic aspects

- Sociolinguistic differences
 - Speech variations
 - Women tend to use more advanced forms of active linguistic change.
 - Men tend to use conservative forms.
- (Labov, 1990, 2001)
- ➔ Estimating the age of female talkers might be easier.
 - ➔ Listeners who are not familiar with a language community could have a disadvantage.

Research questions

1. Does language familiarity affect the listeners' performance of age perception?
2. Does talkers' sex affect age perception?
3. And if so, how do the sex factor interact with the language familiarity factor?

Perception Experiment

Perception Experiment (cont.)

Talkers

- 2 language groups
 - **English:** 30 native speakers in Bloomington, IN.
 - **Japanese:** 30 native speakers in Kobe, Japan.
- 3 age groups
 - Young (25-30 years)
 - Middle-aged (54-60 years)
 - Elderly(80-86 years)
- Equal number of men and women

Perception Experiment (cont.)

Stimuli

- Readings of *The North Wind & the Sun*

English:

“They agreed that the one who could make the traveler take his coat off would be considered stronger than the other one.”

Japanese:

“Tabibito no gaitoo wo nugaseta hoo ga kachi to iukoto ni kimete mazu kita kaze kara hazimemashita.”

- Blocked by the talker’s language
- Each stimulus presented thru a headphone under computer control.

Perception Experiment (cont.)

Listeners

- **English group**
 - 24 English native speakers in Bloomington, IN
 - Mean age = 20.6 years
- **Japanese group**
 - 24 Japanese native speakers in Kobe, Japan.
 - Mean age = 19.0 years

Perception Experiment (cont.)

Task

- Direct age estimation of each talker under computer control
- No instructions about expected age range or the non-native language
- Age responses in years: 1 to 100.

Results

1. Correlations b/w Perceived age (PA) and Chronological age (CA).
2. Estimation accuracy

Correlation: Language familiarity

- Higher correlations were found when the listeners estimate the age in the familiar language.

Table. The r-values b/w PA and CA.

Talker language	Listener language		<i>p-two tailed</i>
	English	Japanese	
English	.81	.67	< .01
Japanese	.70	.89	< .01

Correlation for English talkers (male vs. female)

- English listeners showed a higher correlation for females than males.
- Japanese listeners did not exhibit this sex difference.

Table. The r-values b/w PA and CA for English talkers.

Talker language	Listener language	Male	Female	<i>p</i> -two tailed
English	English	.76	.86	< .0001
English	Japanese	.72	.74	ns

Correlations for Japanese talkers (male vs. female)

Table. The r-values b/w PA and CA for Japanese talkers.

Talker language	Listener language	Male	Female	<i>p</i> -two tailed
Japanese	Japanese	.85	.93	< .0001
Japanese	English	.65	.69	ns

- The same sex difference pattern was found for Japanese talkers.

Correlation: Listener's sex

- Listeners' sex did not influence on the age perception.

Summary of correlation results

- Better age estimation was found when listeners listened to a familiar language.
- Listeners' age estimation was better for female talkers than male talkers *only* when listeners listened to a familiar language.
- Listeners' sex does not affect on age perception.

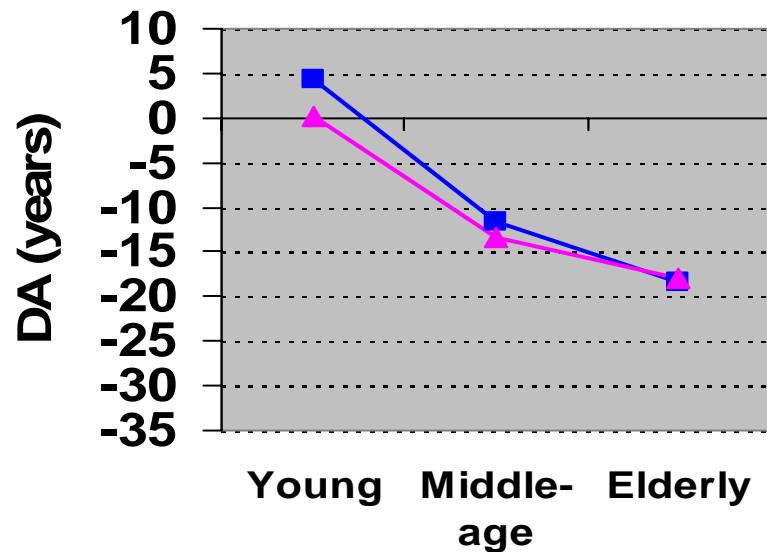
Results

1. Correlations b/w Perceived age (PA) and Chronological age (CA).
2. Estimation accuracy
 - DA: Difference b/w PA and CA
 - $DA = PA - CA$

Accuracy for English talkers by English listeners

English listeners

Talkers: ■ male ▲ female

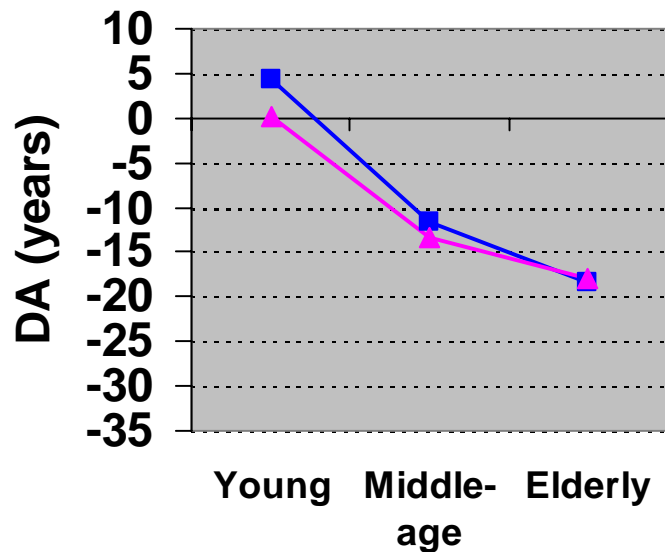


- No sex difference was found in terms of accuracy.
- Error increased as the speakers becomes older.

Accuracy for English talkers by English vs. Japanese listeners

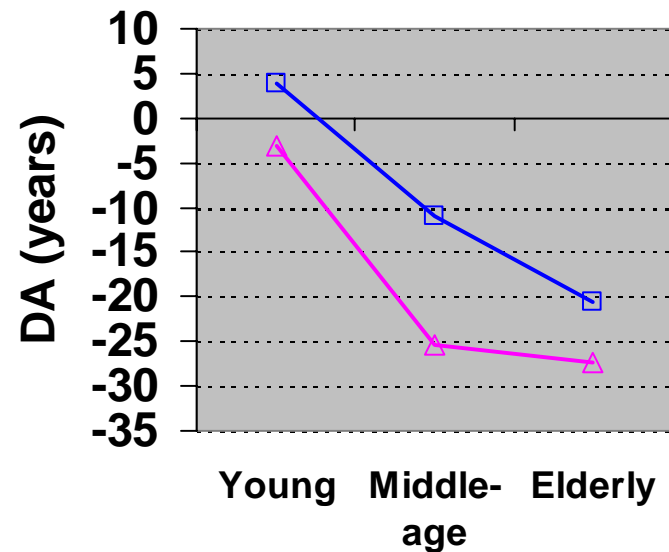
English listeners

Talkers: ■ male ▲ female



Japanese listeners

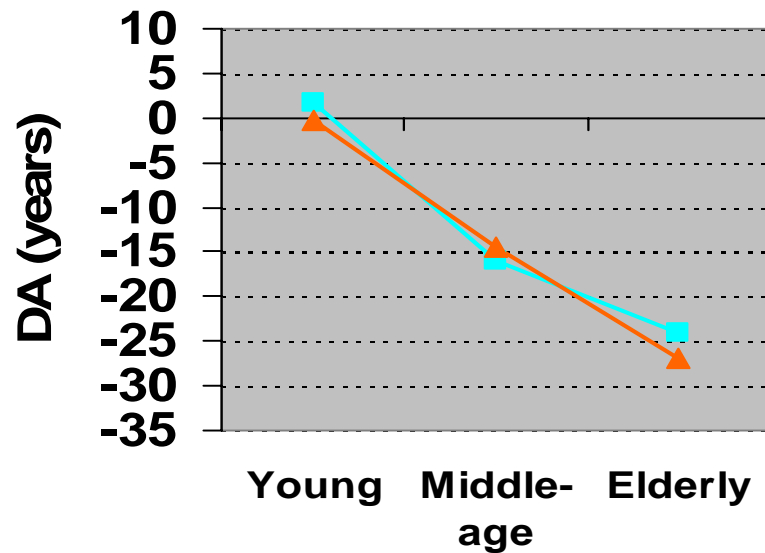
Talkers: □ male ▲ female



Accuracy for Japanese talkers by English vs. Japanese listeners

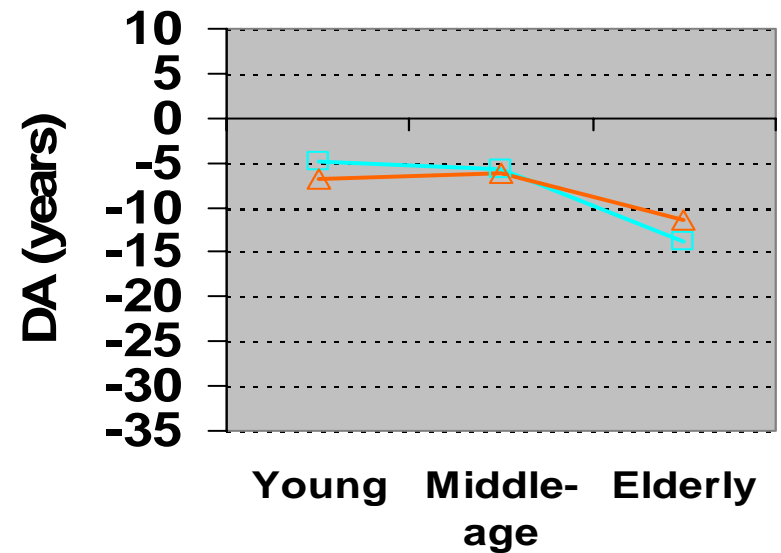
English listeners

Talkers: ■ male ▲ female



Japanese listeners

Talkers: ■ male ▲ female



Summary of accuracy results

- Accuracy decreased as the age of speakers increased.
- No sex differences in terms of accuracy, except Japanese listeners' underestimation for English females.
- As for the age estimation for the native language, Japanese listeners were better judges than English listeners.

Results summary

- Better age estimation was found when listeners listened to a familiar language.
- Listeners' age estimation was better for female talkers than male talkers *only* when listeners listened to a familiar language.
- Regardless of male or female, age estimation errors increased with the age of talkers.
- Japanese were better judges, especially with older talkers.

Why was the age estimation better for female than male talkers?

- Physiological accounts
 - Predicts a better estimation for male.
- Social/Demographic accounts
 - Predicts a better estimation for female.
 - However, also predicts no difference between 2 listener groups.
- Sociolinguistic accounts
 - Predicts a better estimation for female.
 - And, predicts a difference due to the language.

Conclusions

- Age perception is influenced by listener's language familiarity and talker's sex.
- Listeners use sociolinguistic variations in speech to estimate the age of talkers.

Slides of this talk will be downloadable from:

<http://mypage.iu.edu/~knagao/>

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