Distinguishing Dick from Jane: Children’s voices are more difficult to identify than adults’ voices

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**Background**

Prior work has shown that voice recognition depends on both acoustic and linguistic information. Children’s speech productions can differ dramatically from adult speech productions, stemming from differences in vocal tract size, articulatory control and linguistic knowledge.

What effect do these differences between adult and child speech have on voice recognition?

We previously found that, surprisingly, even mothers were not as accurate as expected at identifying their own children’s voices. The current study examined adult listeners’ ability to discriminate between (Experiment 1) and learn to identify (Experiment 2) child and adult voices.

**Experiment 1 – Perceptual Voice Discrimination**

**Participants:** Adult native English speakers (N=40)

**Stimuli:** 20 child voices (10 female) and 20 adult female voices
- Constructed same-age pairs of voices producing 2 different words
- Two trial types: same or different voice (each voice paired with 4 other voices)

**Procedure:** AX ‘same-different’ voice discrimination task
- Listeners judged if two words were spoken by the same talker or two different talkers

**Results**

<table>
<thead>
<tr>
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<th>Child</th>
<th>Adult</th>
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<tbody>
<tr>
<td>Hit Rate (proportion of “different” responses in different trials)</td>
<td>39.9%</td>
<td>65.1%</td>
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<tr>
<td>False Alarm Rate (proportion of “different” responses in same trials)</td>
<td>26.7%</td>
<td>29.2%</td>
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Listeners performed worse at telling apart child voices than adult voices.

**Experiment 2 – Perceptual Voice Learning**

**Participants:** Adult native English speakers (N=24)

**Procedure:** 2-day voice learning task
- 4 adult female voices (e.g., Day 1)
- 4 child female voices (e.g., Day 2)

**Familiarization**
Learn to associate a voice with a cartoon face

**Training**
Hear a word and indicate who said it (with feedback)
Must reach training criterion (70%) to advance to test

**Test**
Hear a word and indicate who said it (no feedback)

Listeners reached the training criterion faster for adult than child voices.
Listeners performed above chance at identifying the voices from both age groups, but they performed worse with child than adult voices.

**Discussion**

This study provides the first evidence of adult listeners’ ability to differentiate and identify voices of children as young as 2.5 years of age.

- **Experiment 1:** Listeners struggled with telling apart child voices relative to adult voices.
- **Experiment 2:** With training, adult listeners learned to identify children’s voices above chance, but child voice learning was slower and less accurate than adult voice learning.

The lack of a relationship between adult and child voice learning may indicate that
- indexical cues used to identify adult voices may not be informative for identifying child voices.
- successful child voice recognition may require a re-tuning of the system to attend to different cues (e.g., child-specific patterns of mispronunciations).

Future work will clarify the role of experience in voice learning by testing mothers of 3- to 5-year-olds to examine whether mothers’ prior experience with their own children will facilitate learning.