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Listener Adaptation to Lexical Stress Misplacement in English

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Questions

- 💡 How does a native speaker of a language adapt to accented speech?
- 💡 In particular, (how) does perceptual adaptation to lexical stress misplacement occur in English?
- 💡 How comparable is it to adaptation to segmental errors in terms of speed and generalizability?

Adaptation to Accented Speech

Accented speech:
- deviates from the canonical/familiar forms of the language along multiple acoustic-phonetic dimensions [1]
- incurs increased processing effort at the beginning
- can be accommodated with adequate exposure

Perceptual adaptation:
- occurs regardless of the baseline intelligibility at the sentence level [1]
- occurs quite rapidly, under 1 minute [2]
- generalizes across items [3,4]
- generalizes across talkers with similar traits [1,5]
- is likely to be lexically-driven [1,6]

Why Lexical Stress?

Proposed mechanisms for perceptual adaptation:
- Phonological abstraction [7]
- Episodic memory [8]

- 💡 Question: what is the contribution of prosodic information to the process of perceptual adaptation?

English stress, as a test case:
- Free stress language (TRUSty/trusTEE)
- Stress misplacement affects word recognition [9] e.g., HIStorical (native speaker); anticiPATE, conTEXT, arGUED, moduLAte (French speaker)
- Involvement of multiple acoustic-phonetic correlates including amplitude, pitch, length, and segmental cues [cf.10]

- 🔑 Prediction: if adaptation to suprasegmental information works similarly to adaptation to segmental mismatches, we expect rapid adaptation with generalization across items and talkers.

Experiment

Perceptual experiment within **Exposure-Test paradigm** using **speeded cross-modal matching.**

Methods

Procedure
- Participants: native speakers of English (n=16)
- Task: speeded cross-modal matching
- Measure: RT (and accuracy)
- 2x2 factorial design:
  Canonical/Non-canonical stress
  Same/Different talker

Task
"climax" 🔊

CLIMAX 👁👁 (Matching Trial)
BASICS 👁👁 (Mismatching Trial)

Table 1. Procedure Summary

		Condition			
Canonicity × Talker		1 Canonical, Same	2 Non-canonical, Same	3 Canonical, Different	4 Non-canonical, Different
Exposure		[ɡɾ̩] × 50 Male Talker	[ɡɾ̩] × 50 Male Talker	[ɡɾ̩] × 50 Male Talker	[ɡɾ̩] × 50 Male Talker
		*[ɡɾ̩] × 50 Male Talker	*[ɡɾ̩] × 50 Male Talker	*[ɡɾ̩] × 50 Male Talker	*[ɡɾ̩] × 50 Male Talker
Test		[ɡɾ̩] × 50 Male Talker	[ɡɾ̩] × 50 Male Talker	[ɡɾ̩] × 50 Female Talker	[ɡɾ̩] × 50 Female Talker
		*[ɡɾ̩] × 50 Male Talker	*[ɡɾ̩] × 50 Male Talker	*[ɡɾ̩] × 50 Female Talker	*[ɡɾ̩] × 50 Female Talker

Materials
Auditory Stimuli:
- monomorphemic, bisyllabic English words
- 100 trochees (/ɡɾ̩/) and 100 iambs (/ɾ̩ɡ/)
- comparable frequency
- no vowel reduction
- recordings by male and female talkers, both native speakers of English
  - canonical tokens: [ɡɾ̩], CLImax
  - non-canonical tokens: *[ɾ̩ɡ], *TYcoon

Visual Stimuli:
- Target: same as auditory stimuli
- Competitor: same length, comparable frequency

Results for Conditions 1 & 2

Exposure phase: RT slower in Condition 2 (M=541.8 ms) than Condition 1 (M=517.3 ms)
Test phase: RT faster in Condition 2 (M=466.6 ms) than in Condition 1 (M=492.2 ms)
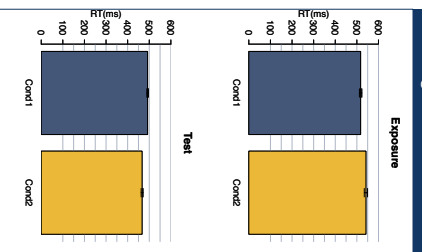

Figure 1. Test RT
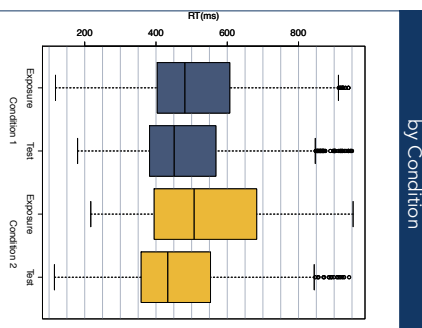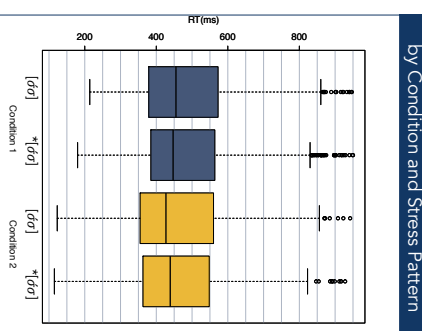

Figure 2. Exposure vs. Test RT by Condition

Figure 3. Test RT by Condition and Stress Pattern

Conclusion

- 🔑 Results compatible with previous work:
  - Initial processing cost
  - Trend towards adaptation
  - 50 words in isolation enough as exposure
  - Generalization over lexical items

Future Work

- Increase sample size
- Implement Condition 3 & 4 to examine generalization across talkers
- Examine potential learning over the time course of the experiment
- Explore the local environment of exposure and the role of variability in adaptation [11]
- Investigate the contribution of prosodic information at the sentential level

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