

# The Effects of Listener Bias on the Perception of Accuracy in Children's Speech

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## INTRODUCTION

### PHONETIC TRANSCRIPTION

Phonetic transcription is a tool that has long been used by speech-language pathologists (SLPs) to record the accuracy of children's productions of speech sounds. Transcription has generally been considered to be an objective method, and not subject to bias when used by speech-language clinicians with professional training.

### TRANSCRIPTION CHALLENGES

- Children's productions of speech sounds do not always fall into distinct categories that match adults' productions.
  - Sometimes children produce *intermediate productions* (productions that lie between two adult endpoints). Because adults tend to perceive speech categorically, these are generally labeled as one of the endpoints. A related phenomenon is *Covert Contrast* (cases where children produce a difference between two sounds, but adults perceive the children's productions to be identical)
- A listener's expectations can influence his or her rating and judgment of a child's production.
  - Previous work (Schellinger, Edwards, Munson, and Beckman, 2008a,b,c) suggested that listener's expectations about a child's age and developmental level can affect his or her rating and subsequent transcription of the child's production. In their preliminary experiment, they presented productions of /s/ and /θ/ that were preceded by two types of carrier phrases, one type with correct productions and one with speech-sound errors. The carrier phrases were presented in random order, and Schellinger et al. found only a small biasing effect in their experiment.

## RESEARCH QUESTIONS

- Does bias due to listener expectations of a talker's age and level of development affect accuracy rating of children's productions of the sounds /s/ and /θ/?
- How do different aspects of experimental design influence this apparent biasing?

## EXPERIMENT 1

### PURPOSE

To investigate the strength of listener bias (found by Schellinger et al.) by presenting the different carrier phrase types in blocks

### PARTICIPANTS

13 English-speaking adult listeners (6 males and 7 females)

### STIMULI

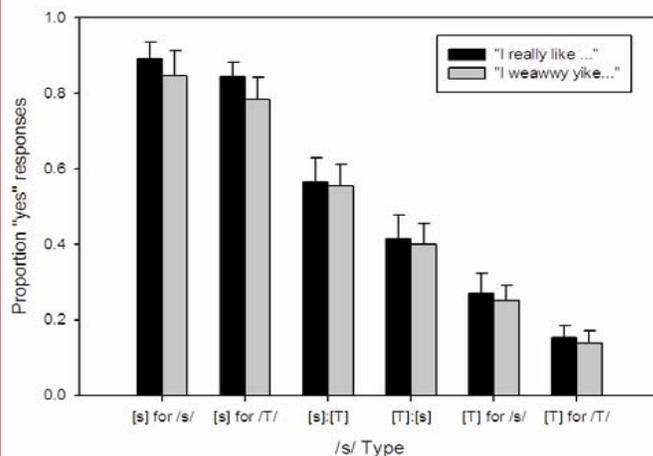
- A 5-year-old boy produced carrier phrase types: a correct phrase, "I really like," and a phrase containing errors, "I weawwy yike." Each phrase type was then paired with 200 consonant-vowel (CV) syllables beginning with /s/ and /θ/ produced by 2- to 5-year-old children.
- There were six types of stimuli:
  - Stimuli that had been transcribed by two experienced native-speaker transcribers as a CORRECT /s/ (i.e., the child produced the /s/ in *sink* correctly)
  - Stimuli that were transcribed as an [s] for /θ/ SUBSTITUTION (i.e., the child produced the /θ/ in *think* as [s])

- Stimuli that were transcribed as an intermediate production that sounded more like /s/ than /θ/.
- Stimuli that were transcribed as an intermediate production that sounded more like /θ/ than /s/.
- Stimuli that were transcribed as a [θ] for /s/ SUBSTITUTION (i.e. the child produced the /s/ in *sink* as a [θ])
- Stimuli that were transcribed as a correct a [θ] (i.e., the child produced the /θ/ in *think* correctly)

### PROCEDURE

- The stimuli were arranged in blocks by carrier phrase type. Half the subjects were presented with the "really" phrases first, the other half with "weawwy" first.
- Listeners were told:
  - Children produce errors as they learn to speak. A common error is a "frontal lisp" (substituting "th" for "s").
  - Each sentence would begin with the phrase, "I really like," and end with a consonant-vowel sound beginning with "s."
  - Sometimes the "s" sound would be produced correctly and sometimes it would be produced with a frontal lisp.
- Listeners were asked to judge whether the "s" sound was produced correctly.
- Listeners responded "yes" or "no" by pressing buttons on a response box.

### RESULTS



- (Note: /T/ indicates /θ/)
- A two-factor within-subjects ANOVA on proportion 'yes' responses showed a significant main effect of fricative type ( $F[5,60] = 86.5, p < 0.001, \text{partial } \eta^2 = 0.86$ ). Bonferroni-correct post-hoc tests showed significant differences between all pairwise comparisons except those between correct /s/ and the [s] for /θ/ substitution.
- Carrier phrase did not affect responses, nor did it interact with /s/ type.

## EXPERIMENT 2

### PURPOSE

To further examine the role of bias in perception by removing "lisp" from the instructions and simply asking listeners to judge the accuracy of /s/.

### PARTICIPANTS

15 English-speaking adult listeners (5 male and 10 female)

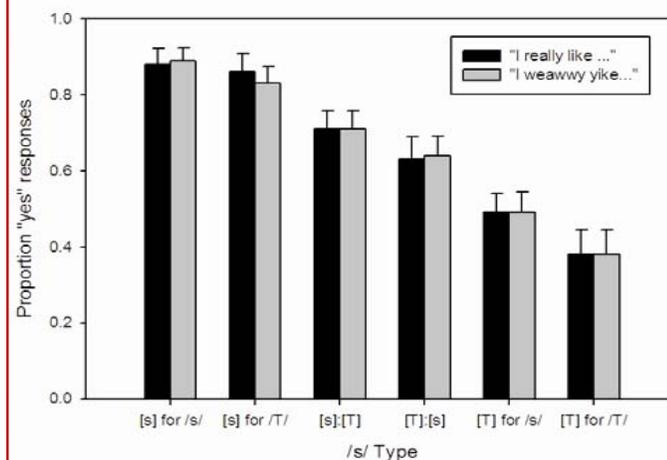
### STIMULI

Stimuli were identical to Experiment 1.

### PROCEDURE

- The stimuli were again blocked by carrier phrase type.
- Listeners were told:
  - Each sentence would begin with the phrase, "I really like," and end with a word beginning with "s."
  - Imagine that the "really" phrase and the word were produced by the same child.
  - Listeners were asked to judge whether the "s" sound was produced correctly.
- Listeners responded "yes" or "no" by pressing buttons on a response box.

### RESULTS



- A two-factor within-subjects ANOVA on proportion 'yes' responses showed a significant main effect of fricative type ( $F[5,70] = 33.5, p < 0.001, \text{partial } \eta^2 = 0.71$ ). Bonferroni-correct post-hoc tests showed significant differences between all pairwise comparisons except the following: correct /s/ and the [s] for /θ/ substitution, the two intermediate productions, correct /θ/ and the [θ] for /s/ substitution.
- Again, there was no effect of carrier phrase, nor did carrier phrase interact with fricative type

## CONCLUSION

- The results suggest that while the carrier phrase does not bias listeners to rate sounds differently, the presence of the word "lisp" in the directions does. Removing "lisp" from the directions dramatically increased listeners' willingness to accept /θ/-like productions as correct.

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