Title
Vowels in Turkish onset clusters: Mind or Matter?

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Vowels in Turkish consonant clusters: Mind or matter?

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Phonology and vowel insertion

- Every language has rules about what sounds can go together & how:
  - Gwimp sounds like it could be English
  - Pmiwg doesn’t!
- These rules are a language’s phonology. Speakers know them implicitly.
  - Speakers of a language change the shape/sounds of a word to make it match the rules stored in their minds (their phonology)
  - Japanese [poki] → English [pok]
  - Russian [gar] → English [gər]
- English “Merry Christmas”
  - Hawaiian “Mele Kalikimaka”
  - Japanese “Merii Kurisumasu”
- Vowels are added to fit loanword into the borrowing lg’s phonology:
  - /kə/ of Christmas is okay in English phonology, but needs to be broken up into /k/ + /ə/ for Japanese or Hawaiian phonology

Speech sounds: Mind or matter?

Type 1 Sounds that the speaker intends to produce.
- The speaker has a mental representation of them.
- Part of the phonology → result of processes in the mind
- Ex: Sounds you think of as part of the word
- Ex: Vowels added in Mele Kalikimaka to make it fit the phonology

Type 2 Sounds that the speaker produces unintentionally.
- The speaker doesn’t have a mental representation of them
  - “Intrusive” sounds → result of physical processes (matter)
  - Ex: prince sounds the same as prince
  - The speaker has [t] in mind when saying prints
  - ... but not when saying prince
  - Intrusive [t] in prince is a side-effect of [n] → [s] transition
  - Ex: pronouncing please as pu
  - e is really part of the word, but uh isn’t
  - Uh = side-effect of slowing down [p] & [l] gestures + intrusive vowel

How can we tell Types 1 & 2 apart?

Question: Are vowels added in Turkish consonant clusters by the mind (phonology), or only by matter (gestural coordination)?

Vowel insertion in Turkish

Phenomenon
- French prince is borrowed into Turkish as [prens]: inserted [i]
- Is the inserted vowel Type 1 (mind-driven) or Type 2 (matter-driven)?

Diagnosing intrusive vowels
- Shorter than real vowels
- More affected by surrounding sounds and speech style / rate
- Don’t count as syllables for poetry or music

Experiments
1) Acoustic study → Inserted vowels sound different
2) Gestural study → Inserted vowels have a different tongue position
3) Corpus study → Inserted vowels are affected by context

Experiment 1: Acoustics

Method
- 6 Turkish speakers
- Recorded in a sound attenuated booth
- 5 repetitions of 54 words: real vowels as in prins ‘rice’ vs. inserted vowels as in prens ‘prince’

Results
- Vowel sounds occur in 74% prens-type words
- Inserted vowels are shorter (6ms)
- Acoustics of prens vowels are more affected by the following vowel than acoustics of prins vowels

Discussion
- Insertion is variable, which is unusual for mind-driven epenthesis but typical for matter-driven intrusion
- Insertion produces a vowel that is “less” than a real vowel

Upshot: Acoustic evidence suggests these inserted vowels reflect gestural timing.

Experiment 2: Articulation

Method
- Same as Expt. 1
- Ultrasound of tongue movements also recorded

Results
- Variation between subjects and conditions
- In general, tongue position in prens words is different from position in prens words
- Fronten when the following vowel is front /i/

Discussion
- Tongue position in prens words is more affected by the following vowel & preceding consonant than in prins words
- When tongue position differs across the three conditions, prens and prens patterns together, and prins patterns separately

Upshot: Ultrasound evidence shows these inserted vowels are articulated differently from real vowels.

Work in progress

Experiment 3: Corpus study

Method
- Model transcribed vowel insertion in a corpus of 30k tokens
- Results: Insertion is affected by the consonant context and other factors that affect gestures but don’t affect type 1 vowel insertion
- Discussion: Corpus results also suggest insertion is gesturally-driven

Experiment 4: Inserted vowels in Turkish music

Method
- Do musicians treat prens and prins vowels the same?
- Results: Variability even within the same song/singer. Sometimes inserted vowels get a beat: sometimes they don’t
- Discussion: prens vowels are optionally treated like real vowels in text-setting. It remains an open question how singers think of them.

Takeaway: Vowel insertion in Turkish onset clusters seems to be driven by matter, not mind. But it takes work to disentangle these factors.

References:


Gokgoz, I. (2016). Acoustic evidence suggests these inserted vowels articulate differently from real vowels.


See also: Mele Kalikimaka

<https://supercheyne.deviantart.com/art/Stitch-Mele-Kalikimaka-575452239>


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