

The relationship of allophony to lexical and sublexical competition

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1. Main findings

Non-neutralizing allophonic alternations may be correlated with lexical factors:

- **Contrast enhancement:** the alternation is correlated with a greater number of lexical contrasts relative to a baseline.
- **Trigger + target frequency:** the trigger + target sequence is frequent in the lexicon compared to the elsewhere context.

2. Background

2.1 Lexical factors as explanatory concepts in sound change

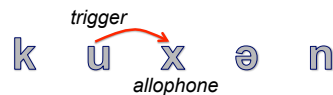
- **Functional load hypothesis:** sound change is constrained by a language's system of lexical contrasts (e.g., Hockett 1967).
- e.g. number of minimal pairs defined by a phoneme contrast predicts the probability of phoneme-contrast mergers (Wedel et al. 2013).
- **Usage Frequency:** the frequencies of individual words, categories and phonetic contexts influence the likelihood and rate of change (e.g., Bybee 2001)

2.2 Allophonic Alternations

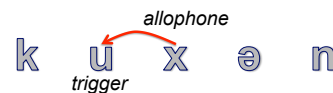
- **Non-structure-preserving alternations:** middle-point on the trajectory to a phonemic split: some context conditions a categorical change in the surface form of a target phoneme.
- e.g.: *ich-laut* vs. *ach-laut* in German:

/ç/ → [x] / __[V, -back] e.g. *Küche* [kyçə] vs *Kuchen* [kuxən]

- **Classic approach to allophony:** *triggering context* provides information that helps us predict the *surface form* of the phoneme.



- **Alternative way to think about allophony:** *surface form* of the phoneme provides information that predicts the *triggering context*.



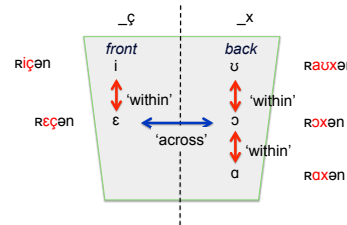
- Presence of allophone introduces a redundant cue to the identity of the triggering context.
- If the triggering context is high information, presence of the allophone spreads information more broadly across the signal (Aylett & Turk 2004, Levy & Jaeger 2007).

3. Research question

Do allophonic alternations correlate with greater functional load of the trigger context?

- **Question:** Are the number of minimal pairs defined by phoneme-pairs *across* a triggering context larger than expected?
- **Baseline Comparison:** the number of minimal pairs defined by phoneme-pairs *within* a triggering context

Example: German dorsal fricatives



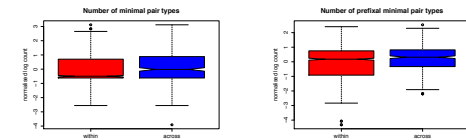
4. Building a database

Use existing lemma-frequency lists corpora to build a database of non-neutralizing, segmental allophonic patterns

- American English: Vowel lengthening before voiced codas
- RP English: u-fronting except before coda /l/.
- Korean: /ʃ, s, h, k/ change before /i/
- Korean: Vowel F0 lowering after plain stops
- Cantonese: Vowel laxing before velar codas
- Turkish: Low-vowel raising before coda sonorants
- Turkish: l-backing after back vowels.
- Spanish: /x/-backing before /u/
- German: /ç/ backing after back vowels
- French: coronal stop affrication before front vowels
- Dutch: breaking/lengthening of /i, y, u, e:, ø:, o:/ before /r/
- Dutch: palatalization of /s, z, t, n/ before /j/
- Hungarian: nasalization of vowels before /n[+cont]/ sequences

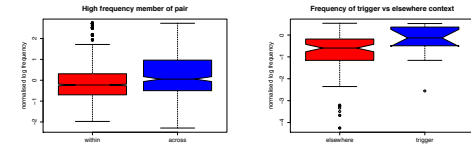
5. Results

5.1 Lexical functional load of the trigger context + target



- phoneme pairs across allophonic trigger contexts have a **higher number of minimal pair types and prefixal minimal pair types**
- correlated measures (R = 0.59, p < 0.001)

5.2 Trigger context + target frequency



5.3 Regression models

- Logistic regression model:
 - DV = Within vs. Across
 - IVs = min pair types, prefix pair types, trigger-target frequency
- model with only random intercepts: confirms the effect of **prefixal minimal pairs and phoneme frequency**
- models with random slopes: very unstable, no clear outcome

6. Interim Conclusions and Next Steps

1. **A greater number of minimal pairs or lexical prefixes** distinguished by the *trigger context plus target* may be predictive of allophonic alternation.
2. **Trigger context frequency:** Where a trigger context can be distinguished from an elsewhere condition, the trigger context is more frequent compared to the elsewhere context.
3. **Allophonic alternation** is more generally correlated with **high frequency of the sublexical sequence** of trigger context plus target, irrespective of elsewhere status.
 - Both of these findings are consistent with the prediction that high usage frequency potentiates assimilatory phonetic biases (e.g. Bybee 2001), which may promote the development of an allophonic alternation.
4. **Next Steps**
 - Add more patterns to the dataset
 - Continue work to distinguish an apparent lexical effect distinct from the sublexical trigger+target sequence frequency effect.