Contributions to diminished perceptual learning in individuals with language impairment

Nikole Giovannone and Rachel M. Theodore

Department of Speech, Language, and Hearing Sciences; University of Connecticut

Background

- One method of accommodating for the lack of invariance in the speech signal is by using lexical information to guide perception, which can lead to persistent changes in the mapping to speech sounds [2, 4].
- There is variability in the degree to which individuals rely on the lexicon [1].
- Do individuals with weaker language abilities show deficits in lexically guided perceptual learning? If so, does this deficit reflect decreased lexical access or an impaired learning mechanism?

Method

- Participants (n = 62) completed two tasks including a lexical recruitment task (Ganong) and a lexically guided perceptual learning task (LGPL).
- Participants also completed standardized measures of language ability (CELF) and nonverbal intelligence (TONI).

Ganong

- Stimuli consisted of tokens from two word/non-word VOT continua, gift-kift and giss-kiss.
- Participants indicated whether each item began with /g/ or /k/.
- The Ganong effect will manifest as more /k/ responses for the giss-kiss compared to the gift-kift continuum.

LGPL

- Participants completed 2 blocks of lexical decision, each followed by a phonetic categorization test for tokens from a sign-shine continuum.
- Ambiguous stimuli replaced /s/ in block 1 (SS bias) and /f/ in block 2 (SH bias).
- If lexically guided perceptual learning is occurring, participants will perceive more sign tokens at test following the SS bias block compared to the SH bias block.

Results

1. Participants had a large range of language (CELF Core Language) and cognitive (TONI) abilities. Language ability and nonverbal IQ constructs were modestly correlated (r = 0.26, p = 0.038).
2. The Ganong effect was mediated by CELF score; those with lower language skills show a stronger Ganong effect. There was no effect of nonverbal IQ on the Ganong effect.

Conclusions

1. Weaker language abilities were associated with a larger Ganong effect, demonstrating increased reliance on the lexicon.
2. Weaker language abilities were associated with stronger learning effects, demonstrating intact learning mechanism.
3. Bootstrapping analyses showed that the current results are robust to variation in sample size, the specific participants included in the sample, and the specific measure of language ability.
4. In contrast to previous research [1], there was no evidence to suggest impaired lexically guided perceptual learning in those with weaker language abilities. This may reflect the specific construct used to measure language (vocabulary size vs. expressive/receptive language).

Acknowledgements/References

This research was supported by NIH NIDCD grant R21DC016141 to RMT and the University of Connecticut Jorgensen Fellowship to NG.

References