Does Even have ATR?

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The current language situation

- Even is a Tungusic language of the Altaic language family
- About 7,000 native speakers (census 2002) – an overstated number
- Dialectal diversity: from 11 to 14 dialectal varieties
- Most dialects are endangered (three of them are being documented within DoBes-project)
- The dialect of Ola was chosen as a basis for literary Even

The vowel harmony in Even

- all vowels are divided into two sets

<table>
<thead>
<tr>
<th>Set 1</th>
<th>Set 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>u</td>
</tr>
<tr>
<td>e</td>
<td>e</td>
</tr>
<tr>
<td>a</td>
<td>a</td>
</tr>
<tr>
<td>e_i</td>
<td>u</td>
</tr>
<tr>
<td>e</td>
<td>e</td>
</tr>
</tbody>
</table>

- within one word vowels of only one set are possible
- stem vowels determine suffix vowels

Set 1

- to
  - to
- lake
  - lake

Set 2

- hi
  - hi
- larch
  - larch

Novikova (1960: 53)

The previous research of Even vowel harmony

- Only descriptions of some individual dialects are available
- Different terminology describing vowel classes
  - Okhotsk dialect (Benzing 1955): "light" vs. "dark" vowels
  - Moma dialect (Lebedev 1978): "soft" (palatal) vs. "hard" (guttural) vowels
- The most detailed phonetic description concerns Ola dialect (literary Even, Novikova 1960)
  - Pharyngealization
    - lack of acoustic data

Pharyngealization in the Ola dialect

- Novikova (1960) provides x-rays for each pair of vowels
- The settings of the experiment are not clear (speakers, wordlist, sustained vowels?, technique of recording)

ATR / RTR in Tungusic Languages

- first proposed by Ard (1980)
- relies mainly on the data of Even (Novikova 1960 and other descriptions) and other Tungus languages in comparison with data from West African languages
- Pharyngealization in the Ola dialect is explained by decrease of the pharynx size, triggered by tongue root retraction
- generally accepted
Comparison with other vowel harmony systems

- Vowel inventory and vowel oppositions
  - Widespread ATR system of African model
    
    $\{+ \text{ ATR}\}: \{i, e, a, o, u\}$
    
    $\{- \text{ ATR}\}: \{i, e, a, o, u\}$  (Local & Lodge 2004)
  - Even
    
    [Set 1]: $\{i, a, o, u, ie\}$
    
    [Set 2]: $\{i, o, u, ia\}$  (Novikova, 1960)

Research questions

- Is there a distinction between two sets?
  - Auditorily hard to distinguish vowels of different sets
- What kind of distinction is it?
  - No clear pharyngealization attested in the examined dialects
- Is it the same for all varieties of Even?

Data

- Two dialects (Sebian-Küöl and Bystraja district)
- Two male and two female speakers in each dialect
- About 5 words of each vowel quality and length
- Recorded three times in isolation and three times within a carrier phrase
- 3367 items in total

Methodology: linear mixed model

- Allows to deal with relatively small, unbalanced datasets

Methodology: analysis factors

<table>
<thead>
<tr>
<th>Fixed effects</th>
<th>Random effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATR-group (advanced/retracted)</td>
<td>word</td>
</tr>
<tr>
<td>Vowel quality (I, U, E/A, O)</td>
<td>speaker</td>
</tr>
<tr>
<td>Vowel height (high/non-high)</td>
<td>repetition</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Dialect</td>
<td></td>
</tr>
<tr>
<td>Proficiency/fluency (age)</td>
<td></td>
</tr>
</tbody>
</table>
Methodology: linear mixed model

- to handle a number of fixed and random factors at the same time

- lme4-package (Bates & Maechler, 2009) and languageR-package (Baayen, 2009) for R (R-Project, 2010)

Acoustic analysis of ATR

- Akan (Stewart 1967, Lindau 1979, Ladefoged & Maddieson 1996)
- Degema (Fulop et al. 1998)
- Maa (Guion et al. 2004)
- Kalenjin (Local & Lodge, 2004) … etc.
- Mongolian (Svantesson 1985, 2005)
- Solon (Svantesson 1985)
- Oroqen (Lulich & Whaley, ms.)

Acoustic parameters

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Hypotheses for ATR</th>
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<tr>
<td>FORMANTS</td>
<td></td>
</tr>
<tr>
<td>F1</td>
<td>lower F1 for +ATR</td>
</tr>
<tr>
<td>F2</td>
<td>indifferent F2</td>
</tr>
<tr>
<td>F3</td>
<td>lower F3 for –ATR</td>
</tr>
<tr>
<td>SPECTRAL SLOPE</td>
<td></td>
</tr>
<tr>
<td>Amplitude difference A1-A2</td>
<td>A1-A2 lower for -ATR</td>
</tr>
<tr>
<td>F0</td>
<td>F0 higher in +ATR</td>
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<tr>
<td>DURATION</td>
<td>vowel duration</td>
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Results

<table>
<thead>
<tr>
<th>Parameter</th>
<th>main effects</th>
<th>Interactions</th>
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<tbody>
<tr>
<td>set1/set2 (advanced vs. retracted)</td>
<td>dialect (Sebian vs. Kamchatka)</td>
<td>vowel height (high vs. non-)</td>
</tr>
<tr>
<td>F1</td>
<td>***</td>
<td>n.s.</td>
</tr>
<tr>
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Signif. codes:  0 ‘****’ 0.001 ‘***’ 0.01 ‘**’ 0.05 ‘*’

Vowel quality: F1

A significantly lower F1 for Set 1 vowels, that supports ATR-hypothesis
Vowel quality: F2

A significantly different F2 for all vowels (as opposed to “classical” ATR-systems)

Set 1
Set 2

Vowel quality: F3

no consistent F3 difference

Set 1
Set 2

Spectral Slope

A1-A2 is lower for Set 2 vowels that supports the hypothesis

Set 1
Set 2

Dialects & F1

A smaller difference for Set 1 and Set 2 i and u for Sebian

Dialects & F1

A smaller difference for Set 1 and Set 2 i and u for Sebian
Duration – Set interaction

- Significant duration distinctions on the speaker level for:
  - Set 1 and Set 2 short o (4 Speakers from Sebian, 3 speakers from Kamchatka)
  - Set 1 and Set 2 short i (3 speakers from Kamchatka)

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Conclusions

- There is a distinction between two sets
- ATR justified?
  - not yet
  - only two parameters (F1, A1-A2) similar
- No significant difference between two dialects
  - A tendency to reduce distinction in Sebian (F1 for high vowels)
→ Duration might play a role for the distinction of vowels

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- Bodo Winter, Luise Zippel, Evgeniya Zhivotova, Brigitte Pakendorf (Max Planck Institute for Evolutionary Anthropology)
- Speakers from Kamchatka and Sebian-Küöl

References

Benzing, J. 1955. Lamutische Grammatik, München

Conclusion

- For Even further research in needed
  - other parameters
  - other factors
  - other dialects
  - perception tests
- Necessity of investigation the phonetic evidence of the label “ATR”
- An endangered language might show a complicated picture

Aknowledgements

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