INTRODUCTION AND RATIONALE

- Traditional studies of children’s speech sound acquisition have relied primarily on phonetic transcription.
- However, listeners can be biased by various speaker-related factors.
- This biasing can go in either direction:
  - Listeners may be more lenient when they think they are listening to a younger child (e.g. Schellinger, 2008).
  - Listeners may be more critical when they think they are listening to a child with a speech sound disorder (e.g. Pedel & Salvia, 1976).
- Much of this research has focused on biasing listeners with pictures of children with and without disorders.
- The focus of this research was to determine whether we could bias listeners with only an auditory prompt, as this is more ecologically valid.

PREVIOUS RESEARCH WITH AUDITORY PROMPTS

Schellinger and colleagues also used an auditory prompt to bias listeners:
- The auditory prompt was the carrier phrase “I really like” or “I want my nails done.”
- The stimuli were CV sequences with initial /d/ or /g/.
  - In one experiment, listeners judged intermediate productions more leniently when they thought they were produced by younger speakers (Schellinger, 2008).
  - In another experiment, listeners judged intermediate productions more strictly when they thought they were produced by younger speakers (Munson et al., 2010).
- The only difference between the two experiments was the instructions to the adult listeners.
- A problem with the Schellinger et al. experiment was that the carrier phrase was produced by a single speaker, while the stimuli were produced by multiple speakers.

PURPOSE OF THIS EXPERIMENT

- To determine whether an auditory prompt that was produced by the same child as the stimuli CV sequences biased listeners more consistently.
- To determine the biasing effect of the carrier phrase more accurately.
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METHOD: EXPERIMENT 1

Purpose: To determine whether word lists composed of correctly or incorrectly produced words could affect listener judgments of speaker age.

Participants:
- 20 young adult native speakers of English

Stimuli:
- Word lists containing four words taken from recordings of 2- to 5-year-old typically developing English-speaking children
  - A correct and an incorrect list was created with productions from each child speaker who contributed consonant-vowel (CV) sequences to experiment 2.
  - Correct list: four words, each produced without errors
  - Incorrect list: four words, each produced with one or more errors

Procedure:
- Carrier word lists were presented in random order
- Participants clicked on a line to indicate their opinion of the age of the speaker
- The left boundary indicated a very young child (“less than 2 years of age.”)
- The right boundary indicated a somewhat older child (“more than 5 years of age.”)

Analysis:
- We analyzed the average age estimate for each child speaker based on: 1) actual age of child; and 2) whether the correct list or the incorrect list had been presented.

METHOD: EXPERIMENT 2

Purpose: To determine if listeners’ judgments of speech sound accuracy could be biased by their perception of speaker age.

Correct list: Corrected older child
Incorrect list: Corrected younger child

Participants:
- 20 young adult native speakers of English

Stimuli:
- Children’s productions of consonant-vowel (CV) sequences containing word-initial /d/ or /g/ from the following transcription categories:
  - Correct productions of /d/ and /g/.
  - Clear substitutions of [d] for /g/ and [g] for /d/.
  - Tokens transcribed as intermediate between the target sounds /d/ and /g/.
  - Correct and incorrect lists from experiment 1.

Procedure:
- Participants heard each CV twice, once after the correct list and once after the incorrect list.
- Listeners participated in two blocks:
  - Block 1: “Was the /d/ sound produced correctly?”
  - Block 2: “Was the /g/ sound produced correctly?”

Instructions to listeners:
- When children are learning to talk, they often make mistakes such as saying sounds for good. For this experiment, you will be listening to many different children who are learning to produce “g” at the beginning of a word. Some of their productions will be correct and some will be mistakes such as said for good. For each item, you will hear a list of four words produced by a child followed by a syllable that begins with “g.” Your job is to answer the question “Is it a correct /g/?” as quickly and accurately as possible.

Analysis:
- We computed the average accuracy score for each CV, based on: 1) transcription category; and 2) whether it was paired with the correct or incorrect list.

RESULTS: EXPERIMENT 1

Figure 1: Rating display for experiment 1

RESULTS: EXPERIMENT 2

Figure 2: Scatter plot of estimated age as function of talkers’ age in months

Figure 3: Response to “Is it a correct /g/?” (top plot) and “Is it a correct /d/?” (bottom plot) as a function of transcription category and carrier list. Black bars show percent “yes” responses for stimuli preceded by “correct” carrier list and gray bars for stimuli preceded by “incorrect” carrier list.

- Results were similar for both the “Is it a correct /g/?” and the “Is it a correct /d/?” blocks
- For both blocks, there was a significant main effect of transcription category on percent “correct” responses.
- For both blocks, there was no significant main effect of carrier list and no significant transcription x list interaction.
- For both blocks, post-hoc comparisons showed that all transcription categories were significantly different from each other with the exception of:
  - No significant difference between correct /d/ and /g/ for /g/ substitutions.
  - No significant difference between correct /g/ and correct /d/.

CONCLUSION & DISCUSSION

- We were unable to bias listeners with an auditory prompt in this experiment.
- It is possible that we saw no effect of carrier list because listeners judge stop consonants more categorically than they judge fricatives, given the different results of Schellinger and colleagues.
- To test this hypothesis, we plan to try this same carrier list method with fricatives instead of stop consonants.
- Moreover, these results, taken together with the results of Schellinger and colleagues, suggest that listener bias based on auditory prompts alone is relatively fragile and differs as a function of both instructions to listeners and perhaps, characteristics of the stimuli.

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