

Advanced Phonological Theory B – Lecture 7: Explaining Vowel Harmony (Part 2)

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VH as innocent misperception?

- Recall Ohala's theory of language change by innocent misperception:
 1. Distinctions in some phonological dimension x are relatively hard to perceive
 2. (Some) learners hear insufficient (direct or indirect) evidence for any distinctions along x and therefore fail to acquire them
 3. These learners transmit a new variety of the language in question with x neutralised to subsequent generations of learners

VH as innocent misperception?

- Note that in this model phonological change is purely perception driven: there's no role for 'innovating' speakers!

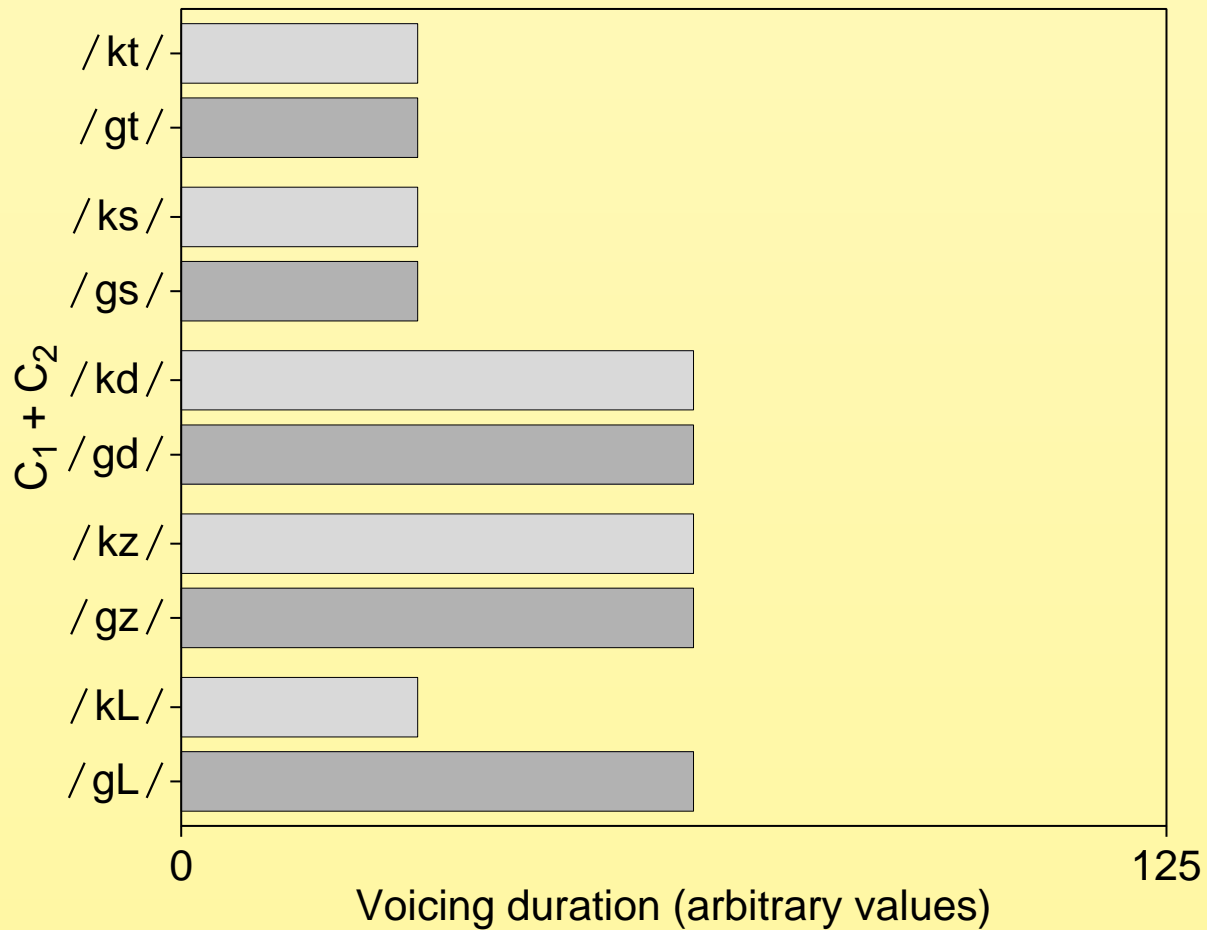
VH as innocent misperception?

- If vowel harmony arises through innocent misperception, what is its source?
- Most plausible candidate: vowel-to-vowel coarticulation (Benguerel & Cowan, 1974; Bell-Berti & Harris, 1979; Purcell, 1979; Fowler, 1981; Recasens, 1984; Boyce, 1988)

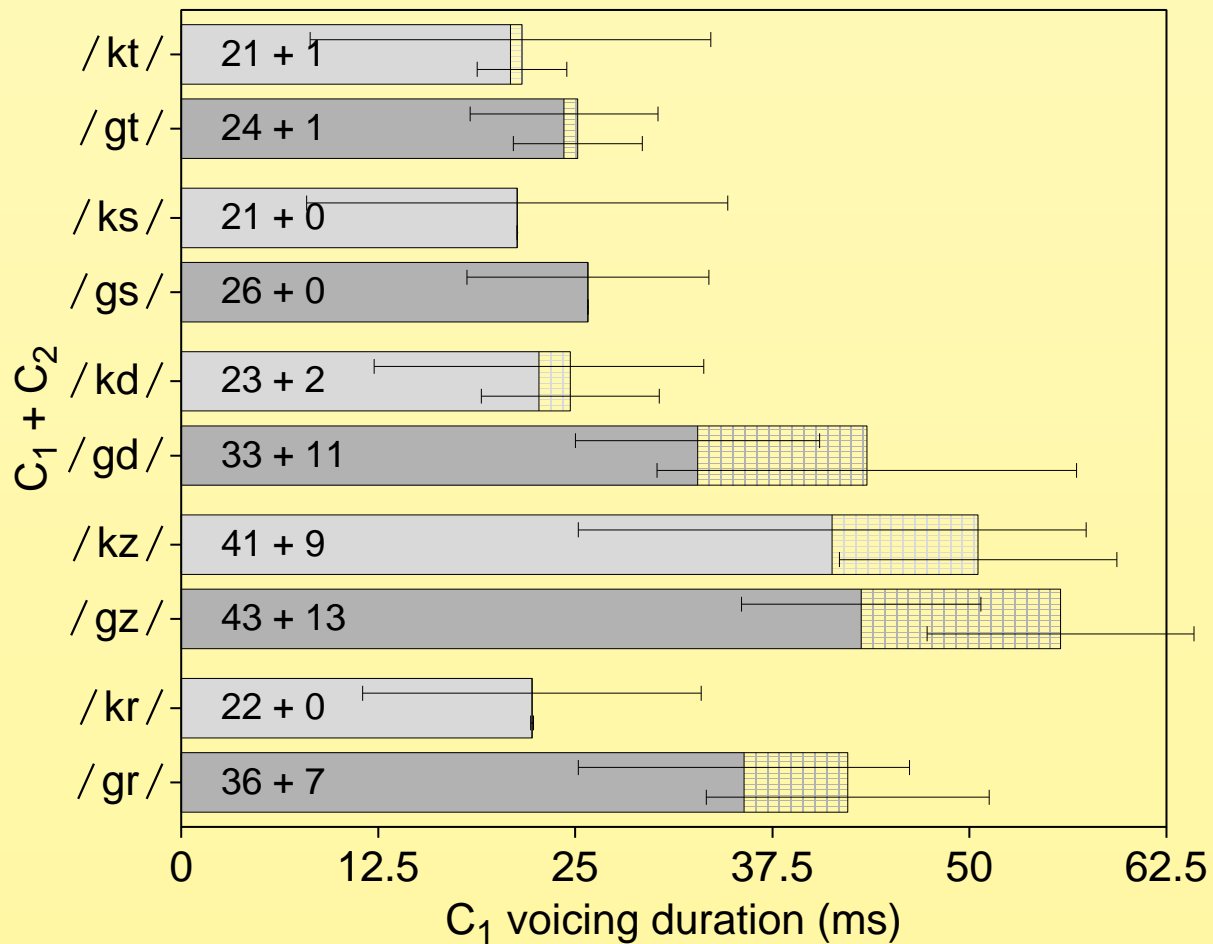
Coarticulation

- **Coarticulation** here refers to the observable results of articulatory strategies that manage the transitions between sounds produced in sequence
- May be distinguished from **Phonological assimilation** on the basis of gradient/non-neutralising properties, dependency on extralinguistic factors, etc.
- But this is not always easy in practice
- Example: English VA (lecture 5; [Jansen 2004](#))

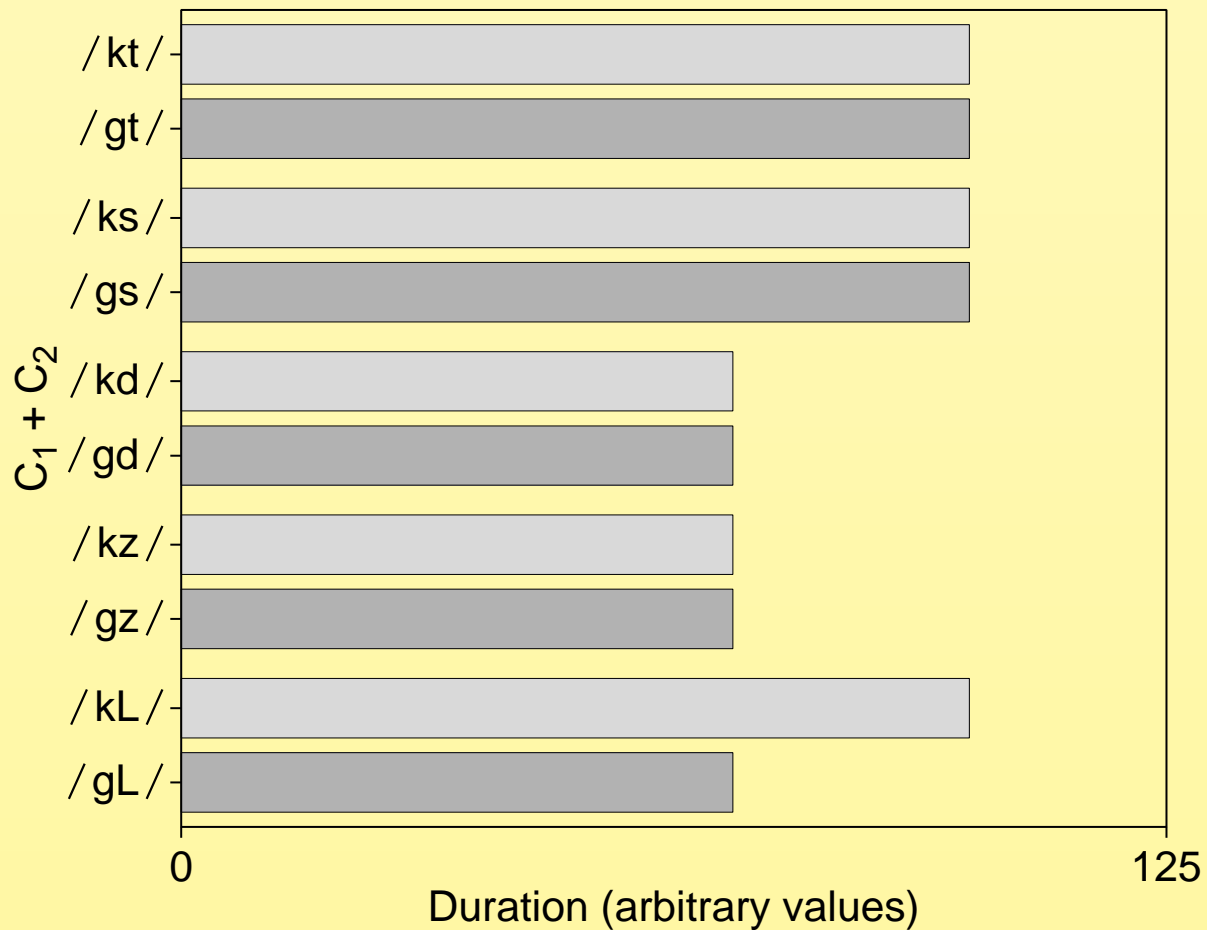
C₁ voicing: categorical assimilation



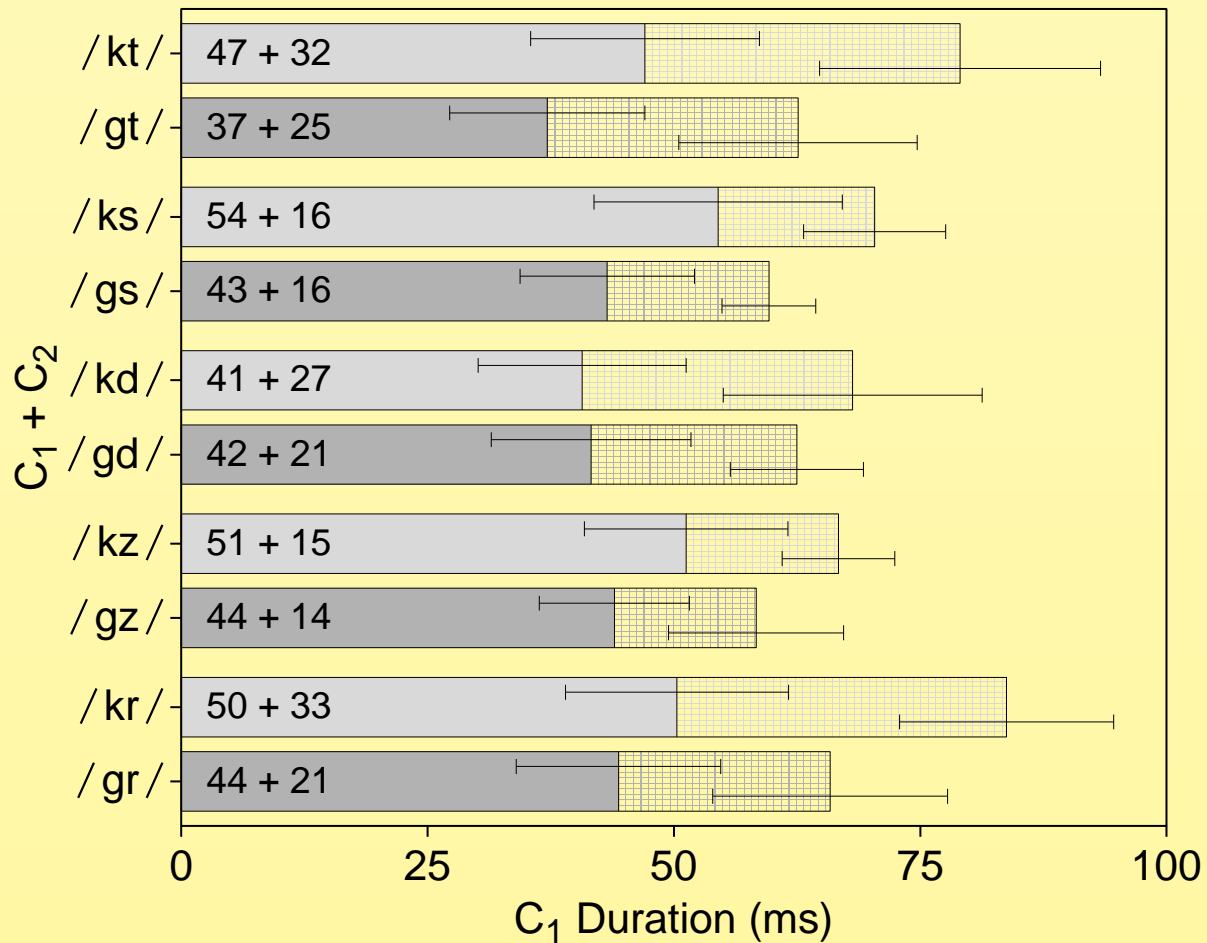
C₁ voicing: English



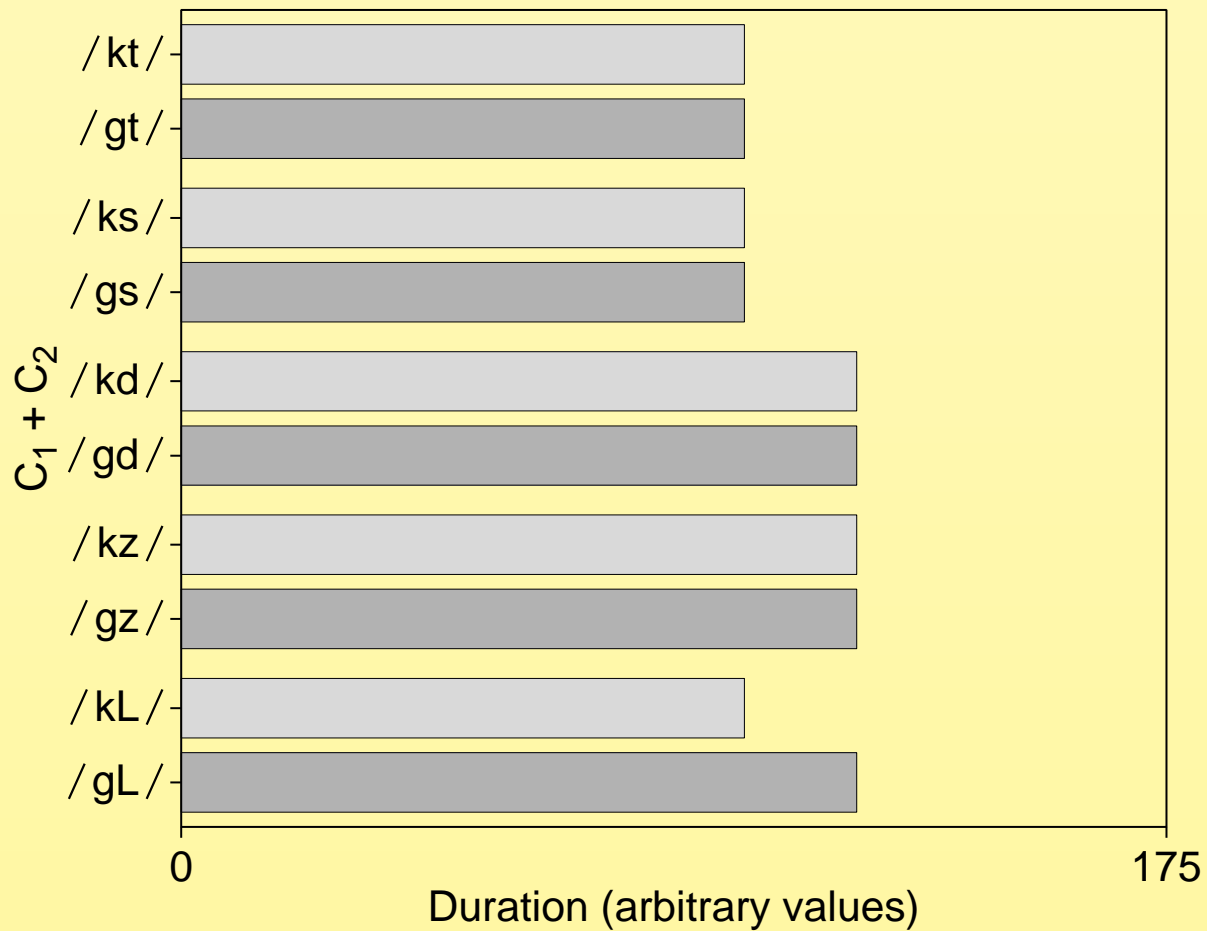
C₁ duration: categorical assimilation



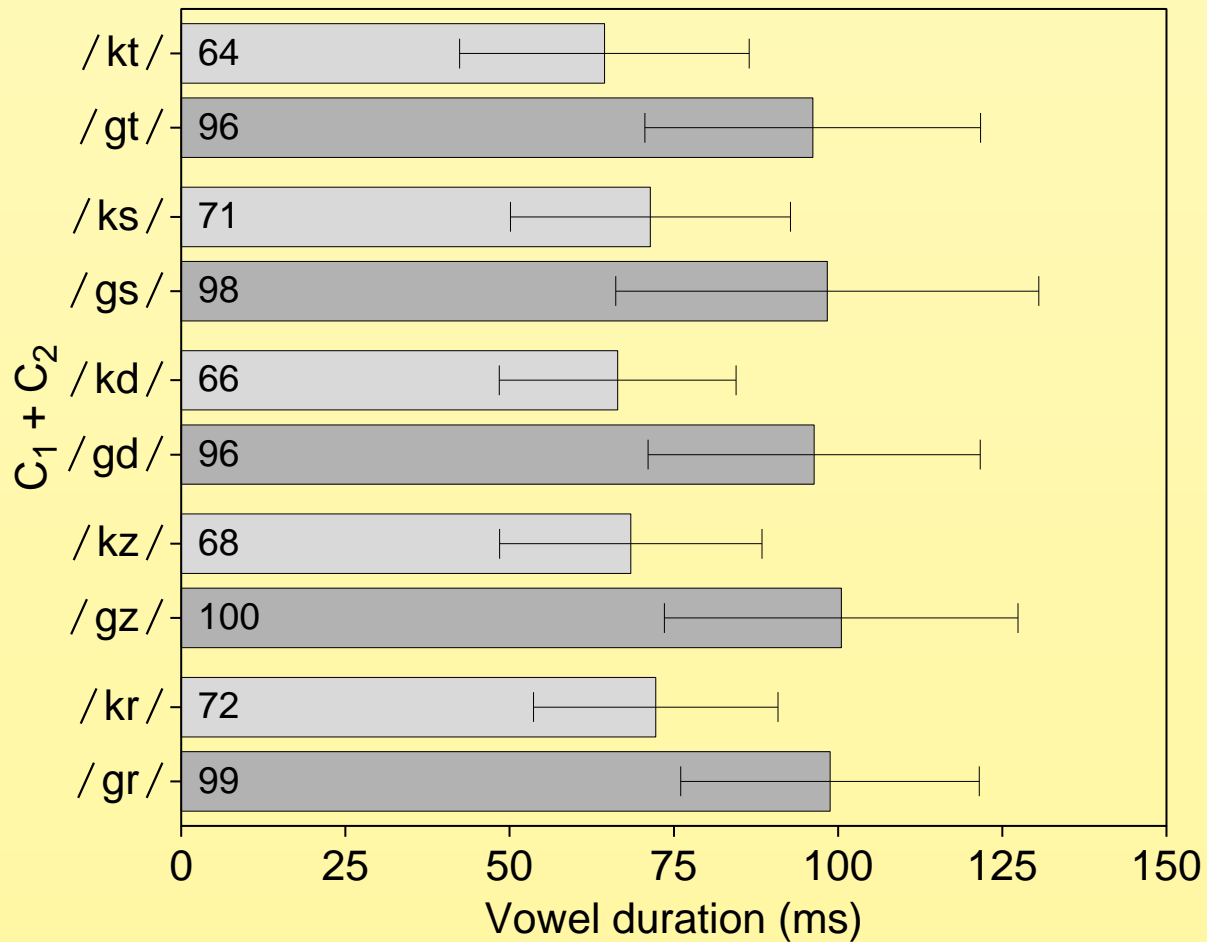
C₁ duration: English



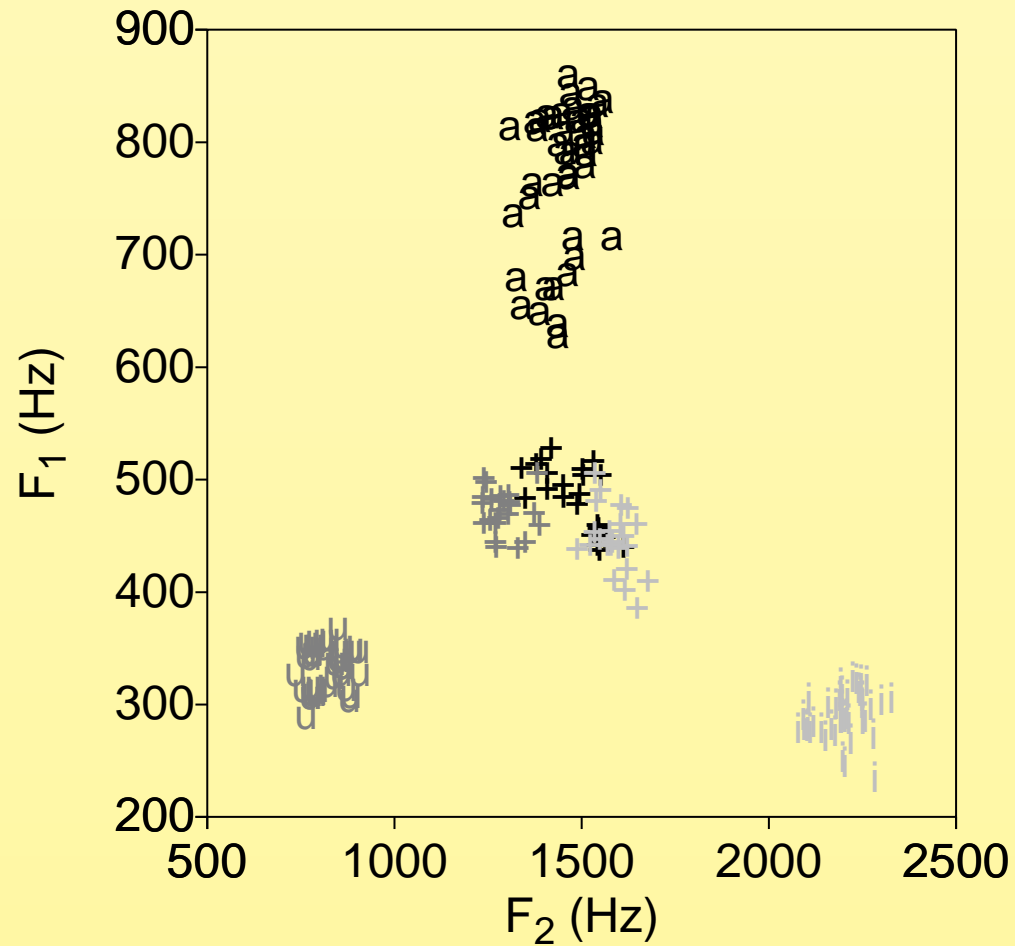
V₁ duration: categorical assimilation



V₁ duration: English

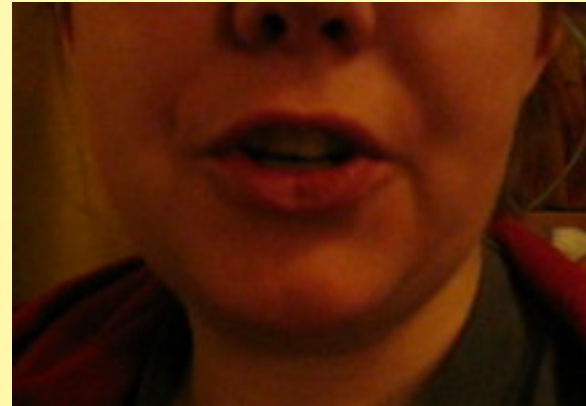
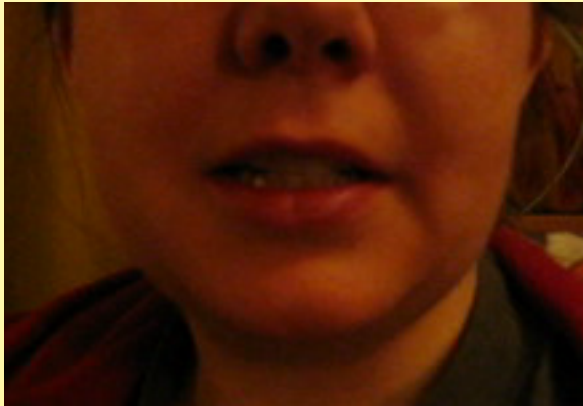


V-to-V Coarticulation



V-(to-C-)to-V Coarticulation

- Lip rounding/protrusion at plosive release in /ti:m/ (left) and /tu:m/ (right):



VH from innocent misperception: problems

- Predicts frequent effects of backness and height harmony on intervening consonants (attested but not necessarily frequent)
- Example: in CV sequences the height of $F_2(C)$ depends in part on $F_2(V)$ and vice versa ([Lindblom, 1963](#))
- Note how this mirrors a serious issue with early feature-geometrical models ([Odden 1991](#):section 2)

VH from innocent misperception: problems

- Uvularisation after [-high] vowels in Yakut (Krueger, 1962):

[tʰɪ-ɡɪt]	‘your-PL. boat’
[kel-li-ɡɪt]	‘you-PL. came’
[saɪ-ʋɪt]	‘your-PL. gun’
[oʋo-ʋut]	‘your-PL. child’
[kinige-ʋit]	‘your-PL. book’
[øŋø-ʋyt]	‘your-PL. service’

VH from innocent misperception: problems

- Misperception (compensation) effects fail to arise in the experiment reported by [Busá & Ohala \(1999\)](#)

Re-introducing the speaker

- A complementary/alternative hypothesis: VH is grounded in the desire of the speaker to sufficiently cue lexical/morphological information (Suomi, 1983; Kaun, 1995, 2004; Boersma, 1998):

Re-introducing the speaker

- From speaker intention to listener misperception:
 1. Vowel features signal lexical contrast (stems) or morphological information (affixes)
 2. There is a benefit in associating a robust phonetic signal with the information in question
 3. A good strategy for making a signal more robust is to extend it in time
 4. Speakers implement this strategy by harmonising vowel features (at the phonetic level)
 5. Misperception by listeners \Rightarrow phonologisation

Re-introducing the speaker

- A possible parallel: progressive assimilation:
 - ◆ The English regular past tense and plural paradigms
 - ◆ The Dutch diminutive (partial paradigm):

[ra:mpjə]	‘little window’
[bo:mpjə]	‘little tree’
[be:ntjə]	‘little leg’
[χɛintjə]	‘(practical) joke’
[ko:nɪŋkjə]	‘little king’
[le:nɪŋkjə]	‘little loan’

Re-introducing the speaker

- A further alternative/complementary hypothesis: VH has a **delimitative** function: i.e., it helps to signal the boundary of grammatical domains (cf. stress, phonotactics)

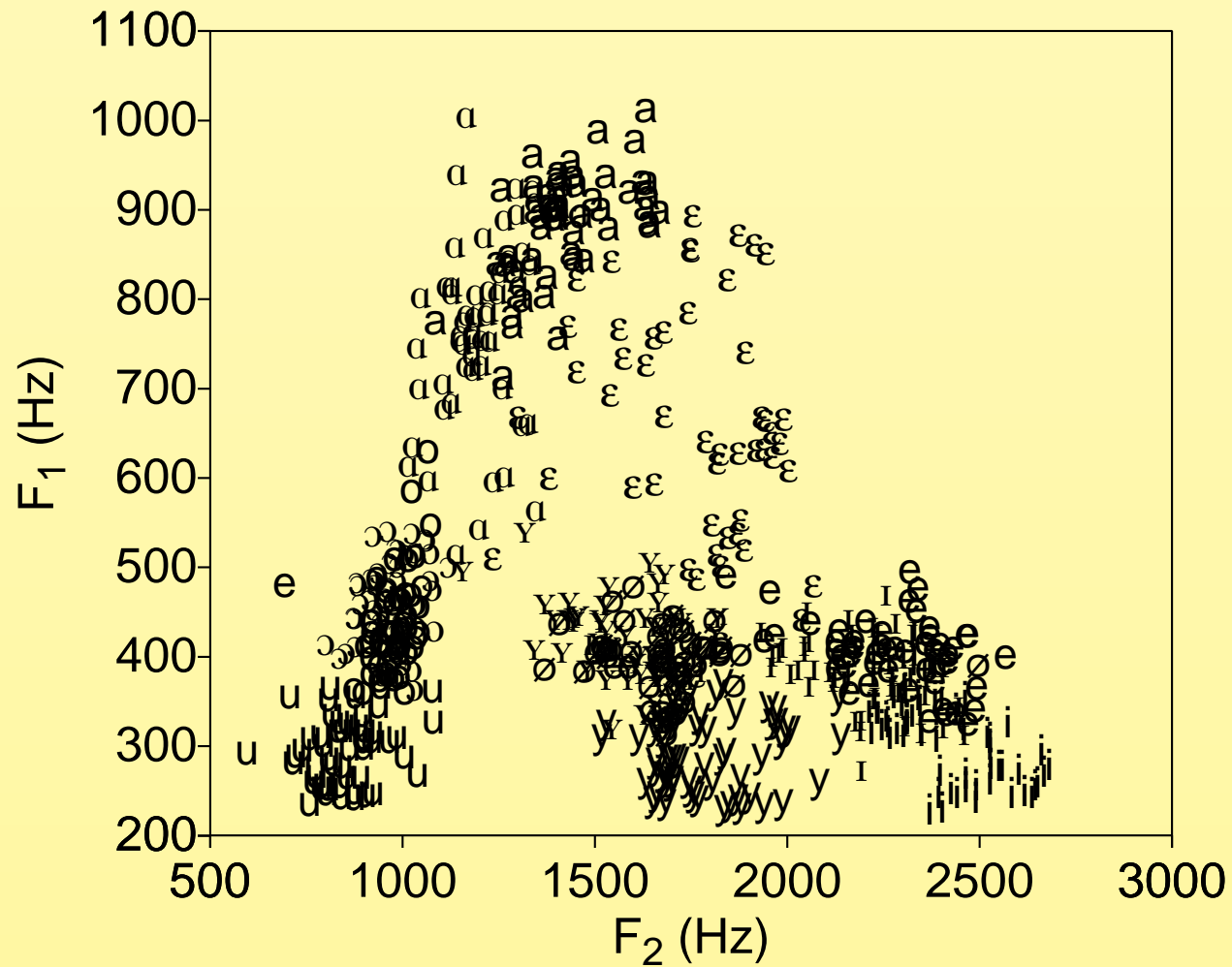
Where next?

- Key perception/psycholinguistic evidence still missing
- But perceptual hypotheses are testable, in principle at least
- Important: a viable model of VH needs to account for more than feature spreading in itself: target/trigger asymmetries, transparency/opacity, neutrality should also be captured

The $[\pm\text{high}]$ asymmetry in rounding harmony

- According to the typology of [Kaun \(1995\)](#) [-high] vowels are relatively resistant to RH
- This may be related to the fact that [round] contrast is disfavoured perceptually in nonhigh (front) vowels, (in part) due to a more restricted F_2 space
- Compare the $[\pm\text{high}]$ asymmetry in contrastive rounding in vowel inventories

The [\pm high] asymmetry in RH



[±high] and [round] in inventories

- Contrastively rounded and unrounded vowels in UPSID₄₅₁:

Height	Front		Back	
	Unround	Round	Unround	Round
hi(mid)	446	32	52	425
lo(mid)	364	11	19	348
lo	76	0	34	21
Total	449	33	87	446

References

Bell-Berti, F. & K. Harris (1979) Anticipating coarticulation: some implications of a study of lip rounding. *Journal of the Acoustical Society of America* 65: 1268-1270.

Benguérel, A.-P. & H. Cowan (1974) Coarticulation of upper lip protrusion in French. *Phonetica* 30: 41-55.

Boersma, P. (1998) *Functional Phonology*. PhD dissertation, University of Amsterdam.

Boyce, S. (1988) *The Influence of phonological structure on articulatory organization in Turkish and in English: Vowel*

harmony and coarticulation. Doctoral dissertation, Yale University.

Towards an articulatory phonology. *Phonology Yearbook* 3: 219-252.

Browman, C. & L. Goldstein (1992) Articulatory Phonology: an overview. *Phonetica* 49: 155-180.

Busá, M. & J. Ohala (1999) In search of the perceptual correlates of vowel harmony. *Proceedings of the XIVth International Congress of Phonetic Sciences* (San Francisco) Vol 1: 357-360.

Fowler, K. (1981) Production and perception of

coarticulation among stressed and unstressed vowels.
Journal of Speech and Hearing Research 46: 127-139.

Jansen, W. (2004) *Laryngeal Contrast and Phonetic Voicing: A Laboratory Phonology Approach to English, Hungarian, and Dutch*. PhD dissertation, University of Groningen.

Kaun, A. (1995) *The Typology of Vowel Harmony: an Optimality Theoretic Approach*. PhD dissertation, University of California at Los Angeles, and Ms., ROA.

Kaun, A. (2004) The typology of rounding harmony. In B. Hayes, R. Kirchner & D. Steriade (eds) *Phonetically-Based Phonology*. Cambridge: CUP.

Krueger, J. (1962) *Yakut manual*. (Uralic and Altaic Series, vol. 21). Bloomington, Indiana: Indiana University Publications.

Lindblom, B. (1963) Spectrographic study of vowel reduction. *Journal of the Acoustical Society of America* 35: 1773-1781.

Odden, D. (1991) Vowel geometry. *Phonology* 8: 261-289.

Ohala, J. (1981) The listener as a source of sound change. In C. Masek, R. Hendrik & M Miller (eds.) *CLS 17: Papers from the Parasession on Language and Behaviour*. Chicago: Chicago Linguistics Society.

Ohala, J. (1990) The phonetics and phonology of aspects of

assimilation. In J. Kingston & M. Beckman (eds.) *Papers in Laboratory Phonology 1. Between the Grammar and the Physics of Speech*. Cambridge: CUP.

Ohala, J. (1993) The phonetics of sound change. In C. Jones (ed.) *Historical Linguistics: Problems and Perspectives*. London: Longman.

Padgett, J. (2001) The unabridged feature classes in phonology. Ms., University of California at Santa Cruz.

Purcell, E. (1979) Formant frequency patterns in Russian VCV utterances. *Journal of the Acoustical Society of America* 66: 1691-1702.

Recasens, D. (1984) Vowel-to-vowel coarticulation in

Catalan VCV sequences. *Journal of the Acoustical Society of America* 76: 1624-1635.

Suomi, K. (1983) Palatal harmony: A perceptually motivated phenomenon? *Nordic Journal of Linguistics* 6: 1-35.