Implications of Language Experience on Accuracy of Speaker Identification

Raquel Mendizabal

Follow this and additional works at: http://digitalcommons.hope.edu/curcp_14

Recommended Citation

http://digitalcommons.hope.edu/curcp_14/23
**Implications of Language Experience for Accuracy of Speaker Identification**

**Raquel Mendizabal**

Faculty Mentor: Dr. Sonja Trent-Brown, Hope College, Holland, MI

---

### Background

- Previous studies suggest that listeners can identify speaker gender and ethnicity from auditory information (Lass et al., 1979; Thomas & Reaser, 2004; Perrachione et al., 2008).
- A previous study analyzing the conditions of temporal, phonetic complexity, speaker gender, and speaker ethnicity found that, overall, listeners were significantly more accurate in identifying forward, sentences, males, and European Americans (Trent-Brown et al., 2011).
- A previous study found that female listeners (69%) were significantly more accurate than male listeners (67%) in identifying speaker.

This study examines the extent to which some listener characteristics influence listener's accuracy in identifying speakers.

- Given that the language experience listeners have been exposed to influences individual formation, this study examines how language experience influences listeners' ability to correctly identify speakers.

### Hypotheses

- Participants who have lived in more places and more regions will have better accuracy in speaker identification.
- Participants who have lived in places with more demographic diversity will have better accuracy in speaker identification.
- Participants who have lived in places with a higher European American population will have higher accuracy identifying European American speakers compared to participants who have lived in places with a lower European American population.
- Participants who have lived in places with higher African American populations will have higher accuracy identifying African American speakers compared to participants who have lived in places with lower African American populations.
- Multilingual participants will have higher accuracy identifying speakers.

### Method

**Participants**

- Data from 466 listeners (295 females, 171 males) was used in the study.
- Most participants were undergraduate college students (mostly from Hope College) and the majority of them were 18-22 years old.
- All participants were English speakers and all had lived in the United States for at least 3 months.

**Mostly European Americans.**

**Procedure**

- Before completing the study, participants completed a Language Background Questionnaire with questions such as:
  - List the places in the United States (City/State) you have lived in for 3 months or more
  - List the places outside the United States you have lived in for 3 months or more
  - Was your first language English?
  - Are you fluent in another language(s), other than English? Which one(s)?
  - Participants listened to four blocks, two with sentences and two with words and two reversed and two normal. Each block was made up of 220 items with an equal number of items spoken by either an African American and European American, and female and male.
  - Listeners had to click on the image in the screen of the speaker they thought the audio belonged to.

**Participants**

- Data from 466 listeners (295 females, 171 males) was used in the study.
- Most participants were undergraduate college students (mostly from Hope College) and the majority of them were 18-22 years old.
- All participants were English speakers and all had lived in the United States for at least 3 months.

**Mostly European Americans.**

**Procedure**

- Before completing the study, participants completed a Language Background Questionnaire with questions such as:
  - List the places in the United States (City/State) you have lived in for 3 months or more
  - List the places outside the United States you have lived in for 3 months or more
  - Was your first language English?
  - Are you fluent in another language(s), other than English? Which one(s)?
  - Participants listened to four blocks, two with sentences and two with words and two reversed and two normal. Each block was made up of 220 items with an equal number of items spoken by either an African American and European American, and female and male.
  - Listeners had to click on the image in the screen of the speaker they thought the audio belonged to.

### Results

**African American Language Exposure**

Our hypothesis was not supported

<table>
<thead>
<tr>
<th>Variable 1</th>
<th>Variable 2</th>
<th>Pearson Correlation</th>
<th>Significance (2-tailed)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American Language Exposure</td>
<td>Overall Identification Rating of African American Speakers in Forward Sentences</td>
<td>.01</td>
<td>.91</td>
<td>466</td>
</tr>
</tbody>
</table>

**European American Language Exposure**

Our hypothesis was supported

<table>
<thead>
<tr>
<th>Variable 1</th>
<th>Variable 2</th>
<th>Pearson Correlation</th>
<th>Significance (2-tailed)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>European American Language Exposure</td>
<td>Overall Identification Rating of European American Speakers in Forward Sentences</td>
<td>.109</td>
<td>0.0118</td>
<td>466</td>
</tr>
</tbody>
</table>

**Number of Regions**

Our hypothesis was not supported

<table>
<thead>
<tr>
<th>Variable 1</th>
<th>Variable 2</th>
<th>Pearson Correlation</th>
<th>Significance (2-tailed)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Regions</td>
<td>Overall Accuracy for Identification of African American Speakers in Forward Sentences</td>
<td>.003</td>
<td>.951</td>
<td>466</td>
</tr>
</tbody>
</table>

**Number of Languages**

Our hypothesis was not supported

<table>
<thead>
<tr>
<th>Variable 1</th>
<th>Variable 2</th>
<th>Pearson Correlation</th>
<th>Significance (2-tailed)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Languages</td>
<td>Overall Accuracy for Identification of European American Speakers in Forward Sentences</td>
<td>.015</td>
<td>.873</td>
<td>466</td>
</tr>
</tbody>
</table>

### Discussion

- We found that participants who had lived in more places did not have a higher accuracy in identifying speakers than participants who lived in less number of regions.
- Multilingual participants were not more accurate than participants who were fluent in one language in identifying speakers.
- Participants who had a higher European American language exposure were not more accurate in identifying European American speakers than participants with a lower European American language exposure.
- We found that participants who had higher African American language exposure were more accurate in identifying African American speakers and were less accurate in identifying European American speakers in forward sentences.
- Therefore, our results suggest that it is not overall language experience that affects accuracy for speaker identification, but rather it is the specific and direct language exposure to a specific group.

### Acknowledgments

We would like to thank:

- The Hope College Psychology Department
- The Jacob E. Nyenhuis Student/Faculty Cooperative Research Grant
- The Willard Wickers Faculty Development Fund