

## Comparing Greek, English and Japanese velar and palatal(iz)ed stops

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## Question:

- What do superficially similar patterns of allophony across languages look like under closer (finer-grained) analysis?

## Traditional description of /k/ allophony

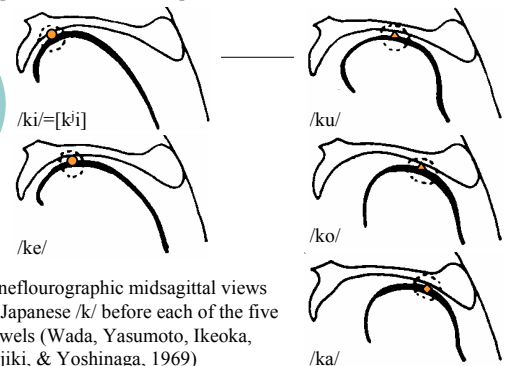
- Chomsky and Halle, 1968
- Setatos, 1974
- Wada et al. 1969

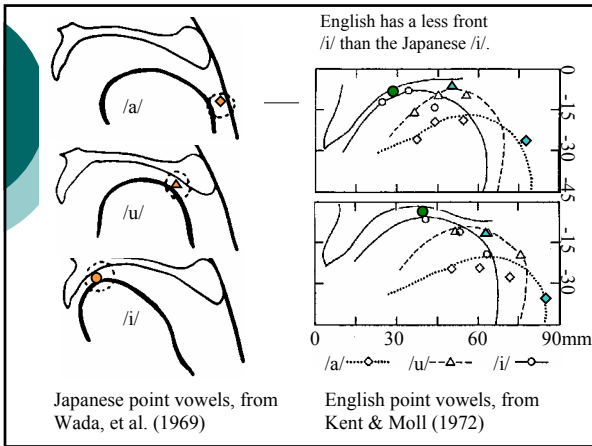
/k/ → [kʲ] or [c] \_/ V<sup>+front</sup>

## Allophones of word-initial /k/

- Greek: κάρτα, κόπος, κούκλα  
κιάλια, κίσκι, κιούπι  
κέφι, κίμινο
- Japanese: kaba, koora, kuma  
kyamru, kyookai, kyuuri  
kirin, keki
- English: car, coke, cool  
cute  
cake, key

Japanese /k/ before /i/ is palatal [kʲ]



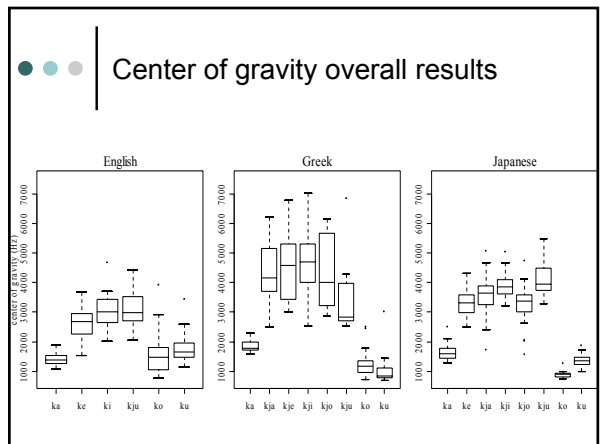
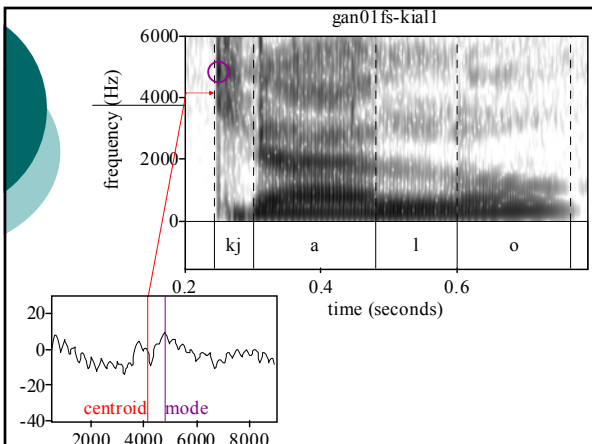
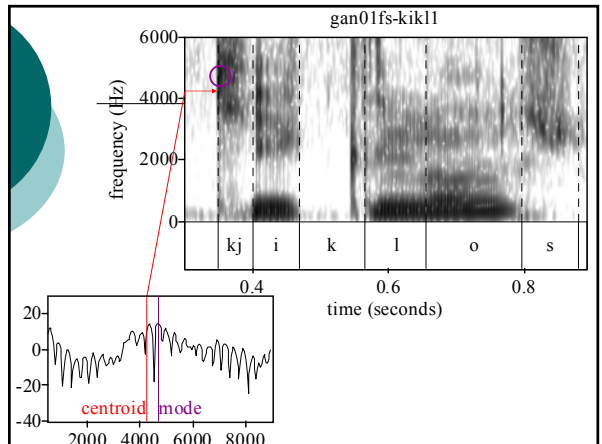


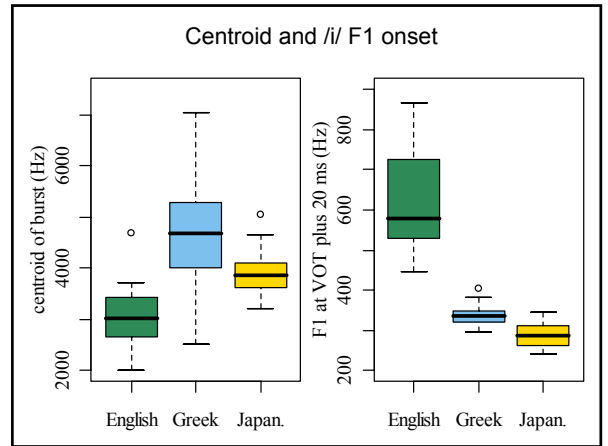
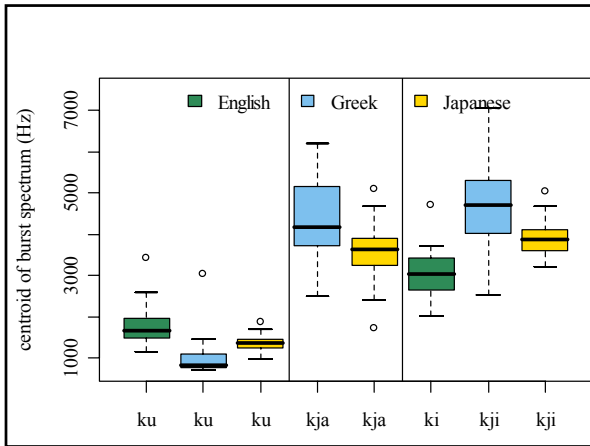
### An acoustic analysis experiment

- How does Greek /k/ and its allophones compare to English and Japanese?
- What is a good acoustic phonetic cue for place of articulation for plosives?
- Burst spectrum and formants of following vowel.

### Method

- 6 adult speakers recorded for each language (data from 3 presented)
- Data part of piloting for a larger NIH project for cross-linguistic language acquisition (PIs Jan Edwards and Mary Beckman).
- Repetition task of aurally presented stimuli (to be used for a different experiment).





## Summary

- o /k/ in palatalizing environments is more palatal in Greek and Japanese than in English.
- o Greek and Japanese /i/ is more peripheral than English.
- o English /u/ is more fronted than Japanese (unrounded) and Greek.

## Conclusions

- o Burst spectrum is a good cue for determining finer phonetic details of place of articulation.
- o Following vowel influences the degree of palatalization of preceding velar.
- o Greek /k/ before front vowels is more palatalized than English and Japanese /k/ thus closer to a true palatal plosive [c] than a palatalized velar plosive [kʲ].

## Discussion

- o English and Japanese, unlike Greek, contrast /k/ before front vowels with /tʰ/ (e.g. kin vs. chin)
- o /k/ is more frequent in Greek and Japanese than in English
- o Historically [kʲ] or [c] often can become affricated.
- o Children acquire /k/ and its allophones earlier in Greek and Japanese than in English
- o Fine-grained phonetic details may be a factor in acquisition and sound change

## Other possible phonetic cues

- o Intensity (dB) of burst.
- o VOT duration.
- o Formant transition durations of following vowel.




## Some references for Greek

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- Arvaniti, A. 1999. "Standard Modern Greek". *Journal of the International Phonetic Association* 29, 167-172.
- Botinis, A., Fourakis, M. and Prinou, I. 2000. "Acoustic Structure of the Greek Stop Consonants". *Glossologia* 11-12, 167-199
- Fourakis, M., Botinis, A. and Katsaiti, M. 1999. "Acoustic Characteristics of Greek Vowels". *Phonetica* 56, 28-43

## Comparisons

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- cube 
- kyuri 
- kiupi 

(sorry, audio files not available in pdf version)