Cyclic Feature Deletion

Kiranti verbal agreement

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Main Claim

Different patterns of blocking in Kiranti verbal agreement systems show instances of the same generalization that is best analyzed as an instance of **Cyclic Feature Deletion**.

Hayu non-past (Michailovski 1974)

A\P	1s	1de	1pe	1di	1pi	2s	2d	2p	3s	3d	3p
1s						-no	-no-tshe	-no-ne	-ŋ	-ŋ-tshe	-ŋ-me
1de						-tshok	-tshok	-tshok	-tshok	-tshok	-tshok
1pe						-kok	-kok	-kok	-kok	-kok	-kok
1di									-tshik	-tshik	-tshik
1pi									-ke	-ke	-ke
2s	-ŋo	-tshok	-kok						-∅	-∅	-me
2d	-ŋo-tshe	-tshok	-kok						-tshik	-tshik	-tshik
2p	-ŋo-ne	-tshok	-kok						-ne	-ne	-ne
3s	-ŋo	-tshok	-kok	-tshik	-ke	-∅	-tshik	-ne	-∅	-tshik	-me
3d	-ŋo-tshe	-tshok	-kok	-tshik	-ke	-∅	-tshik	-ne	-tshik	-tshik	-me
3p	-ŋo-me	-tshok	-kok	-tshik	-ke	-me	-tshik	-ne	-me	-me	-me
intr	-ŋo	-tshok	-kok	-tshik	-ke	-∅	-tshik	-ne	-∅	-tshik	-me

Agreement in Hayu

- agreement: number (sg, du, pl), person (1, 2, 3) and case (S, A, P)
  - Decomposition of features

Number		Person		Case	
sg	+sg,−pl	1	+1,−2,−3	Intr	S
du	−sg,−pl	2	−1,+2,−3	Agens	A
pl	−sg,+pl	3	−1,−2,+3	Patient	P

- with both arguments in transitive contexts, as e.g.

A\P	1s
2s	-ŋo
2d	-ŋo-tshe
2p	-ŋo-ne

/ŋo/ ↔ [SP,+1+sg]
/tshe/ ↔ [−sg−pl]
/ne/ ↔ [−1+2−sg+pl]

But what about... ?

A\P	1s	1de	1pe
2s	-ŋo	-tshok	-kok
2d	-ŋo-tshe	-tshok*-**tshe**	-kok*-**tshe**
2p	-ŋo-ne	-tshok*-**ne**	-kok*-**ne**
3s	-ŋo	-tshok	-kok
3d	-ŋo-tshe	-tshok*-**tshe**	-kok*-**tshe**
3p	-ŋo-me	-tshok*-**me**	-kok*-**me**

Or…?

A\P	2s	2d	2p
1s	-no	-no-tshe	-no-ne
1de	-tshok	-tshok*-**tshe**	-tshok*-**ne**
1pe	-kok	-kok*-**tshe**	-kok*-**ne**

Or…?

A\P	3s	3d	3p
1s	-ŋ	-ŋ-tshe	-ŋ-me
1de	-tshok	-tshok*-**tshe**	-tshok*-**me**
1pe	-kok	-kok*-**tshe**	-kok*-**me**

Generalization

- 1 ≫ 2 ≫ 3 and agreement with the highest argument
- if this argument is singular: agreement with the other argument as well
- otherwise any expected agreement with the other head is blocked

A\P	1s	1de	1pe
2s	-ŋo	-tshok	-kok
2d	-ŋo-tshe	-tshok*-**tshe**	-kok*-**tshe**
2p	-ŋo-ne	-tshok*-**ne**	-kok*-**ne**
3s	-ŋo	-tshok	-kok
3d	-ŋo-tshe	-tshok*-**tshe**	-kok*-**tshe**
3p	-ŋo-me	-tshok*-**me**	-kok*-**me**

/ŋo/	↔	SP,+1+sg
/kok/	↔	+1−2−sg+pl
/tshok/	↔	+1−2−sg−pl
/ne/	↔	+2−1−sg+pl
/me/	↔	+3−sg+pl
/tshe/	↔	−sg−pl

Analysis

The challenge for morphological theories

- **hierarchy** effects in the ordering of morphemes
- **blocking** of expected markers
  - shows an inside-out cyclic effect: markers that are expected to follow are blocked
  - affects only the "lower" argument

A realizational theory
Distributed Morphology (Halle & Marantz 1993)

- Vocabulary Items (VIs) are inserted to **realize** the morphosyntactic features the syntax provides
- VIs can be **underspecified** and are inserted if their features are a proper **subset** of the morphosyntactic feature context (Halle 1997)
- if more than one VI matches a context, the more **specific** marker is chosen

Blocking of expected markers in DM

- the systematic absence of markers in a realizational theory is derived via impoverishment rules
- = deleting of features in the input

(1) $-\text{sg} \rightarrow \text{ø} / [\text{A},-1,\_\_] [-3,-\text{sg}]$

(="delete a feature −sg on a −1 agent head in the context of a −3,−sg head")

A\P	1s	1de	1pe
2s	-ŋo	-tshok	-kok
2d	-ŋo-tshe	-tshok*-**tshe**	-kok*-**tshe**
2p	-ŋo-ne	-tshok*-**ne**	-kok*-**ne**
3s	-ŋo	-tshok	-kok
3d	-ŋo-tshe	-tshok*-**tshe**	-kok*-**tshe**
3p	-ŋo-me	-tshok*-**me**	-kok*-**me**

The problem with such an account

- impoverishment is in itself **blind for hierarchies**
- i.e. very specific rules would be necessary to capture all blocking contexts
- the **inside-out direction of blocking is a coincidence**
  (impoverishment applies prior to insertion and cannot refer to already inserted markers)

Our Departure

- prominence hierarchies are implemented as specificity concept
- deletion/blocking is only sensitive to already realized features

Cyclic Feature Deletion

- after some markers no blocking arises and after other markers blocking can be observed

(2) *Markers in Hayu*

/ŋo/	↔	[SP+1+sg]
/no/	↔	[A+1,+sg] /__+2
/ŋ/	↔	[+1+sg]

/ke/	↔	[+1+2−sg+pl]
/kok/	↔	[+1−2−sg+pl]
/ne/	↔	[+2−1−sg+pl]
/me/	↔	[+3 −sg+pl]
/tshok/	↔	[+1−2−sg−pl]
/tshe/	↔	[−sg−pl]

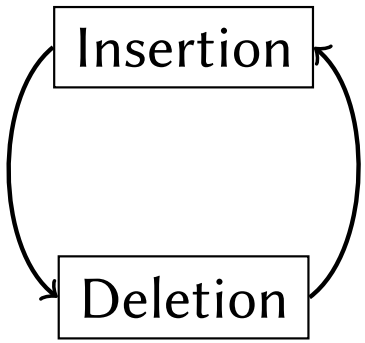
The crucial generalization:

The blocking markers **all realize the same features: −sg**
= a certain morpho-syntactic feature triggers blocking

Our proposal: Cyclic Feature Deletion

- impoverishment rules have **features that are already realized** as their context
- after every insertion step, impoverishment rules are checked for whether their context is met
- they therefore apply cyclically after every insertion step

(3) *Cyclic Impoverishment*



Hayu and CyFDs: Assumptions

- both agreement heads fuse together: their feature structure is visible
  (but: still structured!)
- fission as feature discharge: 'insertion as long as possible'
- specificity decides competition and is bound to the quality of features:
  $1 \gg 2 \gg 3 \gg \text{pl} \gg \text{du} \gg \text{sg}$
- this derives:
  - that the insertion starts with the head bearing the highest features on the scale $1 \gg 2 \gg 3$
  - if both heads are specified for the same person (3–3), the number hierarchy $\text{pl} \gg \text{du} \gg \text{sg}$ decides

Impoverishment in Hayu

- an impoverishment rule deletes all remaining features in the context of a visible (=realized) feature <–sg> (4)
- from this it follows that no agreement marker is ever possible after a non-singular marker but very well possible after a singular agreement marker

(4) *Impoverishment in Hayu*

$[\ldots]_\alpha \Rightarrow \varnothing$ / <–sg>$_\beta$ __

Exemplifying Derivation: two markers in 2d–1sg

I. $\begin{bmatrix} [A,-1,+2,-3,-sg,-pl] \\ [P,+1,-2,-3,+sg,-pl] \end{bmatrix}$ /ŋo/ ↔ [P+1+sg] $\begin{bmatrix} [A,-1,+2,-3,-sg,-pl] \\ [P,+1,-2,-3,+sg,-pl] \end{bmatrix}$

D. No context for an impoverishment rule is met

I. $\begin{bmatrix} [A,-1,+2,-3,-sg,-pl] \\ [P,+1,-2,-3,+sg,-pl] \end{bmatrix}$ /tshe/ ↔ [–sg–pl] $\begin{bmatrix} [A,-1,+2,-3,-sg,-pl] \\ [P,+1,-2,-3,+sg,-pl] \end{bmatrix}$

D. $[\ldots]_\alpha \Rightarrow \varnothing$ / <–sg>$_\beta$ ___

I. No marker specification is met

-ŋo-tshe

Exemplifying Derivation: A is blocked in 2d–1pe

I. $\begin{bmatrix} \text{[A,}-\text{1,}+\text{2,}-\text{3,}-\text{sg,}-\text{pl]} \\ \text{[P,}+\text{1,}-\text{2,}-\text{3,}-\text{sg,}+\text{pl]} \end{bmatrix}$ /kok/ $\leftrightarrow$ [+1–2–sg+pl] $\begin{bmatrix} \text{[A,}-\text{1,}+\text{2,}-\text{3,}-\text{sg,}-\text{pl]} \\ \text{[P,}+\text{1,}-\text{2,}-\text{3,}-\text{sg,}+\text{pl]} \end{bmatrix}$

D. $[\ldots]_\alpha \Rightarrow \varnothing$ / <–sg>$_\beta$ ___

I. $\begin{bmatrix} \text{[A,}-\text{1,}+\text{2,}-\text{3,}-\text{sg,}-\text{pl]} \\ \text{[P,}+\text{1,}-\text{2,}-\text{3,}-\text{sg,}+\text{pl]} \end{bmatrix}$ */tshe/ $\leftrightarrow$ [–sg–pl]

D. No context for an impoverishment rule is met

I. No marker specification is met

-kok

Alternative: 'Regular' impoverishment

Another way to put the generalization

No two –sg markers are possible.

Seems to be captured easily by an impoverishment rule like (5)

(5) $[-\text{sg}\ldots]_{\alpha} \Rightarrow \varnothing \,/\, \_\_[-\text{sg}]_{\beta}$

But on which head is the [–sg] deleted?

- it is not always the object or subject which is deleted – its always the argument, which is lower on the hierarchy

An example: 'regular' impoverishment in Hayu

(6)
① [−sg] → ∅ / __ [A,−3,−sg]
② [−sg] → ∅ / [A,−1,__] [−3,−sg]
③ [−sg] → ∅ / [+3,−pl,__] [+3,+pl]

A\P	1s	1d	1pl	2s	2d	2pl	3s	3d	3p
1s				A	**A–P**	**A–P**	A	**A–P**	**A–P**
1ns				A	A ①	A ①	A	A ①	A ①
2s	P	P	P						P
2d	**P–A**	P ②	P ②				A	A ①	A ①
2pl	**P–A**	P ②	P ②				A	A ①	A ①
3s	P	P	P		P	P		P	P
3d	**P–A**	P ②	P ②		P ②	P ②	A	A	P ③
3p	**P–A**	P ②	P ②	A	P ②	P ②	A	A ③	A

The hierarchy effects are a mere coincidence.

Discussion

Possible extension: marker-sensitive blocking

e.g. in Potawatomi (Hockett 1939):

A\P	1pe	1pi	2p	3p	obv	−anim
1p			−men*−**m**	−men*−**k**	−men*−**n**	−men*−**n**
2p	−men*−**m**			−wa−k	−wa−n_1	−wa−n_2
3p	−nan−k	−nan−k	−wa−k		−wa−n_1	−wa−n_2

(7) *Vocabulary Items*

−nan	⇔	+1,+pl /___[A, +3]
−men	⇔	+1,+pl
−k	⇔	+3,+pl
−n_1	⇔	+obv
−n_2	⇔	−anim,+pl
−m	⇔	+2,+pl

Cross-language evidence

Various blocking phenomena in unrelated languages easily follow in such an account, e.g.:

- in **Gurrgoni** (Gunwinggun, Green 1995),
  a specific –sg > –sg marker blocks any expected number agreement afterwards
- in **Huehuetla Tepehuan** (Totanacan, Troiani 2004),
  the otherwise very regular biactantal agreement paradigm is obscured in 1>2 forms where the expected number agreement marker is blocked
- in **Japhug Rgyalrong** (Sino-Tibetan, Jacques 2010),
  certain person prefixes make any subsequent number agreement with the other head impossible

Conclusion

Cyclic Feature Deletion...

- the context of impoverishment rules: already realized features$_R$
- such impoverishment rules consequently do not apply prior to insertion but *after insertion* of certain markers

...and its advantages

- derives the Kiranti patterns with a minor adjustment in standard DM
- language variation: only in the hierarchy deciding specificity
- it therefore avoids:
  - long lists of arbitrary impoverishment/fission rules
- is able to predict marker-sensitive blocking as well

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