3 main types of morphological relations, again

- Inflection, derivation, and compounding
- Inflectional morphology modifies properties of LEXEMES, while maintaining the basic meaning of the LEXEME.

```
mor-iksel’-i-ń   mor-iksel’-i-ť
sing-DES-PAST-1SG  sing-DES-PAST-2SG
```

`I wanted to sing’     `you wanted to sing’
(Erzya Mordvin)
Inflection

- There is a theoretical tendency to distinguish between derivation and inflection, but what’s really the difference?
- Linguists have identified a number of criteria, but none are definitional
## Prototypical differences between inflection and derivation

<table>
<thead>
<tr>
<th>Derivation</th>
<th>Inflection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Encodes lexical meaning</td>
<td>Encodes grammatical meaning</td>
</tr>
<tr>
<td>2. Not syntactically relevant</td>
<td>Syntactically relevant</td>
</tr>
<tr>
<td>3. Occurs close to the root &amp; inside other derivation</td>
<td>Occurs outside all derivation</td>
</tr>
<tr>
<td>4. Often changes lexical category</td>
<td>Does not change lexical category</td>
</tr>
<tr>
<td>5. Often semantically opaque</td>
<td>Usually semantically obvious</td>
</tr>
<tr>
<td>6. Often shows restricted productivity</td>
<td>Fully productive</td>
</tr>
<tr>
<td>7. Optional</td>
<td>Obligatory</td>
</tr>
</tbody>
</table>
Recursion

• Derivational operations are recursive i.e., the property whereby a single element can appear again and again with additional effect on a structure, but not inflectional ones:

• What's the longest English word?

  antidisestablishmentarianism
  antidisestablishmentarianistic
  antidisestablishmentarianistically
  anti-antidisestablishmentarianistically
  anti-antidisestablishmentarianisticality
  pseudo-anti-antidisestablishmentarianisticality

• Repeated morphs:

  English:    industrializational
  German:    Einheitlichkeit ‘unitarity’
  Dutch:     kleurloosheidloos ‘without colorlessness’
Order

• Derivational rules can apply in more than one order

  idealistic
  semanticist

• Inflectional rules have a fixed order

  German: lieb + te + t ‘love + PAST + 2.PL’
  Basque: z-inez + te + n ‘be + 2.PL + PAST’

• Order varies between languages, but there are strong cross-linguistic tendencies for invariable ordering.
Inherent versus Contextual Inflection

- Templatic (position class) morphology

Bemba (Bantu):

Negation - Subject - Tense - Aspect - Object - Stem - Final V

ta - tu- aku- laa- ba- bombel- a
NEG 1.PL FUT- PROG- 3.PL- work

‘We will not be working for them’

- Inherent: a morphosyntactic category not required by the syntactic combination of words - choice of the speaker

- Contextual: a morphosyntactic category that reflects syntactic combination with another element - obligatory relative to context.
Syntagmatic and Paradigmatic, again

- A syntagmatic perspective aims to get the structures of words with the same morphosyntactic feature values right
- Constructs complex words from small, meaningful bits
- Avoidance of redundancy, so that complex, productive and semantically transparent words are not stored in the morphological component, but are produced by applying the right rules and the appropriate times.
**Syntagmatic and Paradigmatic, again**

<table>
<thead>
<tr>
<th>Root - Position 1 - Position 2 - Position 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
</tr>
<tr>
<td>i</td>
</tr>
<tr>
<td>ø</td>
</tr>
<tr>
<td>no</td>
</tr>
</tbody>
</table>

**Infinitive:** *pāl-a-re* ‘to speak’

<table>
<thead>
<tr>
<th></th>
<th>present indicative</th>
<th>present subjunctive</th>
<th>imperfect indicative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sg.</strong></td>
<td><strong>Pl.</strong></td>
<td><strong>Sg.</strong></td>
<td><strong>Pl.</strong></td>
</tr>
<tr>
<td><strong>1</strong> parl-o</td>
<td>parl-iamo</td>
<td>parl-i</td>
<td>parl-iamo</td>
</tr>
<tr>
<td><strong>2</strong> parl-i</td>
<td>parl-a-te</td>
<td>parl-i</td>
<td>parl-i-ate</td>
</tr>
<tr>
<td><strong>3</strong> parl-a</td>
<td>parl-a-ri-o</td>
<td>parl-i</td>
<td>parl-i-no</td>
</tr>
<tr>
<td><strong>1</strong> parl-a-v-o</td>
<td>parl-a-va-m:o</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2</strong> parl-a-v-i</td>
<td>parl-a-va-te</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3</strong> parl-a-v-a</td>
<td>parl-a-va-no</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
What’s missing in a solely syntagmatic approach

• Even though wordforms are arrayed into paradigms, the paradigms have no theoretical status, they’re just (pedagogically) convenient displays, i.e., epiphenomenal w/ the primary phenomenon being the construction of (classes of) individual wordforms, rather than relatedness between them.

• Apply rules to roots/stems to create individual words:

  Lexicon: parl `speak'; o `1SG' [ V + TNS __ ]

• There are no representations of whole words, let alone, newtorks of related words.
A theoretical role for paradigms?

- Without paradigm organization,
  
  “it would be impossible to learn and memorize such huge amounts of data. Besides, if there are more moods, more voices, and distinct subject-object marking for combinations of persons in the transitive verb, the complexity of data increases accordingly.” Itkonen 2005:84

- A typical transitive verb in Georgian has upwards of 200 forms, whose inflectional patterns identify the verb as belonging to one of four major conjugation classes (Tschenkéli 1958). Even Georgian is relatively conservative in comparison with descriptions of verb paradigms in Archi, which, according to one estimate (Kibrik 1998: 467), may contain ‘more than one and a half million’ members.
The Paradigm Cell Filling Problem
(Pauonen 1976; Thymé 1994, Thymé, Ackerman & Elman 1994, Pirrelli 2000, among others in WP tradition)

- Paradigm Cell Filling Problem: Given exposure to a novel inflected wordform, what licenses reliable inferences about the all the other wordforms in its inflectional family?

- Speakers of languages with complex morphology and multiple inflection classes must generalize beyond direct experience, since it’s implausible to assume they will have encountered each form of every noun.
The Paradigm Cell Filling Problem

- The analogical task of predicting or inferring the correct shapes of words on the basis of limited experience with “similar” patterns of words becomes increasingly crucial as languages depart from the simple content/form mappings associated with what Lounsbury (1953) refers to as the “fictive agglutinative ideal” (morpheme-based) which serves as the basis for most familiar approaches to morphology.

- Word-based proposals offer a simple solution: paradigms are networks of implicative relations among related wordforms and inflectional classes are patterns of wordforms displaying distinctive implicational relations.
To confidently deduce the Finnish nominative for *rasti* ‘checkpoint’ it is enough to know the partitive singular *rastia* on analogy with what occurs with *lasi* ‘cup’; less confidence resides in knowing the partitive plural *rastejä*, since this restricts class membership to either 4 or 9.\(^2\)

---

1. There are numerous phonological and morphological cues that lead to fairly deterministic identification of class membership, i.e., nominals that end -aus, e.g., *kiusaus* ‘temptation’ or C-us, e.g., *kuljetus* ‘carrying’ are class 64, while those ending -cus, e.g., *korkeus* ‘height’ or -uus, e.g., *lujuus* ‘firmness’ are class 65, but their plural partitive and inessive and one allomorph of the genitive are non-diagnostic.

2. It also helps to know that *lasi* is a loan word and that class 4 is a basin for such words.
Deduction and Induction

(following discussion in Itkonen 2005)

- **Deduction:** Reasoning from general laws, where the major premise contains all the conclusions:

  Assume that for all X if X is an apple, then X is edible, the if we encounter a new apple, we know, by the logic of deduction that that apple is edible.

- **Induction:** Reasoning toward a generalization on the basis of multiple examples:

  Assume that X is an apple and is edible; assume that Y is an apple and edible, then one can posit that if any X is an apple, it is edible.
Abduction and Analogy

(following discussion in Itkonen 2005)

- Abduction of theory $T$ from observation $O_1$:
  1. $O_1$
  2. $T \vdash O_1$
  3. $T$

- Confirmation of theory $T$ via prediction of observation $O_2$:
  1. $T \vdash O_2$ [new prediction]
  2. $O_2$ [true prediction]
  3. $T$

- “The idea is that if, confronted by some phenomenon, you find one explanation (perhaps with some initial plausibility) that makes sense of what is otherwise inexplicable ($= T \vdash O_1$), then you should conclude that the explanation is probably right.”
  Hacking 1983:52 cited in Itkonen 2005:30)
Abduction and Analogy

(following discussion in Itkonen 2005)

- Abductive analogical inference

1. $O_1 \& O_2$
2. $T \vdash O_1 \sim O_2$
3. $T$

- Learning a grammatical rule: where $\sim =$ exemplifications of common structure, rather than two independent phenomena

1. dog/dogs & cat/cats
2. $(N \rightarrow N-s) \vdash$ dog/dogs $\sim$ cat/cats
3. $(N \rightarrow N-s)$

- Applying a grammatical rule to new data

1. $(N \rightarrow N-s)$
2. horse
3. horse-s
Periphrasis and inflectional paradigms

- So far, the morphosyntactic information associated with cells have only been occupied by synthetic wordforms/

- Can the occupants of cells be periphrastic expressions?

- If so, then morphology must deal with synthetic and periphrastic expressions: this brings us back to the question concerning what a word is:

  Synthesis       Clisis       Independent elements
Bulgarian verbal morphology
(From Stump 2001:37)

Feature: grammatical attribute such as PERSON, NUMBER, TENSE...

Value: a specification of an attribute such as 2ND, SINGULAR, PAST...

Property: a feature-value pairing such as 2ND PERSON, PAST TENSE...

Property bundle: a set of grammatical properties such as {2ND PERSON; PAST TENSE; PASSIVE VOICE}
Bulgarian verbal morphology
(From Stump 2001:39)

- The inflected wordforms of 4 LEXEMES.
- LEXEME: The abstract element common among related elements.
- Morphosyntactic/Grammatical word: The meaning associated with the lexeme (lexical) and the morphosyntactic properties (grammatical).
- Wordform: The formal realization or exponence of the grammatical word.

Table 2.2 Indicative paradigms of four imperfective verbs in Bulgarian
(Scotton 1984:211ff.)

<table>
<thead>
<tr>
<th>Conjugation</th>
<th>KRAD 'steal'</th>
<th>IGRÁJ 'play'</th>
<th>KOVA 'forge'</th>
<th>DÁVA 'give'</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRESENT 1SG</td>
<td>krád-ŭ</td>
<td>igrá-ŭ</td>
<td>kova-ŭ</td>
<td>dáva-ŭ</td>
</tr>
<tr>
<td>2SG</td>
<td>krád-ê</td>
<td>igrá-ê</td>
<td>kova-ê</td>
<td>dáva-ê</td>
</tr>
<tr>
<td>3SG</td>
<td>krád-će</td>
<td>igrá-će</td>
<td>kova-će</td>
<td>dáva-će</td>
</tr>
<tr>
<td>1PL</td>
<td>krád-će-me</td>
<td>igrá-će-me</td>
<td>kova-će-me</td>
<td>dáva-će-me</td>
</tr>
<tr>
<td>2PL</td>
<td>krád-će-te</td>
<td>igrá-će-te</td>
<td>kova-će-te</td>
<td>dáva-će-te</td>
</tr>
<tr>
<td>3PL</td>
<td>krád-će-a</td>
<td>igrá-će-a</td>
<td>kova-će-a</td>
<td>dáva-će-a</td>
</tr>
<tr>
<td>IMPERFECT 1SG</td>
<td>krád-ă-x</td>
<td>igrá-ă-x</td>
<td>kova-ă-x</td>
<td>dáva-ă-x</td>
</tr>
<tr>
<td>2SG</td>
<td>krád-ă-x-e</td>
<td>igrá-ă-x-e</td>
<td>kova-ă-x-e</td>
<td>dáva-ă-x-e</td>
</tr>
<tr>
<td>3SG</td>
<td>krád-ă-x-e-me</td>
<td>igrá-ă-x-e-me</td>
<td>kova-ă-x-e-me</td>
<td>dáva-ă-x-e-me</td>
</tr>
<tr>
<td>1PL</td>
<td>krád-ă-x-te</td>
<td>igrá-ă-x-te</td>
<td>kova-ă-x-te</td>
<td>dáva-ă-x-te</td>
</tr>
<tr>
<td>2PL</td>
<td>krád-ă-x-a</td>
<td>igrá-ă-x-a</td>
<td>kova-ă-x-a</td>
<td>dáva-ă-x-a</td>
</tr>
<tr>
<td>3PL</td>
<td>krád-ă-x-x</td>
<td>igrá-ă-x-x</td>
<td>kova-ă-x-x</td>
<td>dáva-ă-x-x</td>
</tr>
<tr>
<td>AORIST 1SG</td>
<td>krád-ă-x</td>
<td>igrá-ă-x</td>
<td>kova-ă-x</td>
<td>dáva-ă-x</td>
</tr>
<tr>
<td>2SG</td>
<td>krád-ă-x-e</td>
<td>igrá-ă-x-e</td>
<td>kova-ă-x-e</td>
<td>dáva-ă-x-e</td>
</tr>
<tr>
<td>3SG</td>
<td>krád-ă-x-e-me</td>
<td>igrá-ă-x-e-me</td>
<td>kova-ă-x-e-me</td>
<td>dáva-ă-x-e-me</td>
</tr>
<tr>
<td>1PL</td>
<td>krád-ă-x-te</td>
<td>igrá-ă-x-te</td>
<td>kova-ă-x-te</td>
<td>dáva-ă-x-te</td>
</tr>
<tr>
<td>2PL</td>
<td>krád-ă-x-a</td>
<td>igrá-ă-x-a</td>
<td>kova-ă-x-a</td>
<td>dáva-ă-x-a</td>
</tr>
<tr>
<td>3PL</td>
<td>krád-ă-x-x</td>
<td>igrá-ă-x-x</td>
<td>kova-ă-x-x</td>
<td>dáva-ă-x-x</td>
</tr>
</tbody>
</table>
Syntagmatic & Paradigmatic
(image from Stump 2001:39)

- Syntagmatic: The linear arrangement of elements (morphotactics)
- Paradigm: The set of wordforms sharing the same lexeme; The abstracted schema for wordforms sharing the same lexeme; the selection of one wordform excludes the selection of another wordform for the relevant property set.
- Syncretism: Identity in wordform, but difference in property set.

Table 2.2 Indicative paradigms of four imperfective verbs in Bulgarian (Scarton 1984: 211ff.)

<table>
<thead>
<tr>
<th></th>
<th>KRAD 'steal'</th>
<th>IGRÁJ 'play'</th>
<th>KOVA 'forge'</th>
<th>DÁVA 'give'</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Conjugation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Present</strong></td>
<td>−T, +C</td>
<td>+T, +C</td>
<td>+T, −C</td>
<td>−T, −C</td>
</tr>
<tr>
<td>1SG</td>
<td>krad-ð</td>
<td>iigráj-ð</td>
<td>kov-ð</td>
<td>dava-m</td>
</tr>
<tr>
<td>2SG</td>
<td>krad-ē-þ</td>
<td>iigrá-e-þ</td>
<td>kov-ē-þ</td>
<td>dava-s</td>
</tr>
<tr>
<td>3SG</td>
<td>krad-ē</td>
<td>iigrá-ē</td>
<td>kov-ē</td>
<td>dava-ð</td>
</tr>
<tr>
<td>1PL</td>
<td>krad-ē-m</td>
<td>iigrá-e-m</td>
<td>kov-ē-m</td>
<td>dava-me</td>
</tr>
<tr>
<td>2PL</td>
<td>krad-ē-te</td>
<td>iigrá-e-te</td>
<td>kov-ē-te</td>
<td>dava-te</td>
</tr>
<tr>
<td>3PL</td>
<td>krad-ōt</td>
<td>iigrá-ōt</td>
<td>kov-ōt</td>
<td>dava-t</td>
</tr>
<tr>
<td><strong>Imperfect</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1SG</td>
<td>krad-ē-þ</td>
<td>iigrá-e-þ</td>
<td>kov-ē-þ</td>
<td>dava-s</td>
</tr>
<tr>
<td>2SG</td>
<td>krad-ē-þ-e</td>
<td>iigrá-e-þ-e</td>
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<td>dava-s</td>
</tr>
<tr>
<td>3SG</td>
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<td>kov-ē-þ-e</td>
<td>dava-s</td>
</tr>
<tr>
<td>1PL</td>
<td>krad-ē-x-me</td>
<td>iigrá-e-x-me</td>
<td>kov-ē-x-me</td>
<td>dava-x-me</td>
</tr>
<tr>
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<td>kov-ē-x-te</td>
<td>dava-x-te</td>
</tr>
<tr>
<td>3PL</td>
<td>krad-ē-x-a</td>
<td>iigrá-e-x-a</td>
<td>kov-ē-x-a</td>
<td>dava-x-a</td>
</tr>
<tr>
<td><strong>Aorist</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1SG</td>
<td>krád-ð</td>
<td>iigrá-ð</td>
<td>ková-ð</td>
<td>dava-x</td>
</tr>
<tr>
<td>2SG</td>
<td>krád-e</td>
<td>iigrá-e</td>
<td>ková</td>
<td>dava, davá</td>
</tr>
<tr>
<td>3SG</td>
<td>krád-ð</td>
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<td>dava, davá</td>
</tr>
<tr>
<td>1PL</td>
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<td>iigrá-ō-x-me</td>
<td>ková-x-me</td>
<td>dava-x-me</td>
</tr>
<tr>
<td>2PL</td>
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<td>iigrá-ō-x-te</td>
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<tr>
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<td>iigrá-ō-x-a</td>
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<td>dava-x-a,</td>
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</tbody>
</table>
<pre><code>                 |             |              |              | dava-x-a    |
</code></pre>
### Periphrasis and inflectional paradigms

(8a) **TENSE: PRESENT**

<table>
<thead>
<tr>
<th></th>
<th><strong>POL</strong></th>
<th>** affirmative**</th>
<th>** negative**</th>
</tr>
</thead>
<tbody>
<tr>
<td>1SG</td>
<td>piša</td>
<td>ne piša</td>
<td>pisax</td>
</tr>
<tr>
<td>2SG</td>
<td>pišeš</td>
<td>ne pišeš</td>
<td>pisa</td>
</tr>
<tr>
<td>3SG</td>
<td>piše</td>
<td>ne piše</td>
<td>pisa</td>
</tr>
<tr>
<td>1PL</td>
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<td>ne pišem</td>
<td>pisaxme</td>
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<td>pisaxa</td>
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</table>

(8b) **AORIST**

<table>
<thead>
<tr>
<th></th>
<th>** affirmative**</th>
<th>** negative**</th>
</tr>
</thead>
<tbody>
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<td>1SG</td>
<td>pisax</td>
<td>ne pisax</td>
</tr>
<tr>
<td>2SG</td>
<td>pisa</td>
<td>ne pisa</td>
</tr>
<tr>
<td>3SG</td>
<td>pisa</td>
<td>ne pisa</td>
</tr>
<tr>
<td>1PL</td>
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<td>ne pisaxme</td>
</tr>
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<td>2PL</td>
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</tr>
<tr>
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</tbody>
</table>

(8c) **IMPERFECT**

<table>
<thead>
<tr>
<th></th>
<th>** affirmative**</th>
<th>** negative**</th>
</tr>
</thead>
<tbody>
<tr>
<td>1SG</td>
<td>pišex</td>
<td>ne pišex</td>
</tr>
<tr>
<td>2SG</td>
<td>pišeše</td>
<td>ne pišeš</td>
</tr>
<tr>
<td>3SG</td>
<td>pišeše</td>
<td>ne pišeš</td>
</tr>
<tr>
<td>1PL</td>
<td>pišexme</td>
<td>ne pišexme</td>
</tr>
<tr>
<td>2PL</td>
<td>pišexie</td>
<td>ne pišexie</td>
</tr>
<tr>
<td>3PL</td>
<td>pišexa</td>
<td>ne pišexa</td>
</tr>
</tbody>
</table>

(12a) **TENSE: FUTURE PERFECT**

<table>
<thead>
<tr>
<th></th>
<th><strong>POL</strong></th>
<th>** affirmative**</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1SG šte</td>
<td>šte bāda pisal</td>
</tr>
<tr>
<td></td>
<td>še sām</td>
<td>še bāda pisal</td>
</tr>
<tr>
<td>2.</td>
<td>šte e</td>
<td>šte bāde pisal</td>
</tr>
<tr>
<td></td>
<td>pisal</td>
<td>šte bāde pisal</td>
</tr>
<tr>
<td></td>
<td>šte sme</td>
<td>šte bādem pisali</td>
</tr>
<tr>
<td></td>
<td>pisali</td>
<td>šte bādem pisali</td>
</tr>
<tr>
<td></td>
<td>šte ste</td>
<td>šte bādete pisali</td>
</tr>
<tr>
<td></td>
<td>pisali</td>
<td>šte bādete pisali</td>
</tr>
</tbody>
</table>

(12b) **POL negative**

<table>
<thead>
<tr>
<th></th>
<th>** affirmative**</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1SG ne šte</td>
</tr>
<tr>
<td></td>
<td>še sām pisal</td>
</tr>
<tr>
<td>2.</td>
<td>šte e pisal</td>
</tr>
<tr>
<td></td>
<td>pisal</td>
</tr>
<tr>
<td></td>
<td>šte sme pisali</td>
</tr>
<tr>
<td></td>
<td>pisali</td>
</tr>
<tr>
<td></td>
<td>šte ste pisali</td>
</tr>
<tr>
<td></td>
<td>pisali</td>
</tr>
<tr>
<td></td>
<td>šte sa pisali</td>
</tr>
<tr>
<td></td>
<td>pisali</td>
</tr>
</tbody>
</table>
Composing wholes from pieces doesn’t always work

Udmurt imperfective past tense

Realized by the periphrastic combination of a future-tense form (inflected for subject agreement) with the invariant past form of the copula

**Table 3.** Affirmative imperfective past-tense realizations of Udmurt MINI ‘go’ [data from Suikkonen 1995:302^2^2^2^]

**Table 4.** Affirmative future-tense realizations of Udmurt MINI ‘go’ [data from Csúcs (1988:142)]
Inflection: Distributed exponence

Hungarian: Ackerman 1987 (from Kálmán et. al. 1984)

a holló énekel/énekelt egy dalt a rókának
the raven sing.3sg/sing.3sg.past a song.acc the fox.dat
‘the raven is singing/was singing a song to the fox.’

a holló énekelhet egy dalt a rókának
the raven sing.mod.3sg a song.acc the fox.dat
‘the raven can sing a song to the fox.’

a holló énekelni fog egy dalt a rókának
the raven sing.inf. will.3sg a song.acc the fox.dat
‘the raven will sing a song to the fox’

a hollónak énekelnie kellett egy dalt a rókának
the raven.dat sing.inf.3sg must.past a song.dat the fox.dat
‘the raven had to sing a song to the fox’

Numeral classifiers in Malto (North Dravidian)
Inflection: Periphrasis in paradigms

Note the relation between morphosyntactic markedness and surface realization: the most marked morphosyntactic values for the number and case categories, i.e., dual and local cases, are expressed periphrastically.

If periphrasis were not a possible form of expression within morphological paradigms, how would this evident relation between content and form be captured transparently and simply?

### Table 20. Declension of *ti* `reindeer’ in Tundra Nenets
(Data from Salminen 1997)

<table>
<thead>
<tr>
<th>Grammatical cases</th>
<th>Singular</th>
<th>Dual</th>
<th>Plural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominative Accusative Genitive</td>
<td>ti</td>
<td>texʰh</td>
<td>tiq</td>
</tr>
<tr>
<td></td>
<td>tim</td>
<td>texʰh</td>
<td>ti’</td>
</tr>
<tr>
<td></td>
<td>tih</td>
<td>texʰh</td>
<td>tiq</td>
</tr>
<tr>
<td>Local cases</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dative</td>
<td>tenʰh</td>
<td>texʰh nyah</td>
<td>tex⁰q</td>
</tr>
<tr>
<td>Locative</td>
<td>tex⁰na</td>
<td>texʰh nyana</td>
<td>tex⁰qna</td>
</tr>
<tr>
<td>Ablative</td>
<td>tex⁰dʰ</td>
<td>texʰh nyadʰ</td>
<td>tex⁰η</td>
</tr>
<tr>
<td>Prosecutive</td>
<td>tew⁰na</td>
<td>texʰh nyamna</td>
<td>teq⁰m⁰na</td>
</tr>
</tbody>
</table>
# Numeral classifiers in Malto (North Dravidian)

<table>
<thead>
<tr>
<th>Classifier</th>
<th>Reference of associated noun class</th>
<th>Examples</th>
</tr>
</thead>
</table>
| *jen*      | humans                             | तिनी जेन मालेर ‘three men’  
|            |                                    | तिनी जेन गैलवर ‘three thieves’ |}
| *naq*      | animate nonhumans                   | तिनी नाग गोर ‘three horses’  
|            |                                    | तिनी नाग पुजू ‘three birds’  
|            |                                    | तिनी नाग बुरे ‘three ghosts’ |}
| *dara*     | long, large objects                | तिनी दारा गेढु ‘three legs’  
|            |                                    | तिनी दारा नाद ‘three rivers’ |}
| *kaṭi*     | long, small objects                | तिनी काटी ताल ‘three hairs’  
|            |                                    | तिनी काटी कबी ‘three keys’ |}
| *panda*    | long, flexible objects             | तिनी पादा दावु ‘three ropes’  
|            |                                    | तिनी पादा पावु ‘three roads’ |}
| *pata*     | long pods/fruit                    | तिनी पाता काल्दी ‘three bananas’  
|            |                                    | तिनी पाता सिम्बी ‘three string beans’ |}
| *paṭa*     | flat, broad objects                | तिनी पाटा बाडल ‘three clouds’  
|            |                                    | तिनी पाटा टार्ट ‘three tongues’ |}
| *pata*     | flat, broad, thin objects          | तिनी पाटा आये ‘three leaves’  
|            |                                    | तिनी पाटा चित ‘three letters’ |}
| *kanda*    | flat, broad, cotton objects        | तिनी कंडा कोम ‘three blankets’  
|            |                                    | तिनी कंडा मोर ‘three socks’ |}
| *gota*     | round, heavy objects and miscellaneous objects | तिनी गोट गांडु ‘three eyes’  
|            |                                    | तिनी गोट गंगा ‘three wheels’  
|            |                                    | तिनी गोट तुंग्लु ‘three dreams’ |}
| *pula*     | round, light objects               | तिनी पुला पुप्पु ‘three flowers’  
|            |                                    | तिनी पुला बुझु ‘three mushrooms’ |}

**Repeaters:**
- qep ‘village’
- man ‘tree’
- kif ‘grass’
- kari ‘hole, den, cave’
- kufi ‘shadow, reflection’
- tini qep qep-du ‘three villages’
- tini man mandu ‘three trees’
- tini kif kiflu ‘three (blades of) grass’
- tini kari kari ‘three holes’
- tini kufi kufi ‘three shadows’
Numeral classifiers in Malto (North Dravidian)

The basic constraint: A noun phrase consists of a noun and a numeral phrase and the numeral phrase must exhibit a classifier.

1. The periphrastic pattern:

\[
\text{(1) } \text{NP} \rightarrow \text{NumP} \rightarrow N' \\
\text{[NOUN CLASS: } \alpha \text{]} \rightarrow \text{[NOUN CLASS: } \alpha \text{]} \rightarrow \text{[NOUN CLASS: } \alpha \text{]}
\]

- The periphrastic pattern:

\[
\text{(2) } \text{NumP} \rightarrow \text{Num} \rightarrow \text{Classifier} \\
\text{[NOUN CLASS: } \alpha \text{]} \rightarrow \text{[NOUN CLASS: } \alpha \text{]} \rightarrow \text{[NOUN CLASS: } \alpha \text{]}
\]

3. a. \text{tīni jen māler}  \\
three CLASSIFIER men  \\
‘three men’

b. \text{tīni maq ẏdu}  \\
three CLASSIFIER cow  \\
‘three cows’

4. a. \text{*eike maq ẏdu}  \\
one CLASSIFIER cow  \\
‘one cow’

b. \text{*dīye maq ẏdu}  \\
two CLASSIFIER cow  \\
‘two cows’

5. But, no periphrasis with 1 and 2:
Numeral classifiers in Malto (North Dravidian)

A synthetic pattern:

\[(5) \quad \text{NumP} \rightarrow \text{Num} \]
\[\text{[NOUN CLASS: a]} \rightarrow \text{[NOUN CLASS: a]}\]

\[(6) \quad \begin{align*}
\text{a. } & \text{mag-ond } \ddu \quad \text{CLASSIFIER-one cow} \\
& \text{‘one cow’} \\
\text{b. } & \text{maq-s } \ddu \quad \text{CLASSIFIER-two cow} \\
& \text{‘two cows’}
\end{align*}\]

Another synthetic pattern: 1 or 2 humans

\[(7) \quad \begin{align*}
\text{a. } & *eike jen \text{ maleh} \\
& \text{one CLASSIFIER man} \\
& \text{‘one man’} \\
\text{b. } & *duye jen \text{ maler} \\
& \text{two CLASSIFIER men} \\
& \text{‘two men’}
\end{align*}\]
\[(8) \quad \begin{align*}
\text{a. } & *jen-ond \text{ maleh} \\
& \text{CLASSIFIER-one man} \\
& \text{‘one man’} \\
\text{b. } & *jen-s \text{ maler} \\
& \text{CLASSIFIER-one man} \\
& \text{‘two men’}
\end{align*}\]
\[(9) \quad \begin{align*}
\text{a. } & \text{ort } \text{ maleh} \\
& \text{CLASSIFIER: one man} \\
& \text{‘one man’} \\
\text{b. } & \text{iw } \text{ maler} \\
& \text{CLASSIFIER: two men} \\
& \text{‘two men’}
\end{align*}\]
Representations and Summary

![Diagram](image)

TABLE 2. Use of Malto numerals and classifiers in references to quantities of various types

<table>
<thead>
<tr>
<th>NOUN CLASS</th>
<th>NUMERAL CLASSIFIER</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td><em>jen</em> class (= nouns with human reference)</td>
<td><em>jen</em></td>
<td>Portmanteau form: <em>ort</em></td>
</tr>
<tr>
<td><em>maq</em> class (= nouns with animate nonhuman reference)</td>
<td><em>maq</em></td>
<td>Bound numeral stem -<em>ond</em> with classifier’s prefixal form</td>
</tr>
<tr>
<td><em>dara</em> class (= nouns referring to long, large objects)</td>
<td><em>dara</em></td>
<td>etc.</td>
</tr>
<tr>
<td>etc.</td>
<td>etc.</td>
<td></td>
</tr>
</tbody>
</table>
The theoretical challenge

- Can one define a single mechanism/principle that can relate different types/degrees of synthetic expression with periphrastic expression?

- The default realization of a lexeme and its morphosyntactic property set is periphrasis and this occurs unless there is a “rule” (pattern) which specifies that some value(s) for some morphosyntactic property must be realized in a particular way and where the content cells with the most highly specified values “block” the type of realization associated with a less specified cell.

Realization rules for Malto numeral inflection (realizational approach)

<table>
<thead>
<tr>
<th>Rule</th>
<th>The realization of ( &lt;Y,\sigma&gt; ) is:</th>
<th>Conditions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>( &quot;YX&quot; ), where ( X ) is the ( \sigma )-classifier.</td>
<td>( &lt;Y,\sigma&gt; ) is a cell in a Numeral paradigm.</td>
</tr>
<tr>
<td>b.</td>
<td>( Xond ), where ( X ) is the ( \sigma )-classifier's prefixal form.</td>
<td>( &lt;Y,\sigma&gt; ) is a cell in a Numeral paradigm; ( Y ) is ( \text{eike} ).</td>
</tr>
<tr>
<td>c.</td>
<td>( Xr ), where ( X ) is the ( \sigma )-classifier's prefixal form.</td>
<td>( &lt;Y,\sigma&gt; ) is a cell in a Numeral paradigm; ( Y ) is ( \text{dī̄ŋe} ).</td>
</tr>
<tr>
<td>d.</td>
<td>( ort ).</td>
<td>( &lt;Y,\sigma&gt; ) is a cell in a Numeral paradigm; ( Y ) is ( \text{eike} ); ( \sigma ) is {NOUN CLASS:jen}.</td>
</tr>
<tr>
<td>e.</td>
<td>( irw ).</td>
<td>( &lt;Y,\sigma&gt; ) is a cell in a Numeral paradigm; ( Y ) is ( \text{dī̄ŋe} ); ( \sigma ) is {NOUN CLASS:jen}.</td>
</tr>
</tbody>
</table>
Interaction of (regular) inflection with derivation

- Since, by hypothesis within the generative tradition, words with regular inflection are not stored in the lexicon and inflection occurs external to derivation, this should have consequences for how inflection interacts with derivation.

- In the weak lexicalist hypothesis all irregular inflection and derivation occur in the lexicon, while regular inflection occurs in the syntax: there is a split concerning the domains in which morphology occurs.

- In the strong lexicalist hypothesis all morphology occurs in the lexicon.
Lexical Integrity Hypothesis

- For many structuralists (e.g., Hockett), syntax was simply extended above the word.
- For many generativists (e.g., early Chomsky), morphology was simply syntax below the word.
- Lexicalist theories (Head Driven Phrase Structure Grammar, Lexical Functional Grammar) divide morphology and syntax into two distinct modules, each with its own primitives, objects, rules, etc. (Oddly even lexicalist theories are generally morpheme based.)
- Lexical Integrity Hypothesis
  Words are syntactic atoms, i.e., pieces of words cannot be manipulated by syntactic operations and cannot be accessible to elements outside of the word.
Lexical integrity

Mari case forms (Luutonen 1997:46): DATIVE more analytic than GENITIVE/ACCUSATIVE more analytic than LOCAL CASES:

DAT > GENITIVE/ACCUSATIVE > LOCAL CASES

1. poškuđo den joltaš-lan tēye ojlāšəm
   neighbor and friend-DAT so say-PAST-1SG
   `I said so to the neighbor and friend’

2. ?škol đa klub-ən ्bujlatəšəšt poyəncət
   school and club-GEN leaders assembled
   `the leaders of the school and club assembled’

3. *škol đa klub-əško pörjen-šaməč tolət
   school and club-ILL men came
   `the men came to school and club’
Lexical integrity

• Anaphoric islands

Kim baby_{k} sat last night. It was very cut_{k}.

Even the staunchest Nixon_{k}ite eventually had to repudiate him_{k}.
Lexical Phonology

- The lexicon is organized into levels for the creation of complex wordforms.

- Each level has its own morphological and phonological operations.

- (Sets of) affixes or other morphological operations are assigned to specific levels and after morphological rules have applied the form created by them is submitted to the phonological operations associated with that level.

- In this way, each earlier level in the lexicon feeds subsequent levels and one arrives at fully inflected and derived words (outfitted with all the relevant phonological adjustments).

- After the lexical component does its job, postlexical operations deal with e.g., clitics.
Lexical Phonology: Level ordering

LEXICON

Dictionary

Level 1
morphology

Level 2
morphology

Level n
morphology

Syntax

Post-lexical
phonology
Level ordering

- **English**

  **Level 1**: integrated affixes (*cohering*), irregular inflection, V-N conversion

  **Level 2**: neutral affixes, compounding, N-V conversion

  **Level 3**: regular inflection

  **Post-lexical**: clitics, external sandhi, i.e., across words.

- Generally, the lower the level, the less regular and productive the operations.

- Hypothesis is that all languages are organized similarly into levels, though they naturally differ with respect to how many and what is contained in each.
Lexical phonology

• Different kinds of derived environments trigger different phonological rules

• Phonological processes distinguish two types of rules:
  • Type 1: -ity, in-, -ical, -ion, -ian, -al, -y, -ous, ive
  • Type 2: -ness, un-, -ly, re-, -ize, -able, -ful, -y, -ism

• Primary vs. secondary, cohering vs. non-cohering, integrated vs. neutral
Lexical phonology

• Class 1 affixes triggers stress shift, class 2 doesn’t

<table>
<thead>
<tr>
<th>Class 1</th>
<th>Class 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>réal</td>
<td>náatural náaturalness</td>
</tr>
<tr>
<td>cómedy</td>
<td>accómpány accómpañiable</td>
</tr>
<tr>
<td>pséúdonym</td>
<td>pseudóonymy</td>
</tr>
</tbody>
</table>

• Class 1 affixes trigger assimilation, class 2 doesn’t

Class 1: intolerable, impossible, illegal, irregular
Class 2: untenable, unpardonable, unlawful, unreal
Lexical phonology

• Type 1 affixes can apply to stems, while Type 2 affixes apply to words

submit, deduce, friction
rewash, subhuman, kindness

• Type 1 affixes occur inside Type 2 affixes

*hopefulness
*infriendly
*kindnessical

naturalness
unproductive
Rastafarianism

• Level Ordering hypothesis (Kiparsky 1982)
Level ordering

- English stress depends on category
  - Verbs have stress on the last syllable
    - usúrp, cavórt
  - Nouns have stress on the second-to-last syllable
    - cárrot, dónkey
- V to N conversion: Level 1, since it alters stress assignment
  - tormént\textsubscript{V} → tórment\textsubscript{N}
  - recórd\textsubscript{V} → récord\textsubscript{N}
- N to V conversion: Level 2, since it doesn’t alter stress
  - páttern\textsubscript{N} → páttern\textsubscript{V} (*pattérn\textsubscript{V})
Level ordering

- According to stress assignment:
  - V to N conversion is at level 1
  - N to V conversion is at level 2

- N to V conversion is much more productive than V to N conversion (“verbing weirds language”)

- Given that N to V conversion is level 2, it will always have regular inflection, since, by hypothesis, retreating to a lower level is prohibited and inflection, therefore, can only be on level 3.

Basic verbs ending in -ing/-ink are usually irregular, but not if derived from a noun

- fling/flung, sting/stung, wring/wrung, ring/rang, sing/sang
- ring/ringed, wing/winged, ink/inked
Level ordering

- Noun compounds can become verbs at level 2, since both noun compounds and N-V are on level 2.

  to grandstand, to wallpaper, to snowball

- Verb compounds can’t become nouns, since that occurs at level 1: *an aircondition, *a stagemanage

- Regular vs. irregular inflection

  \[
  \begin{align*}
  \text{grandstanned} & \quad \text{withstood} \\
  \text{stand}_V \rightarrow \text{stand}_N & \quad \text{stand}_V \rightarrow \text{stooky}_V \quad 1 \\
  \text{grand} + \text{stand}_N & \quad \text{with} + \text{stooky}_V \quad 2 \\
  \text{grandstand}_N \rightarrow \text{grandstand}_V & \quad 2 \\
  \text{grandstand}_V + \text{ed} \rightarrow \text{grandstanned} & \quad 3
  \end{align*}
  \]
Level ordering

• Lexical phonology accounts for many facts about English morphology

• Irregular (but not regular) inflection occurs inside compounds
  mice infested, *rats infested
  teethmarks, *nailsmarks

• Endocentric compounds take irregular inflection, but not exocentric compounds
  milk teeth, *sabertooth
  field mice, *Mickey mice, ?computer mice
Mice

Wired Style: Principles of English Usage in the Digital Age (ed. Constance Hale, HardWired, 1996) says: “What’s the plural of that small, rolling pointing device invented by Douglas Engelbart in 1964? We prefer mouses. Mice is just too suggestive of furry little creatures. But both terms are common, so take your pick. We actually emailed Engelbart to see what he’d say. His answer? ‘Haven’t given the matter much thought.’

The Microsoft(R) Manual of Style for Technical Publications (ed. Amanda Clark, Microsoft Press, 1995) says: “Avoid using the plural mice; if you need to refer to more than one mouse, use mouse devices.”

<table>
<thead>
<tr>
<th>Term</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>computer mice</td>
<td>458,000</td>
</tr>
<tr>
<td>computer mouses</td>
<td>44,000</td>
</tr>
</tbody>
</table>