The role of clinical experience in listening for phonetic detail in children's speech

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Moving beyond phonetic transcription alone...

- Phonetic transcription is the "standard of care" tool for the assessment of speech sound disorders.
- It is fast and relatively easy to implement.
- It allows clinicians to communicate in a standardized manner.
- It is widely used in clinical practice.

...to transcription plus continuous rating scales

- Urberg-Carlson et al. (2008) noted the problem was smaller with continuous transcription, using visual-analog scaling (VAS) measures.
- Clinicians had more freedom to explore the sounds, and were more likely to capture subtle differences.
- Continuous transcription allows for more nuanced assessment of speech sound disorders.

Does clinical experience affect the perception of children's speech?

- Only a small number of studies have examined whether clinical experience affects the perception of children's speech.
- For example, Wells et al. (2003) found that experienced clinicians had more sensitivity to subtle differences in children's speech.
- It is possible that clinical experience helps clinicians to better understand the subtleties of children's speech.

Our research questions

1. Does clinical experience affect the perception of children's speech?
2. What is the relationship between overall scores of clinicians' perception and laypeople's perception?
3. What are the specific phonemic contrasts that are most affected by clinical experience?

Methods

Stimuli

- The experiment comprised three tasks:
  1. rating: /s/-/S/ at three tokens
  2. rating: /t/-/k/ at three tokens
  3. VAS: /s/-/S/ at three tokens

- All stimuli were CVs, recorded from natural productions of young speakers and older adults.
- The task was to rate the similarity of the stimuli to acoustic measures of these contrasts.

Listeners

- There were two groups of listeners:
  1. Laypeople: 25 members of the University of Minnesota community.
  2. Clinicians: 21 experienced clinicians (2 years of professional experience after graduate school).  They were selected for their expertise in children's speech.

Procedures

- Each task used stimuli that had been transcribed by skilled phonetic transcribers in the following six categories:
  1. VAS: /s/-/S/ at three tokens
  2. rating: /t/-/k/ at three tokens
  3. SRT: /s/-/S/ at three tokens

- The order of the three tasks was randomized across participants.
- In each task, listeners were presented with randomly ordered CVs.
- After each CV, they clicked on a VAS rating scale and their click location was logged automatically.

Results

- The listeners provided continuous ratings for each stimulus, ranging from 0 to 100.
- The clinicians provided categorical ratings for each stimulus (e.g., /s/ vs. /S/).
- The laypeople's ratings were more variable than the clinicians' ratings.
- The clinicians had more consistent ratings across all stimuli.

Analysis

- We performed a series of linear mixed-effects models with crossed random effects for subjects and items (Baayen et al., 2008) to examine group differences in the relationship between acoustic measures and VAS ratings.
- The models included fixed effects for the acoustic measures and random effects for the subjects and items.
- We also examined the reliability of the ratings using the intraclass correlation coefficient (ICC).

Clinical experience does affect the perception of children's speech

- Clinicians rated the stimuli more accurately and consistently than laypeople.
- Clinicians were more sensitive to subtle differences in the stimuli.
- Laypeople were more likely to make errors in phonemic categorization.

Conclusion

- Clinical experience plays a significant role in the perception of children's speech.
- Clinicians are better able to identify fine phonetic details in children's speech.
- Laypeople may overgeneralize in their perception of these sounds.

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