

# Phonetic accommodation in English loanwords in Bengali

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# Speech accommodation

- Speech accommodation - at all linguistic levels
- Within single language, between varieties of a single language, between languages
- How long does accommodation last?
- Convergence/Divergence
- Language interaction processes - Code switching, borrowing

# Accommodation models

- Current models of speech accommodation
  - The automatic interactive alignment account, Pickering and Garrod [2004]: function-based, convergence facilitates dialogue
  - Exemplar-based model, Goldinger [1998]: phonetic accommodation due to an automatic cognitive reflex of the system, role of memory
  - Communication Accommodation Theory, Shepard et al. [2001]: Socio-psychological model - language as a tool to achieve desired social distance
- Conscious or Automatic?
- Our interest - phonetic accommodation between L1 and L2

# Issues in accommodation studies I

## ① Within-language vs. Between-language studies

- Differences within bilingual contexts
- Why Bengali?
  - Bilingualism in a postcolonial context
  - Unique sociolinguistic position of English in Bengal: an aside
- Possible implications

## ② Long-term vs. Short-term studies

- Accommodation as a function of duration of exposure to ambient language, Tobin et al. [2017]
- Short-term accommodation to interlocutor, Babel [2012]
- Accommodation due to code-switching within single utterance, Antoniou et al. [2011]

# Issues in accommodation studies II

## Our study

Short-term accommodation due to effect of language context

### ③ Production vs. Perception tasks

- Testing Production
  - Lexical shadowing task; Goldinger [1998]
  - Conversational task; Pardo [2006]
- Perceptual Assimilation; Pardo [2010]
- On perception and Acoustics; Strange et al. [2004]

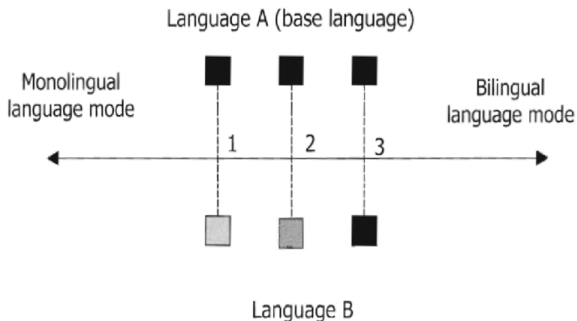
## Our study

Two production tasks

# Issues in accommodation studies III

## 4 'Is this Natural?': a note on Test Paradigms

- Clearly defined ambient languages; Tobin [2013]
- Interpersonal effects; Babel [2012]
- Language modes; Grosjean [1998]



# Experiment design

We report on two experimental paradigms:

- ① A novel picture naming task
- ② A read sentence task

The target words were embedded in the tasks

# Predictions

- The central vowel ( $\Lambda$ ) will be lowered in the Bengali language context (higher F1 value) compared to the English language context.
- The vowel  $\text{æ}$  will gain length in the Bengali language context (increased vowel duration) compared to the English language context.



# Test design: Picture naming task

Language cue: English or Bengali orthography word

A picture presented for 500 ms (named in target language as above)

Target word

Filler

# Test design: Sentence task

A carrier sentence (Bengali or English) with the target word at the end

Carrier sentences:

- That is a yellow [*Target Word*]
- o ʈa ækʈa ka:lo [*Target Word*]

# Item details

- 20 monosyllabic English words
- 10 words contained the vowel [ʌ] and 10 words contained the vowel [æ]
- The items chosen were of the type such that the onset consonant was wither a [b] or a [d]. Examples: Bug, Duck, Bat, Dash etc.
- 10 unrelated filler words
- Each word was recorded in two language contexts; Bengali and English. The items were presented to the subjects in randomized fashion in 4 blocks.

# Subjects

- Total number of subjects: 10 [5 female and 5 male]
- Bilingual: Bengali and English
- Subjects lived in the Indian state of West Bengal for the major portion of their life
- Minimum 6 years of formal education in Bengali.
- Uniform listening-speaking-reading-writing (LSRW) skill tested through a Language Background Questionnaire (LBQ)

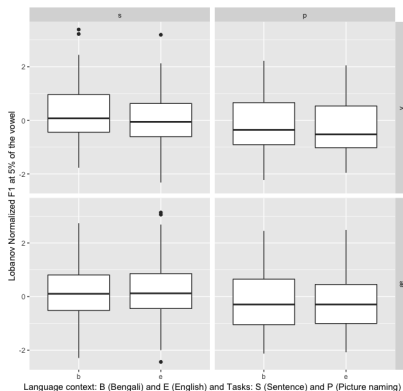
# Procedure

- Alternated set of picture naming and sentence task for each participant
- Asked to read at comfortable pace and volume
- 20 items \* 4 repetitions \* 2 contexts \* 2 tasks \* 10 subjects = 3200 Items
- The first iteration for both the sentence and the picture naming tasks were considered to be test trials and were not measured; 2400 items were analysed.

# Formant extraction and normalization

- Extracted vowels from the target words – PRAAT.
- F1 and F2 measurements in PRAAT at two positions in the vowel; beginning (5%) and middle (50%)
- Linear mixed effects model in R
- Fixed effects – Vowel (2 levels), Context (2 levels; Bengali or English), Gender (2 levels; Female and Male)
- Random effect – Word/Item
- F1 and F2 values Lobanov normalized (by subject) and Bark transformed

# Effects of language context on normalized F1



Effect on normalized F1 at 5% of the vowel

Significantly higher normalized F1 at 5% of the vowel in the Bengali language context compared to the English context

## Effect on normalized F1 (50%) and F2

- A linear mixed effects analysis of the relationship between normalized F1 at 5% of the vowel and language context as a fixed effect shows a significant effect of language context on normalized F1 at 5% of the vowel;  $p=0.009641$ .
- We also had Vowel, Task, and Gender as fixed effects
- The model also specified intercepts for items, as well by-item random slopes for the language context
- P-values were obtained by likelihood ratio tests of the full model with the effect (language context) against the model without the effect (null).
- We did not find a significant effect of language context on normalized F1 at 50% of the vowel, normalized F2 at 5% of the vowel, and normalized F2 at 50% of the vowel.
- Contrary to our predictions, we did not find a significant effect of language context on vowel duration.



# Conclusions

- We find a significant effect of language context on normalized F1 at 5% of the vowel
- F1 at 5% of the vowel is significantly higher in the Bengali language context compared to the English context for both tasks.
- This implies significant lowering of the vowels (both  $\text{æ}$  and  $\text{ʌ}$ ).
- Phonetic accommodation in the Bengali context results in lowering both the target vowels in English borrowings

# Further Research

- Control for socio-economic factors, likelihood/extent of code-switching in daily life
- Semantic content of words; to what extent are they lexicalized - are ready translations available? If not - then more likely to actually be used in real speech context

Thank you

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