Phonetic convergence in an immersive game-based task

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INTRODUCTION

Mapping Acoustic Signals to Phonetic Categories

Phonetic category membership is indicated by multiple dimensions in the acoustic signal. However, acoustic dimensions are variable and context-dependent, which can lead to ambiguities between two speech sounds that only differ in one acoustic attribute. One phenomenon that may affect this variability is phonetic convergence (the observation that speech patterns of interlocutors become more similar during a conversation).

The extent to which task engagement may vary across studies and different contexts is examined in the following sections.

METHOD

Stimuli (subset) Procedure

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<th>Procedure</th>
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<td>30 word-initial voicing minimal pairs</td>
<td>provided key information to interlocutors to provide to each other</td>
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Phonetic convergence was tracked for 4 acoustic dimensions (VOT, VL, F1, F0) over the course of the one hour experiment.

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RESULTS

1. Production Measures

VOT Distributions

2. Convergence Measures

Voice Onset Time

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Vowel Length

F0 Onset

F1 Onset

Normalised Trial Number (Proportion of total trials)

Normalised Trial Number (Proportion of total trials)

F1 Onset

Fundamental Frequency Onset

Statistical Analyses

Three linear mixed effects models were used to examine:

1. The effect of initial VOT, task engagement, initial VOT, and their interactions on the produced VOTs for voiced or voiceless tokens separately. A trial number x task engagement x initial VOT interaction would indicate convergence.

2. The effect of initial VOT, task, and number of their interactions on VOTs of voiced or voiceless tokens separately in each individual task. A trial number x initial VOT interaction would indicate convergence.

3. The effect of trial number on the VOTs of voiced or voiceless tokens for each of the participants in each task.

Summary of Results

Elicted mean VOT were longer than what had been previously reported (voiced VOT: 25 ms, voiceless VOT: 101 ms; Lisker & Abramson, 1964). Lexical factors (Bass-Barker & Goldin-Meadow, 1999) and task difficulty (Schertz, 2013) could contribute to these differences.

However, participants’ productions were not significantly different between the low and high engagement tasks. Convergence was observed along certain acoustic dimensions (VOT, VL, F1 onset), but not others (F0). Interestingly, the extent of convergence was affected by the level of task engagement. Overall, subjects in the high engagement task converged more, whereas subjects in the low engagement task were less likely to converge. This finding was especially the case for VL and F1 onset.

These preliminary results suggest that engaging, naturalistic tasks may yield results that more accurately reflect real-world phonetic variation than traditional laboratory experiments.

Future Directions

Future studies will use these communicative tasks to look at convergence among speakers of different native languages.

ACKNOWLEDGMENTS & REFERENCES

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References


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