Tonal Processes in Vietnamese
The falling tone huyền in bisyllabic units

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Background

- Vietnamese: pure tone language, each syllable contains a phonological tone
- High tones: ngang (level), sắc (rising) ngã (broken rising)
- Low tones: huyền (falling), sắc (falling creaky), nãng (glottal)
- Phonetic tones, when produced in isolation, are distinguishable by phonetic properties:
  - Fundamental frequency
  - Intensity (only in northern Vietnamese)
  - Duration
  - [Glottalization/glottalization/creaky voice](cf. Brunelle, 2009, p. 80)
- This project focuses on the two tones huyền and ngang
- Only fit plays a distinctive role
- No considerable difference in intensity (in the dialect of the speakers) and duration
- [Glottalization/glottalization/creaky voice]

Goals

- Claim:
  - In certain phrasal contexts, tones as phonological categories are not always distinguishable by phonetic properties (see also Brunelle, 2009, p. 94)
  - Variable phonetic tonal neutralization

- Aim of this project:
  - Showing that one phonological tone (low falling tone huyền) is able to take on the phonetic characteristics of another tone (high level tone ngang)
  - Example: bisyllabic units, both syllables are phonologically assigned the tone huyền
  - The effect is expected in the first syllable of each unit (cf. Ha, Grice, & Brunelle, 2014)

Methods

- Speaker:
  - One male speaker from Ho Chi Minh City (Saigon), 25 y. old

- Material and procedure:
  - The speaker was asked to read 15 bisyllabic units with the features under investigation e.g., mùa hè, ânh huyền
  - These bisyllabic units were mixed in randomly with bisyllabic units containing other tones not under investigation and displayed on a slideshow
  - Control items: The subject was asked to produce the first syllable of each unit with the high level tone ngang and then with the low level tone huyền
  - Problem: experiment design does not prevent list intonation

- Phonetic analysis:
  - Dependent variable: Fundamental frequency
  - Independent variables:
    - Fast/slow speech rate
    - Isolation of the target unit/embedding in a carrier sentence
    - Complex/simple syllable structure
    - Frequency of target unit as evaluated by the speaker (cf. Basiric et al., 2001)

- Data processing:
  - Manual transcription/segmentation of the recording with Praat
  - Only the ID of the target rhyme is taken into consideration (cf. Coupe, 2014, p. 483)
  - Normalization of the data for expository purpose: extraction of 10 equidistant points of the f0 values
  - Modelling of the graphs with R

Results

(3) Presence of the expected effect: example mia huyền

(4) tone ngang in isolation

(5) tone huyền in isolation

Speech rate (bisyllabic unit in isolation)

(6) fast

(7) slow

Embedding in a carrier sentence

(8a) Syllable 1

(8b) Syllable 2

Discussion

- The phonological tone huyền in the target syllable takes on more phonetic characteristics of the tone ngang than of the tone huyền in isolation
- BUT: variation on occurrence and strength of this effect
- strengthened by fast speech rate, high frequency and simple syllable structure
- Possible reason:
  - In syllable pairs, Vietnamese appears to have prominence on the rightmost syllable
  - Neutralisation preserves right-headedness of syllable pairs (see also Nguyen & Ingram, 2011 for tone sandhies in reduplicative words, p.33)
- Absence of the effect in the first syllable of units embedded in the carrier sentence
- Possible reason:
  - Stress shifting from the last syllable of the unit to the last syllable of the whole phrase
- Activation of other tonal processes which could be described in further research
- Apparent ranking of phonological features in this case: tone height >> tone contour

Conclusion

- Neutralization: The results confirm the hypothesis that in Vietnamese, tones as phonological categories are not always distinctly coded by phonetic properties
- Coarticulation: For bisyllabic units in which both syllables are assigned the phonological tone huyền, the phonetic realization of the phonological tone huyền in the first syllable can have more characteristics of the tone ngang in isolation than of the tone huyền in isolation

Further research possibilities

- Confirmation of the results: analysis of the remaining data
  - 3 additional speakers from the same town (1m, 2f, 25-30 y.)
- Statistical analysis
- Perceptual experiments (ranking of phonological features)
- Can we speak of coarticulation or even allomorphy/tone sandhi? (see also Ha, Grice & Brunelle, 2014, Nguyen & Ingram 2011)

Selected References


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