Speakers do not necessarily adapt to non-native interlocutors

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Speaker adaptation to interlocutor

- Lindblom (1990) "Hyper- &Hypo- speech" (H&H) theory claims that speaker adaptation to the listener and the communicative situation is a major reason for the lack of invariance in the speech signal.
- Example of adaptation: speaking more loudly when in a noisy environment (Lombard effect).
- To what extent do speakers make on-line, fine-grained modifications?

Speaker adaptation to interlocutor

- Many aspects of a situation may potentially trigger speaker adaptation.
- Here we focus on difference in linguistic experience: a situation involving communication between native and non-native speakers of a language.
- Does a native speaker modify her production when speaking to a non-native interlocutor?

Speaker adaptation to interlocutor

- Lindblom's H&H theory claims that speaker modifications to the listener and situation are adaptive, i.e., intended to improve communication.
- In order for this to be true, the modifications must be detectible by the listener.
- Question under study here:
  - Do speakers make detectible modifications to their speech when speaking to interlocutors who are non-native, but conversant?

Speaker adaptation to interlocutor

- Design of study
  - Record pairs of conversations between a native speaker of French and a native French-speaking interlocutor.
  - the same native speaker and an American interlocutor speaking French.
  - In these pairs of conversations, identify short extracts that are lexically identical and prosodically similar.
  - Play these extracts in pairs to other native speakers of French and ask them which member of the pair was originally spoken to a foreigner.
Recording conversations

- Ten native French speakers were recorded performing a map task.
- Same interlocutors (1 French, 1 American) spoke with all ten speakers.
- Half the speakers spoke to the native speaker first, half to the non-native first.
- The non-native speaker identified himself as American at the beginning of the conversation.

Set-up for recording

- Vous pourrez peut-être m'expliquer comment aller à la Gare du Nord ?
- Pas de problème. C'est pas compliqué. Si, un petit peu ...

Recording conversations

- Map task: Interlocutor asked the speaker for directions to travel to several destinations around Paris, using the metro system.
- The speaker explained the trips, and the interlocutors often asked for clarification or more information, resulting in considerable give-and-take.
- Recordings made in sound-treated room at the Université de Paris III.

Second phase: listening task

- From each speaker's conversations, four pairs of lexically identical extracts were selected.
- New "rate-equalized" versions were created of each extract such that the duration of the corresponding extracts was identical in both members of the pair.
- Total of 40 pairs of original and 40 pairs of rate-equalized extracts were presented in pairs (both original or both rate-modified) to 25 native French-speaking listeners.
- Listeners responded which one of the pair was originally spoken to a foreigner.

Listener responses

- Total number of listener responses: 2000
- Correct responses: 1145 = 57% (d' = 0.37, ns)
- Range among different speakers:
  - Most difficult in which to identify foreigner-directed speech: Listeners were correct 25% of the time.
  - Easiest: Listeners 69% correct (two speakers)
- Range among different listeners:
  - Least successful: 43% correct
  - Most successful: 71% correct

- Original, unaltered extracts: Listeners were 58% correct.
- Rate-equalized extracts: Listeners were 56% correct.
- 12 listeners who were undergraduates: 54% correct
- 13 listeners who were graduate students: 60% correct (neither significantly different from chance in d' analysis)

- Differences among speakers and specific extracts seem to be greater than differences among listeners.
Interpreting listener responses

- The listeners were not reliably able to distinguish which (brief) extracts had been spoken to the non-native speaker.
- But some extracts were much more reliably classified than others.
- Examining the acoustic characteristics of pairs of extracts may suggest which properties the listeners were relying on.

Previous research has suggested that slower speech rate is characteristic of speech directed to non-native interlocutors.

Some listeners in this study reported listening for exaggerated phrase-final rises in pitch, which they considered typical of French spoken to non-natives.

Most promising acoustic dimensions for study would seem to be duration and F0.

Durations of paired extracts (in ms)
- Longer to non-native in 26 of 39 pairs; paired t-test p < .05.

F0 maxima (in Hz)
- Higher max F0 to non-native in 25 of 40 pairs; paired t-test p < .05.

Range of F0 (in Hz)
- Greater range to non-native in 25 of 40 pairs; paired t-test ns.

Are listener responses explained by comparing durations of pairs of extracts?
- Longer duration in extract directed to non-native resulted in more correct identifications: $r^2 = .23$
- Adding Maximum F0 to the regression increases $r^2 = .29$. 

Number correct
- Additional duration to non-native

$\text{Duration of paired extracts (in ms)}$
- to non-native
- to native

$\text{F0 maxima (in Hz)}$
- to non-native
- to native

$\text{Range of F0 (in Hz)}$
- to non-native
- to native

$\text{Are listener responses explained by comparing durations of pairs of extracts?}$
- Length duration in extract directed to non-native resulted in more correct identifications.
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$\text{Number correct}$
- Additional duration to non-native
How much did speakers accommodate to the non-native?

- While there were statistically reliable tendencies for speech directed to the non-native to have longer durations (corresponding to slower speech rate) and higher maximum F0 values, these differences were found in fewer than 2/3 of the pairs of extracts that were compared.
- These differences were small, and did not seem to be sufficient information for the listeners to distinguish between the two interlocutors.

Is speaker adaptation to listener an explanation for variation?

- The very limited, and inconsistent, adjustments made by the speakers in this study suggest that accommodation to the interlocutor was not a significant factor in determining how they spoke.
- It thus seems unlikely that much of the variation in speech can be explained as the product of speaker accommodation to listener: if it is, it is too unreliable to help the listener.
- Variation is driven more by speaker-centric factors than by the needs of the listener.