Morphologische Theorien

X. Synkretismen und Flexionsklassen

Gereon Müller

Institut für Linguistik
Universität Leipzig

SoSe 2015

www.uni-leipzig.de/~muellerg
Trans-Paradigmatic Syncretism

Trans-paradigmatic syncretism can be accounted for by decomposing privative class features into more primitive, binary class features that are cross-classified (yielding natural classes of inflection classes). Predecessors of the system in Alexiadou & Müller (2008):

- Halle (1992) on Latvian noun inflection: [±marginal], [±marked] in addition to the “standard” class features A, B
- Nesset (1994) on Russian noun inflection: [±nom-end] and [a/igen-end]
- Oltra Massuet (1999) on verbal inflection in Catalan
- Müller (2005) on Icelandic noun inflection
- Trommer (2005) on Amharic verbs.

# Latvian Noun Inflection: The Paradigm

## $T_1$: Latvian noun inflection

<table>
<thead>
<tr>
<th></th>
<th>IA</th>
<th>IIA</th>
<th>IIIA</th>
<th>IVA</th>
<th>VB</th>
<th>VIB</th>
<th>VIIIB</th>
<th>VIIIIB</th>
</tr>
</thead>
<tbody>
<tr>
<td>nom</td>
<td>-s</td>
<td>-i-s</td>
<td>-s</td>
<td>-u-s</td>
<td>-a</td>
<td>-s</td>
<td>-e</td>
<td>-e</td>
</tr>
<tr>
<td>gen</td>
<td>-a</td>
<td>-j-a</td>
<td>-s</td>
<td>-u-s</td>
<td>-a-s</td>
<td>-s</td>
<td>-e-s</td>
<td>-e-s</td>
</tr>
<tr>
<td>dat</td>
<td>-a-m</td>
<td>-i-m</td>
<td>-i-m</td>
<td>-u-m</td>
<td>-a-j</td>
<td>-i-j</td>
<td>-e-j</td>
<td>-e-j</td>
</tr>
<tr>
<td>inst</td>
<td>-u</td>
<td>-i</td>
<td>-i</td>
<td>-u</td>
<td>-u</td>
<td>-i</td>
<td>-i</td>
<td>-i</td>
</tr>
<tr>
<td>acc</td>
<td>-u</td>
<td>-i</td>
<td>-i</td>
<td>-u</td>
<td>-u</td>
<td>-i</td>
<td>-i</td>
<td>-i</td>
</tr>
<tr>
<td>loc</td>
<td>-a:</td>
<td>-i:</td>
<td>-i:</td>
<td>-u:</td>
<td>-a:</td>
<td>-i:</td>
<td>-e:</td>
<td>-i:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>nom</th>
<th>gen</th>
<th>dat</th>
<th>inst</th>
<th>acc</th>
<th>loc</th>
</tr>
</thead>
<tbody>
<tr>
<td>nom</td>
<td>-i</td>
<td>-u</td>
<td>-i-e-m</td>
<td>-j-ie-m</td>
<td>-u-s</td>
<td>-uo-s</td>
</tr>
<tr>
<td>gen</td>
<td>-u</td>
<td>-j-u</td>
<td>-j-u</td>
<td>-u</td>
<td>-u</td>
<td>-j-u</td>
</tr>
<tr>
<td>dat</td>
<td>-j-ie-m</td>
<td>-j-ie-m</td>
<td>-j-ie-m</td>
<td>-j-ie-m</td>
<td>-a:s</td>
<td>-i:s</td>
</tr>
<tr>
<td>inst</td>
<td>-j-ie-m</td>
<td>-j-ie-m</td>
<td>-j-ie-m</td>
<td>-j-ie-m</td>
<td>-a:s</td>
<td>-i:s</td>
</tr>
<tr>
<td>acc</td>
<td>-u-s</td>
<td>-j-u-s</td>
<td>-j-u-s</td>
<td>-u-s</td>
<td>-a:s</td>
<td>-i:s</td>
</tr>
<tr>
<td>loc</td>
<td>-uo-s</td>
<td>-j-uo-s</td>
<td>-j-uo-s</td>
<td>-uo-s</td>
<td>-a:s</td>
<td>-i:s</td>
</tr>
</tbody>
</table>

**Example Words:**
- 'horse' (zirg)
- 'swan' (gulb)
- 'stone' (akmen)
- 'market' (tirg)
- 'sister' (ma:s)
- 'cow' (gov)
- 'handmill' (dzirn)
- 'earth' (zem)
Structure of Latvian Nouns

Latvian nouns have a functional morpheme for *theme vowels* (th), and a functional morpheme for case/number (cn).

(1) Syntactic structure of the Latvian noun (one possibility):

```
     cnP
    /   \
   /     \n cnP  thP
 th   cn  th
N     th  tN
   .....
```
Decomposition of Class Features

Choice of the theme vowel depends on an inflection class feature on the noun stem. Class features: [A], [B], [±Marginal], [±Marked].

<table>
<thead>
<tr>
<th>Class B:</th>
<th>u</th>
<th>i</th>
<th>e</th>
<th>a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class A:</td>
<td>u</td>
<td>iₜ</td>
<td>iₐ</td>
<td>a</td>
</tr>
<tr>
<td></td>
<td>+</td>
<td>+</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>+</td>
<td>−</td>
<td>+</td>
<td>−</td>
</tr>
</tbody>
</table>
Vocabulary Items for th, plus Readjustment Rules

Redundancy rules: [+fem] → class B; [−fem] → class A (with lexical exceptions)

(3) Vocabulary items (theme vowels; decreasing specificity):
   a. /e/ ↔ {[N], [B], [−marginal, +marked]}
   b. /i/ ↔ {[N], [N^marginal, N^marked]}
   c. /u/ ↔ {[N], [+marginal]}
   d. /a/ ↔ {[N]}

The insertion context for /i/ refers to variables over feature values (Halle himself uses a disjunction of two specifications here).

Two additional sets of readjustment rules are necessary to change the outcome of theme vowel insertion.

(4) Readjustment rules for theme vowels:
   a. (i) [−cons]-X → [+high]/__cn:[sg.acc]
      (ii) [−cons]-X → X-X/N:[classB]__cn:[pl.loc/dat]
      (iii) [−cons]-X → X-X/__cn:[sg.loc]
   b. (i) Ø → ie/N:[classA]__cn:[pl.dat]
      (ii) Ø → u/N:[classA]__cn:[pl.acc]
      (iii) Ø → (u)o/N:[classA]__cn:[pl.loc]
Vocabulary Items for cn, plus Readjustment Rules

(5) Vocabulary items (case/number markers):
   a. /a/ ↔ {[classA],[Sg.Gen]}
   b. /i/ ↔ {[classA],[Pl.Nom]}
   c. /j/ ↔ {[+fem],[Sg.Dat]}
   d. /Ø/ ↔ {[classB],[Sg.Nom]}
   e. /Ø/ ↔ {[Sg.Acc/Loc]}
   f. /u/ ↔ {[Pl.Gen]}
   g. /m/ ↔ {[Dat]}
   h. /s/ ↔ {−}

Certain instances of case syncretism remain to be derived. Suggestions: further readjustment rules, as in (6). (Note: These readjustment rules are not phonological in nature; rather, they correspond to rules of referral or feature-changing impoverishment).

(6) Rules of referral:
   a. (i) Inst → Acc/___cn:[Sg]
      (ii) Inst → Dat/___cn:[Pl]
   b. (i) Nom → Gen/N:[classB, +marg]___cn:[sg]
      (ii) Gen → Nom/N:[classA, +marg]___cn:[sg]
Final Vowel Changes

(7) Morpho-phonological readjustment rules:
   a. \([-\text{cons}] \rightarrow \emptyset / \text{N: [classB, +marginal]} \_ \text{cn: [sg.gen]}\]
   b. \([-\text{cons}] \rightarrow \emptyset / \text{N: [classA, -marked]} \_ \text{cn: [sg.nom]}\]

(8) General phonological rules of Latvian:
   a. \([-\text{back}, -\text{cons}] \rightarrow /j/ / _[-\text{cons}]\]
   b. \([-\text{cons}] \rightarrow \emptyset / _[-\text{cons}]\]
Noun Inflection in Greek

References:

Assumption (Ralli (1994)):
There are eight inflection classes. (Traditional view: three classes)
## Four Inflection Classes

### $T_2$: Inflection classes I–IV

<table>
<thead>
<tr>
<th></th>
<th>I: masc $kip_m$ (‘garden’)</th>
<th>I: fem $psif_f$ (‘vote’)</th>
<th>II: masc $maxit(i)_m$ (‘fighter’)</th>
<th>III: fem $avl(i)_f$ (‘yard’)</th>
<th>IV: fem $pol(i)(e)_f$ (‘city’)</th>
</tr>
</thead>
<tbody>
<tr>
<td>nom/sg</td>
<td>os</td>
<td>os</td>
<td>s</td>
<td>$\emptyset$</td>
<td>$\emptyset$</td>
</tr>
<tr>
<td>acc/sg</td>
<td>o(n)</td>
<td>o(n)</td>
<td>$\emptyset$</td>
<td>$\emptyset$</td>
<td>$\emptyset$</td>
</tr>
<tr>
<td>gen/sg</td>
<td>u</td>
<td>u</td>
<td>$\emptyset$</td>
<td>s</td>
<td>s</td>
</tr>
<tr>
<td>voc/sg</td>
<td>e</td>
<td>e</td>
<td>$\emptyset$</td>
<td>$\emptyset$</td>
<td>$\emptyset$</td>
</tr>
<tr>
<td>nom/pl</td>
<td>i</td>
<td>i</td>
<td>es</td>
<td>es</td>
<td>is</td>
</tr>
<tr>
<td>acc/pl</td>
<td>us</td>
<td>us</td>
<td>es</td>
<td>es</td>
<td>is</td>
</tr>
<tr>
<td>gen/pl</td>
<td>on</td>
<td>on</td>
<td>on</td>
<td>on</td>
<td>on</td>
</tr>
<tr>
<td>voc/pl</td>
<td>i</td>
<td>i</td>
<td>es</td>
<td>es</td>
<td>is</td>
</tr>
</tbody>
</table>
## T₃: Inflection classes V–VIII

<table>
<thead>
<tr>
<th></th>
<th>V: neut</th>
<th>VI: neut</th>
<th>VII: neut</th>
<th>VIII: neut</th>
</tr>
</thead>
<tbody>
<tr>
<td>vunₙ n</td>
<td>‘mountain’</td>
<td>kratₙ n</td>
<td>‘state’</td>
<td>spitiₙ n</td>
</tr>
<tr>
<td>nom/sg</td>
<td>o</td>
<td>os</td>
<td>Ø</td>
<td>Ø</td>
</tr>
<tr>
<td>acc/sg</td>
<td>o</td>
<td>os</td>
<td>Ø</td>
<td>Ø</td>
</tr>
<tr>
<td>gen/sg</td>
<td>u</td>
<td>us</td>
<td>u</td>
<td>os</td>
</tr>
<tr>
<td>voc/sg</td>
<td>o</td>
<td>os</td>
<td>Ø</td>
<td>Ø</td>
</tr>
<tr>
<td>nom/pl</td>
<td>a</td>
<td>i</td>
<td>a</td>
<td>a</td>
</tr>
<tr>
<td>acc/pl</td>
<td>a</td>
<td>i</td>
<td>a</td>
<td>a</td>
</tr>
<tr>
<td>gen/pl</td>
<td>on</td>
<td>on</td>
<td>on</td>
<td>on</td>
</tr>
<tr>
<td>voc/pl</td>
<td>a</td>
<td>i</td>
<td>a</td>
<td>a</td>
</tr>
</tbody>
</table>
Independently Motivated Features?

Observation:
(i) Gender features on the stem do not suffice to predict inflection class ($N_{masc}$ can be I or II; $N_{fem}$ can be I, III, or IV; $N_{neut}$ can be V-VIII).
Observation:
(i) Gender features on the stem do not suffice to predict inflection class ($N_{\text{masc}}$ can be I or II; $N_{\text{fem}}$ can be I, III, or IV; $N_{\text{neut}}$ can be V-VIII).
(ii) Phonological features on the stem do not suffice to predict inflection class (thematic vowels are either part of the ending, in which case they cannot encode inflection class by definition; or they are part of the stem, where they fail to unambiguously encode inflection class; see, e.g., $\text{maxit}(i)$ (‘fighter’) vs. $\text{papa}(\delta)$ (‘priest’) vs. $\text{papu}(\delta)$ (‘grandfather’) in class II).
Independently Motivated Features?

Observation:

(i) Gender features on the stem do not suffice to predict inflection class ($\text{N}_{\text{masc}}$ can be I or II; $\text{N}_{\text{fem}}$ can be I, III, or IV; $\text{N}_{\text{neut}}$ can be V-VIII).

(ii) Phonological features on the stem do not suffice to predict inflection class (thematic vowels are either part of the ending, in which case they cannot encode inflection class by definition; or they are part of the stem, where they fail to unambiguously encode inflection class; see, e.g., $\text{maxit(i)}$ (‘fighter’) vs. $\text{papa(δ)}$ (‘priest’) vs. $\text{papu(δ)}$ (‘grandfather’) in class II).

(iii) Semantic features on the stem do not suffice to predict inflection class.
Analysis

**T₄: Syncretism within and across inflection classes in Greek**

<table>
<thead>
<tr>
<th></th>
<th>‘2.decl.’</th>
<th>‘1.decl.’</th>
<th>‘3.decl.’</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Iₘ,ₙ</td>
<td>IIₘ</td>
<td>IIIₙ</td>
</tr>
<tr>
<td>nom/sg</td>
<td>os</td>
<td>s</td>
<td>Ø</td>
</tr>
<tr>
<td>acc/sg</td>
<td>o(n)</td>
<td>Ø</td>
<td>Ø</td>
</tr>
<tr>
<td>gen/sg</td>
<td>u</td>
<td>Ø</td>
<td>s</td>
</tr>
<tr>
<td>voc/sg</td>
<td>e</td>
<td>Ø</td>
<td>Ø</td>
</tr>
<tr>
<td>nom/pl</td>
<td>i</td>
<td>es</td>
<td>es</td>
</tr>
<tr>
<td>acc/pl</td>
<td>us</td>
<td>es</td>
<td>es</td>
</tr>
<tr>
<td>gen/pl</td>
<td>on</td>
<td>on</td>
<td>on</td>
</tr>
<tr>
<td>voc/pl</td>
<td>i</td>
<td>es</td>
<td>es</td>
</tr>
</tbody>
</table>
Case Decomposition

(9) **Decomposition of cases in Greek**: [±governed], [±oblique] ([±subject])

- nominative: [−gov,−obl]
- accusative: [+gov,−obl]
- genitive: [+gov,+obl]
- (vocative: [−subj,−gov,−obl])
Inflection Class Decomposition

(10) Decomposition of inflection classes in Greek: $[\pm \alpha], [\pm \beta], [\pm \gamma]$

I: $[+\alpha, +\beta, +\gamma]$  
    $kip_m$ (‘garden’), $psif_f$ (‘vote’)  

V: $[+\alpha, +\beta, -\gamma]$  
    $vun_n$ (‘mountain’)  

VII: $[+\alpha, -\beta, +\gamma]$  
    $spiti_n$ (‘house’)  

VIII: $[+\alpha, -\beta, -\gamma]$  
    $soma(t)_n$ (‘body’)  

VI: $[-\alpha, +\beta, +\gamma]$  
    $krat_n$ (‘state’)  

IV: $[-\alpha, -\beta, +\gamma]$  
    $pol(i)(e)_f$ (‘city’)  

II: $[-\alpha, +\beta, -\gamma]$  
    $maxit(i)_m$ (‘fighter’)  

III: $[-\alpha, -\beta, -\gamma]$  
    $avl(i)_f$ (‘yard’)
Vocabulary Items (Singular)

(11) Inflection markers (singular):

1. /o(n)/: \{[+N],[+\alpha,+\beta,+\gamma],[+\text{gov},-\text{obl}]\}
2. /os/: \{[+N],[+\alpha,-\beta,-\gamma],[+\text{gov},+\text{obl}]\}
3. /us/: \{[+N],[-\alpha,+\beta,+\gamma],[+\text{gov},+\text{obl}]\}
4. /o/: \{[+N],[+\alpha,+\beta,-\gamma],[+\text{obl}]\}
5. /os/: \{[+N],[+\beta,+\gamma],[+\text{obl}]\}
6. /s/: \{[+N],[-\alpha,\beta],[+\text{gov},-\text{obl}]\}
7. /u/: \{[+N],[+\alpha],[+\text{gov},+\text{obl}]\}
8. /Ø/: \{[+N]\}
Variables over Feature Values

Note on ℵ-notation with /s/:
Assuming that variables ranging over feature values can show up in morpho-syntactic specifications of inflection markers, the two /s/ markers in II and III/IV emerge as one: ℵ ranges over ±. The ℵ-notation (originally: α-notation) is introduced in Chomsky (1965), Chomsky & Halle (1968), and has been used in morphology in Noyer (1992) (but see Harley (1994)), Johnston (1996), and Wiese (2003). Without this notion, there would have to be two /s/ markers, one specified as \{[+N],[-α, +β],[-gov, −obl]\}, and one specified as \{[+N],[-α, −β],[+gov, +obl]\}. However, the ℵ-notion captures the gist of what is traditionally known as the “s-principle” (II uses /s/ where III/IV does not, and vice versa, see Ruge (1986)). (Also note that, other things being equal, markers with variables over features values count as less specific than markers without such variables.)
## Competition

**T₅**: The interaction of inflection markers in the singular in Greek

<table>
<thead>
<tr>
<th></th>
<th>I:</th>
<th>II:</th>
<th>III:</th>
<th>IV:</th>
<th>V:</th>
<th>VI:</th>
<th>VII:</th>
<th>VIII:</th>
</tr>
</thead>
<tbody>
<tr>
<td>nom/sg:</td>
<td>[+α+β+γ]</td>
<td>[−α+β−γ]</td>
<td>[−α−β+γ]</td>
<td>[−α−β−γ]</td>
<td>[+α+β−γ]</td>
<td>[−α+β+γ]</td>
<td>[−α−β+γ]</td>
<td>[−α−β−γ]</td>
</tr>
<tr>
<td>[+gov,−obl], [−pl]</td>
<td>/os/⁵ (/[Ø/⁸])</td>
<td>/s/⁶ (/[Ø/⁸])</td>
<td>/Ø/⁸</td>
<td>/Ø/⁸</td>
<td>/o'/⁴ (/[Ø/⁸])</td>
<td>/os/⁵ (/[s/⁶, /Ø/⁸])</td>
<td>/Ø/⁸</td>
<td>/Ø/⁸</td>
</tr>
<tr>
<td>acc/sg:</td>
<td>/o(n)/¹ (/[os/⁵, /Ø/⁸])</td>
<td>/Ø/⁸</td>
<td>/Ø/⁸</td>
<td>/Ø/⁸</td>
<td>/o'/⁴ (/[Ø/⁸])</td>
<td>/os/⁵ (/[Ø/⁸])</td>
<td>/Ø/⁸</td>
<td>/Ø/⁸</td>
</tr>
<tr>
<td>[+gov,−obl], [−pl]</td>
<td>/Ø/⁸</td>
<td>/Ø/⁸</td>
<td>/Ø/⁸</td>
<td>/Ø/⁸</td>
<td>/Ø/⁸</td>
<td>/Ø/⁸</td>
<td>/Ø/⁸</td>
<td>/Ø/⁸</td>
</tr>
<tr>
<td>gen/sg:</td>
<td>/u'/ (/[Ø/⁸])</td>
<td>/Ø/⁸</td>
<td>/s/⁶ (/[Ø/⁸])</td>
<td>/s/⁶ (/[Ø/⁸])</td>
<td>/u'/ (/[Ø/⁸])</td>
<td>/us/³ (/[Ø/⁸])</td>
<td>/u'/ (/[Ø/⁸])</td>
<td>/os/² (/[u/⁷, /Ø/⁸])</td>
</tr>
</tbody>
</table>
(12) Inflection markers (plural):

1. /on/: \[ [+N], [+pl], [+gov, +obl] \]
   \[ [+N], [+pl], [-\alpha, -\beta, +\gamma], [-obl] \]

2. /is/: \[ [+N], [+pl], [+\alpha, +\beta, +\gamma], [+gov, -obl] \]
   \[ [+N], [+pl], [-\alpha, -\gamma], [-obl] \]

3. /us/: \[ [+N], [+pl], [+\alpha, +\beta, +\gamma], [+gov, -obl] \]
   \[ [+N], [+pl], [+\beta, +\gamma], [-obl] \]

4. /es/: \[ [+N], [+pl], [+\alpha, +\beta, +\gamma], [+gov, -obl] \]
   \[ [+N], [+pl], [-\alpha, -\gamma], [-obl] \]

5. /i/: \[ [+N], [+pl], [+\beta, +\gamma], [-obl] \]

6. /a/: \[ [+N], [+pl], [-obl] \]
### Competition

**T₆**: The interaction of inflection markers in the plural in Greek

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>/i/⁵ (/_a/⁶)</td>
<td>/es/⁴ (/_a/⁶)</td>
<td>/es/⁴ (/_a/⁶)</td>
<td>/is⁴ (/_a/⁶)</td>
<td>/a/⁶</td>
<td>/i/⁵ (/_a/⁶)</td>
<td>/a/⁶</td>
<td>/i/⁵ (/_a/⁶)</td>
<td>/a/⁶</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>acc/pl: [+gov,-obl], [+pl]</th>
<th></th>
<th>/es/⁴ (/_a/⁶)</th>
<th>/es/⁴ (/_a/⁶)</th>
<th>/is⁴ (/_a/⁶)</th>
<th>/a/⁶</th>
<th>/i/⁵ (/_a/⁶)</th>
<th>/a/⁶</th>
<th>/a/⁶</th>
</tr>
</thead>
<tbody>
<tr>
<td>/us³ (/_i/⁵, /a/⁶)</td>
<td></td>
<td>/es/⁴ (/_a/⁶)</td>
<td>/es/⁴ (/_a/⁶)</td>
<td>/is⁴ (/_a/⁶)</td>
<td>/a/⁶</td>
<td>/i/⁵ (/_a/⁶)</td>
<td>/a/⁶</td>
<td>/a/⁶</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>gen/pl: [+gov,+obl], [+pl]</th>
<th></th>
<th>/on/¹</th>
<th>/on/¹</th>
<th>/on/¹</th>
<th>/on/¹</th>
<th>/on/¹</th>
<th>/on/¹</th>
<th>/on/¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>/on/¹</td>
<td></td>
<td>/on/¹</td>
<td>/on/¹</td>
<td>/on/¹</td>
<td>/on/¹</td>
<td>/on/¹</td>
<td>/on/¹</td>
<td>/on/¹</td>
</tr>
</tbody>
</table>
Literatur


