An acoustic analysis of the /iːʃ/ diphthong in Standard Daco-Romanian

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Today’s talk overview

I. The class of diphthongs

II. Diphthongs in Standard Daco-Romanian

III. The acoustic analysis

IV. Some conclusions
I. The class of diphthongs - overview (1)

Latin had 3 diphthongs: AE [ai̯], OE [oɪ] and AU [au̯], the first two became a monophthong [ε] and [ɛ] while the third one survived as a diphthong in Romanian, in some dialects of Sicily, the far south of mainland Italy, Romansh, Gascon, as [ou̯] or [oi̯] in Portuguese.

- The diphthongs in Romance languages are innovations with respect to Latin.
- Martin Maiden (2016: 647)
I. The class of diphthongs (2)

- Catford (1977: 215, *apud.* Miret 1998: 27): „A diphthong may be defined as a sequence of two perceptually different vowel sounds within one and the same syllable”
- Miret (1998: 27): *are diphthongs single sounds or sequences of two sounds?*
I. The class of diphthongs (3)

• Some diphthongs behave like **units** (show unitary features) and others behave like **sequences** (show dual features);

• **True** (representatives of the ideal diphtohong) vs **false** (another type of entity, bad examples of the category) diphthongs;


• **Rising diphthongs** vs. **falling diphthongs** (true diphthongs)

(Miret 1998: 29)
I. The class of diphthongs (4)
Classifications of *true* and *false* diphthongs
(Miret 1998: 31)

<table>
<thead>
<tr>
<th></th>
<th>criterion</th>
<th>true diphthongs</th>
<th>false diphthongs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sievers</td>
<td>auditory impression</td>
<td>unity [æj, ɛj, ɑu]</td>
<td>sequence [iə, uə]</td>
</tr>
<tr>
<td>Jespersen</td>
<td>tradition</td>
<td>falling</td>
<td>rising</td>
</tr>
<tr>
<td>Donegan</td>
<td>prosody</td>
<td>falling</td>
<td>rising</td>
</tr>
<tr>
<td>Marotta</td>
<td>syllabic structure</td>
<td>branching nuclei [wɔ]</td>
<td>onset + nucleus [je], nucleus + coda [æʃ]</td>
</tr>
<tr>
<td>Dutch diphthongs</td>
<td>phonotactics, articulation</td>
<td>VV /eɪ, ʌɪ, ʊə/</td>
<td>VC /æj, ɔj, ʊj, əw, ɪw/</td>
</tr>
<tr>
<td>Lehiste and Peterson</td>
<td>acoustics</td>
<td>diphthongs [ɑu, ɑʊ, ɔɪ]</td>
<td>glides [ɛʃ, ɔʃ, əʃ]</td>
</tr>
</tbody>
</table>
II. Diphthongs in Standard Daco-Romanian (1)

- seven fundamental vowels: /a, ə, i, e, i, o u/.
- + /ö/: /vrö/ - vreo “any” - the impossibility of forming a diphthong in this case, due to the small degree of vowel height between the two (Calotă 1977a: 482);
- the diphthong is a sequence of vocal sounds pronounced in the same syllable, with a single muscle tension and a single respiratory effort (Rosetti 1974: 71-72);
- + the condition of the existence of different degrees of vowel height (Calotă 1977a: 484)
II. Diphthongs in Standard Daco-Romanian (2)

• Anca Ulivi (1975: 110) states that the asyllabic elements with a longer duration and a shorter vowel height, spoken with a friction as in the case of fricative consonants, form the category of semiconsonants (/j, w/), while asyllabic sounds with a shorter duration but with a longer vowel height, with no friction, form the category of semivowels (/e, ö/).
II. Diphthongs in Standard Daco-Romanian (3)

- phonetic nature of the asyllabic element
  - Calotă (1977b: 599): asyllabic sounds /j, w, e, ö/ are vocal from an acoustic-articulatory point of view, but they play the role of consonants from a functional point of view.
  - distinguishing asyllabic sounds: duration, vowel height, presence or absence of friction noise and the place they occupy in the syllable.
II. Diphthongs in Standard Daco-Romanian (4)

- The role of a syllabic element in a diphthong can be played by all 7 vowels of the Daco-Romanian, as Calota (1977a: 488) argues, while the asyllabic element can be represented of close vowels that combine with open vowels to form a diphthong.

- Asyllabic element can be realized by the close vowels /i, u/ and by the close-mid vowels /e, o/.

- /ɨ/ is missing from the series of close vowels, which cannot be an asyllabic element according to Avram, although it is a close sound.

- /ɨ/ can fulfill the function of an asyllabic element in combination with central vowels and only as the first element of the diphthong, so as an asyllabic appendix in rising diphthongs (Calotă: 1977a: 488)
II. Diphthongs in Standard Daco-Romanian (5)

- /o/ is too open to perform the asyllabic function before its syllabic /a/, so that it cannot form a diphthong /ɔa/ → /ʊa/ in utterance (due to the fact that there is a larger vowel height difference between /u/ and /a/ than between /o/ and /a/).
- /ɛa/ and /ja/ are possible because they satisfy the condition of the existence of a difference of vowel height and also the asyllabic elements are switchable in words like [bɛatə] - *drunk* [bjatə] *poor her*
II. Diphthongs in Standard Daco-Romanian (6)

- 52 possible combinations, so 52 diphthongs
- Romanian has only 30
II. Diphthongs in Standard Daco-Romanian (7)

• The order criterion classified diphthongs into: rising and falling diphthongs.
II. Diphthongs in Standard Daco-Romanian (8)

• In Romanian there are 16 rising diphthongs and 14 falling diphthongs.
• The most common rising diphthongs are:

  /ea/: /stea/  star  /ju/: /ju.bit/  loved
  /eo/: /vreo/  any  /qa/: /qa.men/i/  people
  /ja/: /pja.trə/  stone  /wa/: /zi.wa/  the day
  /je/: /fjer/  iron  /we/: /do.wə/  two
  /jo/: /mjo.r.lə.i/  caterwaul
II. Diphthongs in Standard Daco-Romanian (9)

- Falling diphthongs are proper diphthongs, the asyllabic element is not an appendix in this case, but it has an etymological motivation.

| /œj/ : /rœj/ | /œu/: /reœu/ | /œi/: /reœi/ | /œj/: /leœj/ | /œu/: /leœu/ | pl. bad | sg. bad | river | lion | new |
| /iœi/: /piœne/ | /iœu/: /piœiu/ | /iœu/: /leœu/ | /iœj/: /fœmiœj/ | /iœu/: /fœmiœu/ | bread | lion | I know | new |
| /iœj/: /leœj/ | /iœj/: /fœmiœj/ | /iœj/: /leœj/ | /iœj/: /fœmiœj/ | /iœj/: /leœj/ | lions | I know | new |
II. Diphthongs in Standard Daco-Romanian (10)

• some sequences of two synthetic vocal sounds are perceived as vowels, groups of vowels or diphthongs
• because there are no differences in duration and intensity, Avram (1975: 70) proposes some distinctions from the acoustic structure of the first element, the second element and the phonetic distance between them.
• the structure /ij/ was perceived as one single vowel.
III. The acoustic analysis (1)

- a man and a woman (46-49 years old, Bucharest)
- 4 pairs of words: comedii (comedies)-comèdii (funny things), herghelii (studs)-domicilii (residences), cacofonii (cacophony)-bazacònii (follies), anestezii (anaesthesia)-dezilùzii (disillusions)
- 6 sentences:
  1. La teatru au avut loc numai comedii. - Only comedies took place in the theater.
  2. Comedii, doar atât ai putut citi? Comedies, that's all you could read?
  3. A pus la cale numai comèdii. He is up to funny things.
  4. Ce comèdii mai sunt și acestea? What funny things are these?

- PRAAT
III. The acoustic analysis (2)
III. The acoustic analysis (3)

• the man's utterance lacks an ascending contour of the pitch, the woman's utterance is characterized precisely from this perspective
• intensity shows small oscillations in the man's speech, while the woman maintains it at close values
• the emphasis on another vowel in the word causes a series of changes, especially in the utterance of the man
• he has no control on the final sequence which appears with a low value of intensity and a contour in a continuous change, while the pitch has values below the limit
• the woman is influenced by the way the word is written and does not change the way she pronounces
### III. The acoustic analysis (4)

<table>
<thead>
<tr>
<th>The words</th>
<th>MP</th>
<th>WP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I (dB)</td>
<td>P (Hz)</td>
</tr>
<tr>
<td>/komedi/</td>
<td>71.06</td>
<td>113.2</td>
</tr>
<tr>
<td>/komèdij/</td>
<td>62.2</td>
<td>87.36</td>
</tr>
</tbody>
</table>
III. The acoustic analysis (5)
III. The acoustic analysis (6)

- the diphthong /ij/ is under control in the man’s utterance in the context in which it is stressed.
- a decrease in intensity and very small values of the pitch.
- in the woman's utterance we can observe that it implies a longer duration in both cases and a pitch that has an ascending contour.
- as the contour of the pitch increases, the intensity gradually decreases.
- if we compare the two speakers, the first things that stand out are the duration and pitch with much higher values of the diphthong in the woman's speech, regardless of the position of the accent.
III. The acoustic analysis (7)

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</thead>
<tbody>
<tr>
<td></td>
<td>I (dB)</td>
<td>P (Hz)</td>
</tr>
<tr>
<td>/hergˈelij/</td>
<td>70.73</td>
<td>98.07</td>
</tr>
<tr>
<td>/domiʃˈelij/</td>
<td>65.85</td>
<td>82.17</td>
</tr>
</tbody>
</table>
III. The acoustic analysis (8)
III. The acoustic analysis (9)

• the speakers preserve the characteristics they use in highlighting or not the final sequence.
• the man's speech is characterized by a low pitch value in both situations, an intensity at a constant level in the first example, and one that has a downward contour in the second; the duration shows changes.
• the woman's utterance is characterized by an ascending contour of the pitch, a longer duration in both cases and an intensity that remains at approximately equal values in the first part of the articulation, but which decreases with the increasing of the pitch.
### III. The acoustic analysis (10)

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td></td>
<td>I (dB)</td>
<td>P (Hz)</td>
</tr>
<tr>
<td>/kakofonij/</td>
<td>70.47</td>
<td>99.89</td>
</tr>
<tr>
<td>/bazakonij/</td>
<td>63.81</td>
<td>82.67</td>
</tr>
</tbody>
</table>
III. The acoustic analysis (11)
III. The acoustic analysis (12)

- in the first situation you can see both an increase in intensity and pitch at the level of the first stage of utterance of the diphthong. This ascending contour is followed by a sudden decrease.
- the duration is longer as opposed to the context in which the diphthong isn’t stressed, and the pitch is below the limit recorded by the program
- the intensity has low values
- the woman has the same behavior that we saw before, namely the use of an increase in pitch, an extension of the diphthong by relatively long duration and an intensity with high values.
### III. The acoustic analysis (13)

<table>
<thead>
<tr>
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<th>WP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I (dB)</td>
<td>P (Hz)</td>
</tr>
<tr>
<td>/anestezìj/</td>
<td>69.95</td>
<td>97.87</td>
</tr>
<tr>
<td>/dezilùzìj/</td>
<td>62.02</td>
<td>-</td>
</tr>
</tbody>
</table>
III. The acoustic analysis (14)

- small analysis of four sentences in which the terms /komedˈij/ /koˈmedij/ appear
- ? the type of sentence influences them
- ? the position of the word in a sentence has an impact on the acoustic properties
- (S1) *La teatru au avut loc numai comedii.* - (Only comedies took place in the theatre.)
- (S2) *Comedii, doar atât ai putut citi?* (Comedies, that's all you could read?)
- (S3) *A pus la cale numai comèdii.* (He is up to funny things.)
- (S4) *Ce comèdii mai sunt și acestea?* (What funny things are these?)
III. The acoustic analysis (15): MP - S1/S3
III. The acoustic analysis (16)

- the speaker does not turn to a sudden increase in the final sequence
- the diphthong whose vowel is stressed is spoken without an effort to illustrate this feature
- the intensity increases in the first part of the utterance, but begins to have a downward contour immediately.
- the diphthong: 0.19 ms vs 0.09ms.
- the pitch is at a very low level, which shows his preference to use a higher energy in speech.
III. The acoustic analysis (17) WP - S1/S3
III. The acoustic analysis (18)

- interrogative context → a precise control over the final sequence
- the intensity constitutes the highest values reached in this sentence
- a rather unusual thing for this subject is the pitch, which reaches maximum values here
- a strong friction noise
- 0.20 ms vs 0.06 ms
III. The acoustic analysis (19) MP - S2/S4
III. The acoustic analysis (20)

- the frequency is no longer at a high level and it is in a continuous decrease
- the high concentrations of energy with which the vowel / e / is spoken, bearing the accent in the second spectrogram
- although the two words, analyzed in this paper, do not have a focus position, they retain some very high values of acoustic features
- 0.16 ms vs 0.12 ms
III. The acoustic analysis (21) WP - S2/S4
III. The acoustic analysis (22)

- interrogative context brings a clear record of the speaker's effort to maintain the final sequence
- the increase in intensity may be the result of a tendency to utter all words with a certain energy, as it can be seen in the second spectrogram.
- placing the word in the focus position does not always bring the same results, as we can see in the two spectrograms above.
IV. Some conclusions (1)

- The two people I recorded presented different approaches to the diphthong. If the woman used the big values of pitch to control the final sequence, the man increased the intensity values without exploiting the pitch.
- The woman also controlled its utterance very well in the situation where the accent was on another vowel, unlike the man, whose utterance was marked by sudden decreases in intensity or pitch.
IV. Some conclusions (2)

- the differences between the phonological contexts in which this diphthong appears did not considerably modify the acoustic peculiarities of the /ij/ diphthong.
- at the level of sentences, differences can be observed between the two speakers, even at the level of the same speaker, from one situation to another.
- if in the affirmative sentences, the speakers did not pay attention to the final sequence, in the interrogative sentences one can see a greater control of the diphthong.
- the woman kept the tendency to pronounce the /ij/ diphthong with a pitch whose values were very high, unlike the man, who uttered the diphthong more deeply.
References

- Avram, Andrei, 1966, „Interpretarea fonologică a semivocalelor inițiale de silabă în limba română”, în SCL, XVII, nr. 5, p. 531-545.
- Avram, Andrei, 1975, „Perceperea secvențelor de două vocale sintetice și problema naturii fonetice a diftongilor”, în Fonetică și dialectologie, IX, p. 67-75.
References


• Sala, Marius, 1970, Contribuții la fonetica istorică a limbii române, București, Editura Academiei Republicii Socialiste România, p. 22-23.


• Sievers, Eduard, 1901 Grundzüge der Phonetik zur Einführung in das Studium der Lautlehre der indogermanischen Sprachen, Leipzig, Breitkopf and Härtel


• Vasiliu, Emanuel, 1965, Fonologia limbii române, București, Editura Științifică.
Thank you!