Defaults and head marking: maximal inheritance, minimal overriding

Andrew Hippisley
University of Kentucky
outline

1. Network Morphology fundamentals
2. Derivation and default inheritance
3. Derivational relatedness
4. Canonical derivation and inheritance
   • Russian expressive morphology, non-canonical
5. Headed derivatives
6. Defaults and the canonical
1. Network Morphology fundamentals
Network Morphology fundamentals

Knowledge representation

- word structure facts distributed over a network of nodes
- nodes linked by inheritance
- inheritance by default
- inheritance can be from more than one node
Network Morphology fundamentals

Theoretical

- lexeme as minimal sign
  - lexical entries are lexemes ‘filled in’

- inferential-realizational
  - features expressed as an attribute path, word form as value

- centrality of the paradigm
  - lexical entry’s theorems

- autonomous morphology
  - orthogonal hierarchies, multiple inheritance

- regularity as degree
  - default inheritance
2. Derivation and default inheritance
derivation and default inheritance
derivation and default inheritance

LEXEME

| Verb

Čitatě

Čitatel

pisatel “writer”
xranitel “custodian”
grabitel “thief”
derivation and default inheritance
derivation and default inheritance
derivation and default inheritance

\[
\begin{align*}
[x]_x & y \\ [x]_v & er \quad 'one who V's' \\
[bak]_v & er \\
[bake]_v
\end{align*}
\]

Construction Morphology
(Booij 2005:124)

Also:
Riehemann (1998)
Kriger & Nerbonne (1993)
Deo (2007)
## Inflection and Derivation

<table>
<thead>
<tr>
<th></th>
<th>Inflection</th>
<th>Derivation</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>build versions of a lexeme</td>
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<tr>
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<tr>
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</tr>
<tr>
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<tr>
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inflection and derivation

| 6 | all base features inherited maximal inheritance defaults | Some base features inherited non-maximal inheritance overrides |
inflection and derivation

some base features inherited

*non-maximal* inheritance

overrides: morphosyntactic features
3. Derivational relatedness
derivational relatedness

Č´ITAT´

phon level
root = /č´ it-/
stem 2 = /č´ ita-/

sem level
‘read’

syn level
syn cat = V
args = 2 (NP_NP)

Č´ITATEL´

phon level
- 
/č´ ita-tel´/

sem level
‘person who reads’

syn level
syn cat = N
derivation relatedness

Č´ ITAT´

phon level
root = /č´ it-/  Č´ ITATEL´
stem 2 = /č´ ita-/ phon level

sem level
‘read’ > sem level
‘person who reads’

syn level
syn cat = V syn level
args = 2 (NP_NP) syn cat = N
derivational relatedness

Č´ITAT´

phon level
root = /č´it-/ 
stem 2 = /č´ita-/ 
sem level
‘read’
syn level
syn cat = V 
args = 2 (NP_NP)

Č´ITATEL´

phon level
- 
/č´ita-tel´/
sem level
‘person who reads’
syn level
syn cat = N
derivational relatedness

Č´ ITAT´

mor level
Class V_1

Č´ ITATEL´

mor level
Class N_1
derivational relatedness

Č´ ITAT´  Č´ ITATEL´

mor level  >  mor level
Class V_1   Class N_1
derivational relatedness

Č´ ITAT´ Č´ ITATEL´

mor level > mor level
Class V_1 Class N_1

Principle of the morpholexically coherent lexicon
(Spencer 2005)
i.e. correspondence among syntactic, semantic
and morphological properties
WFR

Base: telˈ WFR

Derivative

phon level

/x/ /x + telˈ /

sem level

X ‘person who Xes’

syn

V syn cat = N
Lexeme Formation Template
(Construction Morphology)

Base tel´ LFT

Derivative

phon level

/x/

/x + tel´/

sem level

X ‘person who Xes’

syn

V syn cat = N
relatedness and inheritance
relatedness and inheritance

<table>
<thead>
<tr>
<th>lexemic level</th>
<th>inheritance source</th>
<th>Čitat´ → Čitatel´</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>base</td>
<td></td>
</tr>
<tr>
<td>syntactic</td>
<td>x</td>
<td>✔</td>
</tr>
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<td>semantic</td>
<td>!√!</td>
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čitat´ → čitatel´
formal analysis

Č´itat´:
<> == VERB
<gloss> == read
<conjugation_class> == V_I:<mor>
<root all> == č´it
<stem 2> == <root all> a
<valence> == 2.

Č´itatel´:
<> == LFT_TEL
<base> == “Č´itat´::<>”. 
formal analysis

Č´itat´:
<> == VERB
<gloss> == read
<conjugation_class> == V_I:<mor>
<root_all> == č´it
<stem 2> == <root_all> a
<valence> == 2.

Č´itatel´:
<> == LFT_TEL´
;base> == „Č´itat´:<>“.

<base_gloss> == „Č´itat´:<base_gloss>“
<base_stem 2> == „Č´itat´:<base_stem 2>“
### conversion

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**dobro** ‘good deed’

**dobryj** ‘kind’
## transposition

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**LEXEME**

**VERB**

- Pobel´it LFT
- Pobelka

**pobelit** ‘whitewash’

**pobelka** ‘whitewashing’
4. Canonical derivation & inheritance
canonical derivation & inheritance

- derivative is maximally distinct from base while maintaining some connection with base
canonical derivation & inheritance

- derivative is maximally distinct from base while maintaining some connection with base
- some formal connection with base keeps the relation morphological
canonical derivation & inheritance

- derivative is maximally distinct from base while maintaining some connection with base
- some formal connection with base keeps the relation morphological
- in an inheritance framework, canonical derivation is maximal inheritance from the LFT node
non-canonical derivation

- towards maximal inheritance from Base,
  minimal inheritance from LFT
non-canonical derivation

- towards maximal inheritance from Base, minimal inheritance from LFT
- inheritance of Base’s morphosyntactic features
non-canonical derivation

- towards maximal inheritance from Base, minimal inheritance from LFT
- inheritance of Base’s morphosyntactic features
- category preserving derivation
## non-canonical derivation

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category preserving derivation

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category preserving derivation

gromadn-yj ryž-ij  dom-išč-e
huge-SG.M  rust-SG.M  house(M)-AUG-SG(IV)
‘The huge red-rust house’ (Chekov, *Svetlaja ličnost´)

- Class I → masculine, e.g. *dom*
- Class II → feminine
- Class III → feminine
- Class IV → neuter
category preserving derivation

s  godoval-ym  brat-išk-oj
with year-SG.M.INS  brother(M)-PEJ-SG.INS(II)
‘with your one-year-old brother’

- Class I → masculine, e.g. *brat*
- **Class II** → feminine
- Class III → feminine
- Class IV → neuter
Russian expressive morphology
*dom* ‘house’, *topor* ‘axe’, *kniga* ‘book’, *šinel* ‘coat’

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<tr>
<th>Base</th>
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<th>AUG</th>
<th>PEJ</th>
<th>AFFECT</th>
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<td>domišče</td>
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<td>Šinel</td>
<td>šinelka</td>
<td>-</td>
<td>šineliška</td>
<td>šineločka</td>
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</table>

Based on Stankiewicz (1968)
category preserving derivation

expressive morphology is an example of category preserving derivation (Stump 1991, 1993, 2001: ch 4)
5. Headed derivatives
headed derivatives

- The product of a category preserving rule of word formation is a *headed* expression (when PFM goes derivational)
  - endocentric compounds
    
    [tooth [brush] \textit{HEAD} ]
  - output of expressive derivation rule
    
    [ [\textit{dom}] \textit{HEAD} ik ]
  - head&Modifier / subsective semantics
headed derivatives

- base features persist
  - semantics
  - (important) morphosyntactic features
headed derivatives

- base features persist
  - semantics
  - (important) morphosyntactic features
- a property of a category preserving word formation rule is transparency (Stump 2001: 99)
  - rule allows base features to persist (PFM)
  - Network Morphology: base features are non-canonically inherited by the derivative lexical entry
headed derivatives

- base features persist
  - semantics
  - (important) morphosyntactic features
- a property of a category preserving word formation rule is *transparency* (Stump 2001: 99)
  - rule allows base features to persist (PFM)
  - Network Morphology: base features are non-canonically *inherited* by the derivative lexical entry
    - šineliška (fem), bratiška (masc)
    - Breton *bag* ‘boat’ → *bagig* ‘little boat’; *bihan* ‘small’ → *bihanig* ‘a little too small’ (Stump 2001: 100)
headed derivatives

- category changing rules yield unheaded expressions
  - [čitatel´]
  - (important) features from the base are *overridden* (inheritance from the LFT)
  - that’s canonical derivation
head marking: maximal base inheritance

- headed compounds
  - head is always inflected (Stump 2010)
    - *outlive/outlived* [out [live-d] ]
    - *understand/understood* [under [stood_{PST} ] ]
    - *mothers-in-law* [[mother-s] in law]
    - *grandstand/grandstanded* [grandstand]_{V-ed}
      - $V \rightarrow N \rightarrow \text{compound}_{N} \rightarrow V$ conversion
head marking: maximal base inheritance

- headed derivatives
  - inflecting the head is an option
  - *bratiška* [[brat] išk]-a edge marking
  - Shughni, East Iranian ‘little baby goats’
  - *guǰbucenik* [[guǰbuc-en]_{PL} ik] head marking
head marking: maximal base inheritance

- headed derivatives

\textit{gu\v{c}bucenik} \quad \texttt{[[gu\v{c}buc-en]_{\text{PL}} \ ik]} head marking

\texttt{\v{c}ost \ \ wam \ \ gu\v{c} bu\v{c}-en - ik=en \ \ \ \ \ \ \ dis \ \ \ \ \ \ may\v{z}\\dual\nu\v{b}-idi}

appear.PST \ \ her.OBL \ \ babygoat-PL-DIM =3.PL \ \ very \ \ hungry-INTENS

The dear little kids appeared very hungry to her.
head marking: maximal base inheritance

- for headed expressions, as well as a rule of exponence you need a rule of composition (Stump 2010): does the head inflect or the whole expression?
head marking: maximal base inheritance

**Head Application Principle** (Stump 2005: 67)

Where stem $d$ arises from stem $b$ through the application of a word-word rule $r$, then for each cell $<b,\sigma>$ in $b$’s paradigm, if $<b,\sigma>$ has realization $x$, then the corresponding cell $<d,\sigma>$ in $d$’s paradigm has realization $r(x)$. 
head marking: maximal base inheritance

Head Application Principle (Stump 2005: 67)

Where stem \( d \) arises from stem \( b \) through the application of a word-word rule \( r \), then for each cell \( <b,\sigma> \) in \( b \)’s paradigm, if \( <b,\sigma> \) has realization \( x \), then the corresponding cell \( <d,\sigma> \) in \( d \)’s paradigm has realization \( r(x) \).

- stem \( b \) cell \( <\text{guǰbuc}, \{\text{NUM:PL}\}> \) is realized as \text{guǰbucen}
- stem \( d \) is \text{guǰbucik} through rule \( r \)
- stem \( d \) cell \( <\text{guǰbucik}, \{\text{NUM:PL}\}> \) realized as \text{guǰbucenik}, i.e. \( <\text{guǰbuc}, \{\text{NUM:PL}\}> \) ik
category preserving derivation

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Dom

Dom´išče

LFT
maximal Base inheritance

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Gujbucik

LFT
formal analysis

1. LFT_DIMINUTIVE:
   <> ==
   LFT HEAD MARKING
   feature>== small
   == ik.

2. LFT HEAD MARKING:
   <> ==
   LFT_CAT_PRESERV
   "<base mor>"""<deriv aff>"
formal analysis

1. LFT_DIMINUTIVE:
<> == LFT_HEAD_MARKING
  <sem feature> == small
  <deriv aff> == ik.

2. LFT_HEAD_MARKING:
<> ==
LFT_CAT_PRESERV
"<base mor>" "<der aff>"

<mor pl> == "<base mor pl>" "<der aff>"
formal analysis

1. \text{LFT\_CAT\_PRESERV:}
   \[
   \langle\rangle \equiv \begin{align*}
   \text{LEXEME} & \quad \langle\rangle \\
   "\text{<base syn>}" & \quad \langle\rangle \\
   \wedge x["\text{<sem feature>}"(x) \& "\text{<base gloss>}"(x)]
   \end{align*}
   \]

...
formal analysis

Theorems of Guǰbucik

Guǰbucik:<syn cat> = n.
Guǰbucik:<gloss> = small baby_goat.
Guǰbucik:<sem feature> = small.
Guǰbucik:<mor sg> = guǰbuc ik.
Guǰbucik:<mor pl> = guǰbuc en ik.
finding head marking
finding head marking

- Greg’s Sanskrit example
  - *car* ‘act’, *abhicar* [abhi [car]]
  - 3sg present indicative [abhi [car-ati]]
    - but why not [abhi [car]]-ati ??
  - 3sg imperfect *a-carat*, *abhy-a-carat*,
    [abhi [a-car-at]]
finding head marking

- PFM Principles:
  - if head is marked in one cell, it’s marked in all cells (PFM’s Paradigm Uniformity Generalization)
  - coderivatives are either all head marking or not, i.e. head marking stipulated in the rule (PFM’s Coderivative Uniformity Generalization)
Russian prefixation
Russian prefixation

- **Nouns**
  - *pod-gruppa* ‘sub-group’, *ne-znanie* ‘ignorance’

- **Adjectives**
  - *ne-gramotnyj* ‘illiterate’, *bez-opasnyj* ‘dangerous’, *pre-dobryj* ‘overly kind’

- **Verbs**
  - *za-govorit* ‘begin to speak’, *pere-delat* ‘alter’, *pere-pisat* ‘to rewrite’, *prij-ti* ‘come’
Russian prefixation

- **Verbs**
  
  - za-govorit́ ‘begin to speak’, pere-delat́ ‘alter’, pere-pisat́ ‘to rewrite’, prij-ti ‘come’

1st and 2nd sg non-past
### Russian prefixation

- **Verbs**

  - *za-govorit* ‘begin to speak’, *pere-delat* ‘alter’, *pere-pisat* ‘to rewrite’, *prij-ti* ‘come’

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<tr>
<th>V_II</th>
<th>V_I</th>
<th>V_III</th>
</tr>
</thead>
<tbody>
<tr>
<td>govorju</td>
<td>delaju</td>
<td>pišu</td>
</tr>
<tr>
<td>govoriš´</td>
<td>delaeš´</td>
<td>pišeš´</td>
</tr>
<tr>
<td>zagovorju</td>
<td>peredelaju</td>
<td>perepišu</td>
</tr>
<tr>
<td>zagovoriš´</td>
<td>peredelaješ´</td>
<td>perepišeš´</td>
</tr>
</tbody>
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1st and 2nd sg non-past
Russian prefixation

- **Verbs**
  
  *o prij-ti ‘come’*  
  *o idu, idëš ″; šla (past feminine singular)*  
  *o pridu, pridëš ″; prišla (past feminine singular)*
Russian prefixation

- **Verbs**
  - o *prij-ti* ‘come’
    - o *idu*, *idëš´*; *šla* (past feminine singular)
    - o *pridu*, *pridëš´*; *prišla* (past feminine singular)

- **Derived forms maintain inflectional class of the base, as well as idiosyncracies, e.g. suppletion**
  - o *zagovoriš´* [za [govor-iš´]] head marking
Russian prefixation

- an extension of the Coderivative Uniformity Generalization:
  ‘all prefix-based category preserving derivation in Russian results in a head marked expression’
Formal analysis

- an extension of the Coderivative Uniformity Generalization:
  ‘all prefix-based category preserving derivation in Russian results in a head marked expression’

**LFT HEAD MARKING:**
- `<> == LFT_CAT_PRESERV`
- `<mor> == "<deriv aff>" "<base mor>"`
- `<stem> == PREFIXATION.`

**PREFIXATION:**
- `<stem> == "<deriv aff>" "<base stem>"`. 
Formal analysis

неграмотный́й ‘illiterate’
Formal analysis

negramotnyj ‘illiterate’

1 LFT_CAT_PRESERV:
   %<> == NOUN %too restrictive
   <> == LEXEME
   <syn> == "<base syn>"
   <gloss> == λx ["<sem feature>"(x) &
                 "<base gloss>" (x)]
   <stem> == SUFFIXATION.

2 LFT_HEAD_MARKING:
   <> == LFT_CAT_PRESERV
   <mor> == "<deriv aff>" "<base mor>"
   <stem> == PREFIXATION.

3 LFT_NEG_ADJ:
   <> == LFT_HEAD_MARKING
   <deriv aff> == ne
   <sem feature> == ¬ .
6. Defaults and the canonical
defaults and the canonical

inflection vs derivation

1 build versions of a lexeme build new lexeme

Canonical derivation

Lexeme 1 → Lexeme 2

maximally distinct, while staying morphologically connected
defaults and the canonical

Canonical derivation

Lexeme 1  \rightarrow  Lexeme 2

maximally distinct, while staying morphologically connected

From Base  
minimal inheritance
maximal overriding

From LFT
maximal inheritance
defaults and the canonical

Least canonical derivation

Lexeme 1 → Lexeme 2

minimally distinct, while staying morphologically connected

From Base
maximal inheritance
minimal overriding

From LFT
minimal inheritance
defaults and the canonical

Least canonical derivation

Lexeme 1 → Lexeme 2
minimally distinct, while staying morphologically connected
And therefore most like inflection

Lexeme_α
1 syn word_α
2 syn word_α

From Base
From LFT
maximal inheritance
no inheritance

no overriding
defaults and the canonical

defaults versus default situations
defaults and the canonical

defaults versus default situations

- defaults characterize system-driven generalization, A dominating B implies B gets everything A has unless overridden; hierarchical wrt non-default
defaults and the canonical

defaults versus default situations

- defaults characterize system-driven generalization, A dominating B implies B gets everything A has *unless overridden*; hierarchical wrt non-default
- default situations depend on perspective; characterize canonicity; non-hierchical wrt non-default situation
defaults and the canonical

defaults versus default situations

- defaults characterize system-driven generalization, A dominating B implies B gets everything A has *unless overridden*; hierarchical wrt non-default
- default situations depend on perspective; characterize canonicity; non-hierarchical wrt non-default situation

  - Canonical: default situation may mean overriding the default
  - Non-canonical: overriding the default situation may mean inheriting the default