Unblurring the inflection/derivation divide in Laz

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- Laz conjugation presents a challenge for the split morphology hypothesis (Anderson, 1982; Perlmutter, 1988):
  - Inflectional and derivational affixes are interspersed.
  - Some position classes host either lexemic or inflectional material.
- The puzzle can be solved by allowing inflection rules to access structured lexemic representations.
- The analysis is couched in a modified version of Paradigm Function Morphology (Stump, 2001).

| -4 | -3 | -2 | -1 | 1 | 2 | 3 | 4 | 5 | 6 |
| ko | go | m | o | root | in | am | t’ | t | doe |
| AFF | LOC | OBJ,1 | CAUS | k’untsx | CAUS | TSH | IPFV | PST | EVD |

“You (pl) were waking me up, I’m told.”

1. Empirical evidence

1.1 Purely inflectional slots

-4 : affirmative preverbs
-2 : agreement with subject, object and/or indirect object
3 & 4 : tense/aspect/mood
5 : agreement with subject, object and/or indirect object
6 : tense/aspect/evidentiality

See (Lacroix, 2009) for a full description and (Bonami and Lacroix, 2010) for a full analysis of person markers.

1.2 Purely derivational slots

1 causative suffixes (in, ap)
-3 preverbs deriving productively locative verb lexemes

☞ In many cases a nonlocative meaning is lexicalized.
1.3 Mixed slots

-1 Usually filled by a valence marker reflecting a derivational operation.

Some underived verbs begin with the valence marker o-

In the perfect, hosts an inflectional exponent cumulating subject person marking.

In some TAM combinations, filled by a lexemically specified thematic suffix.

Some derivation operations provide their own thematic suffix.

Others percolate the base lexeme’s thematic suffix.
In other TAM combinations, hosts an inflectional suffix

\[
\begin{array}{ccc}
\text{root} & 2 & \text{om} \\
\text{dzir} & \text{om} & \text{THS} \\
\text{see} & 5 & \text{SBJ.3SG} \\
\end{array}
\Rightarrow
\begin{array}{ccc}
\text{root} & -2 & \text{m} \\
\text{dzir} & -1 & \text{i} \\
\text{see} & 2 & \text{om} \\
\end{array}
\]

\[
\begin{array}{ccc}
\text{OBJ.1} & \text{APP} & \text{SBJ.3SG} \\
\end{array}
\]

\[
\begin{array}{ccc}
\text{he sees it'} & \rightarrow & \text{he finds it for me'} \\
\end{array}
\]

```
2 Proposed analysis

2.1 The framework
- We rely on a modified version of Paradigm Function Morphology Stump (2001) integrated as the inflectional component of an HPSG grammar Pollard and Sag (1994); see (Bonami, 2011)
  - Provides PFM with an articulated theory of the lexicon and an explicit interface with syntax and semantics.
  - Allows for straightforward accounts of inflectional periphrasis (Bonami and Webelhuth, ress, this conference) and morphosyntactic mismatches (Bonami and Lacroix, 2010)

2.1.1 Revised HPSG architecture
- Lexical entries are not signs, but a new type of object constraining the relation between a syntactic word and a feature structure characterizing the inflectional paradigm that word belongs to:

```
\begin{array}{c}
\text{ling-object} \\
\left[ \begin{array}{c}
\text{sign} \\
\text{SYNSEM} \\
\text{phrase} \\
\text{word} \\
\end{array} \right] \rightarrow \\
\left[ \begin{array}{c}
\text{lex-entry} \\
\text{WORD} \\
\text{INFL} \\
\text{PID} \\
\text{MORSYN} \\
\end{array} \right] \rightarrow \\
\left[ \begin{array}{c}
\text{phon} \\
\text{synsem} \\
\text{word} \\
\text{pid} \\
\text{morsyn} \\
\end{array} \right] \rightarrow \\
\left[ \begin{array}{c}
\text{PHON} \\
\text{SYNSEM} \\
\text{SYNSEM} \\
\text{SYNSEM} \\
\end{array} \right] \rightarrow \\
\left[ \begin{array}{c}
\text{PID} \\
\text{MORSYN} \\
\text{MORSYN} \\
\end{array} \right]
\end{array}
```

- The Lexical Licencing Principle: any object of type \textit{word} used as part of an utterance must correspond to the value of the \textit{WORD} feature of some lexical entry in the lexicon.

- The inflectional component is defined by a relation \textit{pdgm-rln} relating objects of type \textit{pid} and objects of type \textit{morsyn} to objects of type \textit{phon}:

```
\text{lex-entry} \rightarrow \left[ \begin{array}{c}
\text{WORD} \\
\text{INFL} \\
\end{array} \right] \rightarrow \left[ \begin{array}{c}
\text{PHON} \\
\text{PID} \\
\text{MORSYN} \\
\end{array} \right] \rightarrow \left[ \begin{array}{c}
\text{pid} \\
\text{morsyn} \\
\end{array} \right]
```

- We use a relation rather than a function, because of the phenomenon of overabundance (Thornton, ress): there may be more than one form filling a given paradigm cell (e.g. English \textit{dived/dove}.

- Contra Bonami and Boyé (2007), this is still compatible with Pāṇinian rule competition; see (Bonami and Stump, ming) for discussion.
2.1.2 Paradigm identifiers

- **PID (PARADIGM IDENTIFIER)** is the home of all idiosyncratic information characterizing an inflectional paradigm, such as:
  - Minimally, the phonological representation of a **STEM**
  - Inflection class information, coded as a subtyping of *pid* values
  - In some languages, discontinuous thematic elements (preverbs, theme vowels, etc.)
  - In some languages, indexed collections of allomorphic stems (Bonami and Boyé, 2006)

- The structure of the *pid* hierarchy needs to be fine-grained enough that quasi-homophous lexemes (e.g. English *lie/led* vs. *lie/lay* have different *pid* values.

- No need to introduce individual types for inflectional identifiers (contra Spencer, 2010): the inflection of quasi-homophous lexemes always differ either in terms of inflection class or lexemic phonological information.

- **PID** is complementary with **LID (Sag, ress)** but plays a different role: homophous lexemes will have the same **PID** value but different **LIDs**.

2.1.3 Morphosyntactic features

- Inflection normally realizes syntactic features residing within **WORD**. However:
  - Which features are available for inflectional realization is a highly parochial matter
    * Some, but not all, **HEAD** features
    * In languages with agreement and/or pronominal affixes, some, but not all, aspects of **ARG-ST**
    * In many languages, some **EDGE** features (e.g. Kupść and Tseng, 2005; Samvelian and Tseng, 2010)
  - Existence of **morphosyntactic mismatches**: cases where morphology seems to realize feature values other than those provided by syntax
    * Default agreement to 3sg for non-nominal subject in English or French
    * Deponency phenomena (Stump, 2006; Baerman, 2007)
    * Here: Lack of number agreement in the 3rd person in Laz

- For this reason, it is best to constrain explicitly the relationship between word-level syntactic properties and the input to inflection

- This is done by positing a **MORSYN** structure whose feature values are related to features in **WORD** explicitly.

(1) a. \( \text{WORD} \left[ \cdots | \text{HEAD} \left[ \begin{array}{c} \text{verb} \\ \text{VFORM} \end{array} \right] \right] \rightarrow \text{INFL} \left[ \text{MORSYN} \left[ \text{TAM} \right] \right] \)

b. \( \text{WORD} \left[ \cdots | \text{HEAD} \left[ \begin{array}{c} \text{verb} \\ \text{ARG-ST} \end{array} \right] \right] \rightarrow \text{INFL} \left[ \text{MORSYN} \left[ \text{AGR1} \right] \right] \)

c. \( \text{WORD} \left[ \cdots | \text{HEAD} \left[ \begin{array}{c} \text{verb} \\ \text{ARG-ST} \end{array} \right] \right] \rightarrow \text{INFL} \left[ \text{MORSYN} \left[ \text{AGR2} \left[ \text{PER} \right] \right] \right] \)
2.1.4 Realization rules

Realization rules associate a description of an inflectional identifier and a morphosyntactic description with a function from forms to forms:

2.2 Lexical entries

- Valence markers are modelled using a subhierarchy, to capture the commonalities between applicatives and the perfect.

- Sample lexical entries:
2.3 Inflection rules

\[
gook'untsxinam:
\left[
\begin{array}{c}
\text{WORD} \\
\text{SYNSEM} \\
\text{CAT} \\
\text{HEAD} \\
\text{verb} \\
\text{LID}
\end{array}
\right]
\left[
\begin{array}{c}
\text{wake-up-rel}
\end{array}
\right]
\]

\[
\left[
\begin{array}{c}
\text{am-vb} \\
\text{k'untsx}
\end{array}
\right]
\left[
\begin{array}{c}
\text{LPV} \\
\text{go}
\end{array}
\right]
\left[
\begin{array}{c}
\text{VMK} \\
o
\end{array}
\right]
\]

\[
ibir:
\left[
\begin{array}{c}
\text{WORD} \\
\text{SYNSEM} \\
\text{CAT} \\
\text{HEAD} \\
\text{verb} \\
\text{LID}
\end{array}
\right]
\left[
\begin{array}{c}
sing-rel
\end{array}
\right]
\]

\[
\left[
\begin{array}{c}
\text{athematic-vb} \\
\text{bির}
\end{array}
\right]
\left[
\begin{array}{c}
PVB \\
\emptyset
\end{array}
\right]
\left[
\begin{array}{c}
\text{VMK} \\
i
\end{array}
\right]
\]

\[4\left[\text{vb-pid}\right]_{\text{AFF } +}\rightarrow [x \rightarrow k\emptyset x]\]

\[-3\left[\text{vb-pid}\right]_{\text{LPV } y} \rightarrow [x \rightarrow y \emptyset x]\]

\[-2\left[\text{vb-pid}\right]_{\text{AGR2 } \text{PER } 1} \rightarrow [x \rightarrow m \emptyset x]\]
\[\left[\text{vb-pid}\right]_{\text{AGR2 } \text{PER } 2} \rightarrow [x \rightarrow g \emptyset x]\]
\[\left[\text{vb-pid}\right]_{\text{AGR2 } \text{PER } 3} \rightarrow [x \rightarrow b \emptyset x]\]

\[1\left[\lambda; \text{vb-pid}\right]_{\sigma; \iota} \rightarrow \langle \lambda, \sigma \rangle : E\]
\[\lambda; \text{vb-pid}, \sigma; \text{PRF } + \rightarrow \langle \lambda[\text{VMK } iu], \sigma \rangle : E\]

\[0\left[\text{vb-pid}\right]_{\text{STEM } y} \rightarrow [x \rightarrow y]\]

\[1\left[\text{vb-pid}\right]_{\text{THS } y} \rightarrow [x \rightarrow x \emptyset y]\]
\[\left[\text{vb-pid}\right]_{\text{PRF } +} \rightarrow [x \rightarrow x \emptyset ur]\]
\[\left[\text{vb-pid}\right]_{\text{TNS } \text{pst} \text{ MOOD } \text{opt}} \rightarrow [x \rightarrow x \emptyset a]\]
\[2\left[\text{vb-pid}\right]_{\text{TNS } \text{pst} \text{ PFV } -} \rightarrow [x \rightarrow x \emptyset t']\]
\[
3 \left( [vb-pid], \begin{bmatrix}
\text{TNS} & \text{pst} \\
\text{PRF} & -
\end{bmatrix} \right) \rightarrow (x \mapsto x \# i)
\]

\[
4 \left( \lambda; [vb-pid], \sigma; \right) \rightarrow \langle \lambda, \sigma \rangle; A
\]

\[
\left( \lambda; [vb-pid], \sigma; \begin{bmatrix}
\text{AGR1} & \text{PER} & 3 \\
\text{NB} & \text{sg}
\end{bmatrix} \right) \rightarrow \langle \lambda, \sigma \rangle; B
\]

\[
\left( \lambda; [vb-pid], \sigma; \begin{bmatrix}
\text{AGR1} & \text{PER} & 3 \\
\text{NB} & \text{sg}
\end{bmatrix} \right) \rightarrow \langle \lambda, \sigma \rangle; C
\]

\[
\left( \lambda; [vb-pid], \sigma; \begin{bmatrix}
\text{AGR1} & \text{PER} & \text{non3} \\
\text{NUM} & \text{pl}
\end{bmatrix} \right) \rightarrow \langle \lambda, \sigma \rangle; D
\]

\[
\left( \lambda; [vb-pid], \sigma; \begin{bmatrix}
\text{AGR1} & \text{PER} & \text{non3} \\
\text{NB} & \text{pl}
\end{bmatrix} \right) \rightarrow \langle \lambda, \sigma \rangle; D
\]

\[
5 \left( [vb-pid], \begin{bmatrix}
\text{MOOD} & \text{ind} \\
\text{EVID} & \text{indir}
\end{bmatrix} \right) \rightarrow (x \mapsto x \# \text{doren})
\]

Block sequence - 1 → 1 → 2 → 3 → 4 → - 2 → - 3 → - 4 → 5

Portmanteau 3 > 4 rules

\[
\left( [vb-pid], \begin{bmatrix}
\text{TNS} & \text{pst} \\
\text{PFV} & + \\
\text{AGR1} & \text{PER} & 3
\end{bmatrix} \right) \rightarrow (x \mapsto x \# \text{es})
\]

\[
\left( [vb-pid], \begin{bmatrix}
\text{TNS} & \text{pst} \\
\text{PFV} & + \\
\text{AGR1} & \text{PER} & 3 \\
\text{NB} & \text{sg}
\end{bmatrix} \right) \rightarrow (x \mapsto x \# \text{u})
\]

Unordered rule blocks

\[
A \left( [vb-pid], \begin{bmatrix}
\text{TNS} & \text{fut} \\
\text{PRF} & -
\end{bmatrix} \right) \rightarrow (x \mapsto x \# \text{are})
\]

\[
B \left( [vb-pid], \begin{bmatrix}
\text{TNS} & \text{fut} \\
\text{PRF} & -
\end{bmatrix} \right) \rightarrow (x \mapsto x \# \text{anoren})
\]

\[
\left( [vb-pid], \begin{bmatrix}
\text{TNS} & \text{prs} \\
\text{PRF} & -
\end{bmatrix} \right) \rightarrow (x \mapsto x \# \text{nan})
\]

\[
\left( \text{class-i-vb}, \begin{bmatrix}
\text{TNS} & \text{prs} \\
\text{PRF} & -
\end{bmatrix} \right) \rightarrow (x \mapsto x \# \text{an})
\]

\[
\left( [vb-pid], \text{t} \right) \rightarrow (x \mapsto x \# \text{n})
\]
Portmanteau –1 > 5 rule

\[
\lambda:vbpid[\sigma:\begin{array}{c}
\text{INV} \\
\text{AGR}1 \\
\text{AGR}2
\end{array}] 
\rightarrow \langle \lambda,\sigma!:\begin{array}{c}
\text{AGR}1 \\
\text{AGR}2
\end{array} \rangle ; -1 > 5
\]

### 2.4 Derivation rules

Potential:

<table>
<thead>
<tr>
<th>lex-entry</th>
<th>lex-entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>\text{WORD} \</td>
<td>\text{WORD} \</td>
</tr>
<tr>
<td>\text{INFL} \</td>
<td>\text{PID} \</td>
</tr>
</tbody>
</table>

Causative:

<table>
<thead>
<tr>
<th>lex-entry</th>
<th>lex-entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>\text{WORD} \</td>
<td>\text{ARG-ST} \</td>
</tr>
<tr>
<td>\text{INFL} \</td>
<td>\text{PID} \</td>
</tr>
</tbody>
</table>

Applicative:
3 Conclusions

• In Laz, inflectional and derivational affixes do not cleanly align in separate parts of the word

• We propose an analysis where:
  – Inflection and derivation rules are of a different nature.
  – Competition between lexemic and inflectional material amounts to a distinction of two modes of exponence within the same position class.

• The analysis is semi-templatic (Simpson and Whitgott, 1986): lexemes come equipped with a template, which relates indirectly to position classes.

• We extend to ‘discontinuous stems’ the use of vectorial representations motivated by the treatment of stem allomorphy (Bonami and Boyé, 2006).

• This constitutes an alternative to the use of reified morphs (Crysmann, 2002) for the treatment of unusual affix orderings.

References


