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

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

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

<table>
<thead>
<tr>
<th>Age group</th>
<th>Male-Female ratio(=M/F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-34</td>
<td>1.02</td>
</tr>
<tr>
<td>55-64</td>
<td>0.92</td>
</tr>
<tr>
<td>65-74</td>
<td>0.82</td>
</tr>
<tr>
<td>75-84</td>
<td>0.65</td>
</tr>
<tr>
<td>85+</td>
<td>0.41</td>
</tr>
</tbody>
</table>

[US Census 2000]
Sex differences related with aging: Social/Demographic aspects (US vs. Japan)

- Avg. life expectancy
  
<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>74.5</td>
<td>79.9</td>
</tr>
<tr>
<td>Japan</td>
<td>78.6</td>
<td>85.6</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Talker language</th>
<th>Listener language</th>
<th>p-two tailed</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>.81</td>
<td>&lt; .01</td>
</tr>
<tr>
<td>Japanese</td>
<td>.67</td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>.70</td>
<td>&lt; .01</td>
</tr>
<tr>
<td>Japanese</td>
<td>.89</td>
<td></td>
</tr>
</tbody>
</table>
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>
<thead>
<tr>
<th>Talker language</th>
<th>Listener language</th>
<th>Male</th>
<th>Female</th>
<th>p-two tailed</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>English</td>
<td>.76</td>
<td>.86</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>English</td>
<td>Japanese</td>
<td>.72</td>
<td>.74</td>
<td>ns</td>
</tr>
</tbody>
</table>
Correlations for Japanese talkers (male vs. female)

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

<table>
<thead>
<tr>
<th>Talker language</th>
<th>Listener language</th>
<th>Male</th>
<th>Female</th>
<th>p-two tailed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japanese</td>
<td>Japanese</td>
<td>.85</td>
<td>.93</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>Japanese</td>
<td>English</td>
<td>.65</td>
<td>.69</td>
<td>ns</td>
</tr>
</tbody>
</table>

- 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

- 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

LSA Albuquerque, NM, 1/7/2006
Accuracy for Japanese talkers by English vs. Japanese listeners

English listeners
Talkers: ▲ male ▲ female

Japanese listeners
Talkers: ▲ male ▲ female

DA (years)

Young Middle-age Elderly

LSA Albuquerque, NM, 1/7/2006
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.

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References


