First-come, First-serve

Marker-sensitive Blocking and Ordering in Potawatomi

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Main Claim

We present an account for some interesting properties of the verbal agreement system in the Algonquian language Potawatomi:

- the order of affixes follows a hierarchy of morpho-syntactic features
- a marker-sensitive blocking of expected markers

We will discuss and compare different possible approaches and will conclude that a solution to the interesting marker-sensitive blocking is naturally provided in a realizational DM account that introduces the new concept of **Collateral Feature Discharge**.

Potawatomi language

- Potawatomi, Central Algonquian, North America
- rich morphology (especially verbal morphology)
- direct/inverse system
- agreement with subject and object

- Hockett 1939, Hockett 1948
- theories: Anderson 1992, Stump 2001, Halle & Marantz 1993, et al.

Potawatomi Affix Order

(1) *Extract of the transitive animate paradigm*

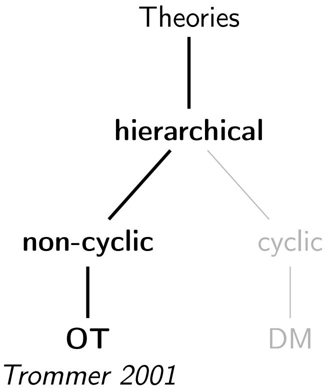
A\P	2s	2p	3s	3p
2s			Σ-a	Σ-a-k
2p			Σ-a-wa	Σ-a-wa-k
3s	Σ-uko	Σ-uko-wa		
3p	Σ-uko-k	Σ-uko-wa-k		

$$\textbf{case} \gg \mathbf{1} \gg \mathbf{2} \gg \mathbf{3}$$

(2) *Marker specifications*

–*uko*	Nom, 3	–*a*	Acc, 3
–*wa*	2p	–*k*	3p

Available Types of Theories



Affix Order in Optimality Theory – Trommer (2001a+b, 2002)

Violable alignment constraints (McCarthy & Prince 1993) demand the order of morphemes:

(3) $\Sigma \Lleftarrow$ [Agr]

Assign a violation mark for every morpheme between the right edge of the stem and a morpheme realizing [Agr].

Order of Affixes in Potawatomi (OT)

The order of morphemes following the prominence hierarchy

$$\textbf{case} \gg \textbf{1} \gg \textbf{2} \gg \textbf{3}$$

is derived from the constraint hierarchy:

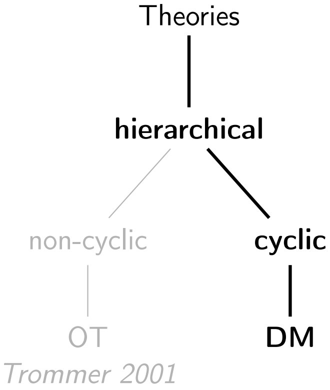
(4) $\Sigma \Lleftarrow [\mathrm{C}] \quad \gg \quad \Sigma \Lleftarrow [+1] \quad \gg \quad \Sigma \Lleftarrow [+2] \quad \gg \quad \Sigma \Lleftarrow [+3]$

Order of Affixes in Potawatomi (OT)

				$\Sigma \Lleftarrow$ [C]	$\Sigma \Lleftarrow$ [+2]	$\Sigma \Lleftarrow$ [+3]
	[A,–1,–2,+3,+pl] [P,–1,+2,–3,+pl]					
a.	–wa [+2,+pl]	–uko [A,–1,–2]	–k [+3,+pl]	*!		**
☞ b.	–uko [A,–1,–2]	–wa [+2,+pl]	–k [+3,+pl]		*	**
c.	–uko [A,–1,–2]	–k [+3,+pl]	–wa [+2,+pl]		**!	*

Discussion: OT derives affix order

- the OT account allows to implement a prominence hierarchy: the constraint ranking directly reflects it
- not every affix is assigned to a certain position: the order is derived with reference to the morpho-syntactic features a marker realizes


Theories
hierarchical
non-cyclic
cyclic
OT
Trommer 2001
DM

Distributed Morphology – A realizational theory I

- Halle & Marantz 1993
- post-syntactic insertion
- functional morphemes contain fully specified bundles of morpho-syntactic features
- vocabulary items pair phonological and (underspecified) morpho-syntactic features
- 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)

Distributed Morphology – A realizational theory I

(5) *Subset Principle* Halle (1997)

A vocabulary item V is inserted into a functional morpheme M iff a. and b. hold:

a. The morpho-syntactic features of V are a subset of the morpho-syntactic features of M.

b. V is the most specific vocabulary item that satisfies a.

Distributed Morphology – Feature Discharge

- Noyer 1997
- after insertion, the features that are realized by the marker are **discharged** and unavailable for further insertion

(6) *Fission as Feature Discharge* *Noyer (1992)*
If insertion of a vocabulary item V with the morpho-syntactic features β takes place into a fissioned morpheme M with the morpho-syntactic features α, then α is split up into β and $\alpha - \beta$, such that (i) and (ii) hold:
(i) $\alpha - \beta$ is available for further vocabulary insertion.
(ii) β is not available for further insertion.

Specificity

- if more than one VI matches a context, the more **specific** marker is chosen
- hierarchy-effects result if specificity refers not only to the number of features a marker realizes, but to the **quality of the features**

(7) *Specificity* Müller (2005)

A vocabulary item V_i is more specific than a vocabulary item V_j iff there is a class of features F such that a. and b. hold.

a. V_i bears more features belonging to F than V_j does.

b. There is no higher-ranked class of features F' such that V_i and V_j have a different number of features in F'.

Example: Potawatomi

case ≫ 1 ≫ 2 ≫ 3

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context:	possible VIs:	the most specific one:
$\left[\begin{array}{l} \cancel{A},\cancel{-1},\cancel{-2},+3,+pl \\ P,-1,+2,-3,+pl \end{array}\right]$	*-wa* ↔ [+2,+pl] *-uko* ↔ [A,–1,–2] *-k* ↔ [+3,+pl]	*-uko* ↔ [A,–1,–2]

Example: Potawatomi

. . . the insertion continues...

$\begin{bmatrix} \text{A},-1,-2,+3,+\text{pl} \\ \text{P},-1,+2,-3,\cancel{+\text{pl}} \end{bmatrix}$ $\quad$ $-wa \leftrightarrow [+2,+\text{pl}]$ $\quad$ /–uko/

$\begin{bmatrix} \text{A},-1,-2,\cancel{+3},\cancel{+\text{pl}} \\ \text{P},-1,+2,-3,+\text{pl} \end{bmatrix}$ $\quad$ $-k \leftrightarrow [+3,+\text{pl}]$ $\quad$ /–uko–wa/

$\begin{bmatrix} \text{A},-1,-2,+3,+\text{pl} \\ \text{P},-1,+2,-3,+\text{pl} \end{bmatrix}$ $\quad$ **/–uko–wa–k/**

OT vs. DM draw?

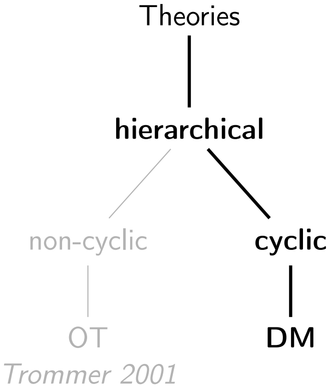
- up to now both approaches seem to work equally good since they derive the affix order with help of a hierarchy
- but there are more data which have to be taken into account

Blocking of markers

- there are contexts where certain suffixes do not occur although they would be expected
- we see only theme marking and a 1p suffix

A\P	1pe	2p	3p	obv	–anim
1p		–en–men***–m** [+2,+pl]	–a–men***–k** [+3,+pl]	–a–men***–n** [+obv]	–a–men***–n** [−anim]
2p	–y–men***–m** [+2,+pl]				

Σ–case–1p


Theories
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DM

Hierarchy-governed insertion in DM: The misprediction

head:	insertion of:
$\left[\begin{array}{l} A,+1,-2,-3,+pl \\ P,-1,-2,+3,+pl \end{array}\right]$	*–men* ↔ [+1,+pl]
$\left[\begin{array}{l} A,+1,-2,-3,+pl \\ P,-1,-2,+3,+pl \end{array}\right]$	*–*k* ↔ [+3,+pl]

–a–men

A possible solution: Impoverishment Rules

- in DM, the VIs are inserted to realize the morpho-syntactic features the syntax provides
- prior to insertion, these features can be manipulated: features can be deleted in the presence of other features
  - (Bonet 1991, Halle & Marantz 1993, Bonet 1995, Noyer 1996, Halle 1997)

Impoverishment Rules in Potawatomi

(8)

$$\left.\begin{array}{llll}
\text{a.} & +\text{pl} & \Rightarrow & \varnothing \;/ __[\ \text{A},+1,+\text{pl}\ ] \\
\text{b.} & +\text{obv} & \Rightarrow & \varnothing \;/ __[\ \text{A},+1,+\text{pl}\ ] \\
\text{c.} & -\text{anim} & \Rightarrow & \varnothing \;/ __[\ \text{A},+1,+\text{pl}\ ]
\end{array}\right\}\ \text{Agr}_\text{P} \Rightarrow \varnothing$$

$$\begin{array}{llll}
\text{d.} & +\text{pl} & \Rightarrow & \varnothing \;/ __[\ \text{P},+1,+\text{pl}\ ]
\end{array}$$

	1p	2p	3p	obv	–anim
1p		–men*–m [+2,+pl]	–men*–k [+3,+pl]	–men*–n [+obv]	–men*–n [–anim]
2p	–men*–m [+2,+pl]				
3p	–nan–k				

The effect of impoverishment in Potawatomi

head after impoverishment:

$$\left[\begin{array}{l} \text{A},+1,-2,-3,+\text{pl} \\ \text{P},-1,-2,+3 \end{array}\right]$$

$$\left[\begin{array}{l} \text{A},+1,-2,-3,+\text{pl} \\ \text{P},-1,-2,+3 \end{array}\right]$$

insertion of:

$-men \leftrightarrow [+1,+\text{pl}]$

$^*-k \leftrightarrow [+3,+\text{pl}]$

–a–men

Theories

hierarchical

non-cyclic cyclic

OT DM

Trommer 2001

Blocking in Optimality Theory (Trommer 2001)

The constraint (9) demanding that every feature in the input must be realized with some morpheme in the output is outranked by a constraint (10) demanding that a certain feature must be impoverished (=not realized) in a certain context.

(9) Parse [FS]
Assign a violation mark for each feature structure FS' in the input that is subsumed by FS and not realized by a feature structure in the output that parses FS in FS'.

(10) Impoverishment $[FS_{Target}]^{[FS_{Trigger}]}$:
Assign a violation mark if there is a VI in the output that parses FS_{Target} in an input FS subsumed by $FS_{Trigger}$.

Blocking in Potawatomi (OT)

	1p	2p	3p	obv	−anim
1p		−en−men***−m**	−a−men***−k** [+3,+pl]	−a−men***−n**	−a−men***−n**
2p	−y−men***−m**				

(11) Impoverishment $[+3]^{[A,+1,+pl]}$ $(I[3^{A1p}])$

Blocking in Potawatomi (OT)

[A,+1,–2,–3,+pl] [P,–1,–2,+3,+pl]	$I[3^{A1p}]$	Ps-[+1]	Ps-[+2]	Ps-[+3]
a. –a [P,–1,–2] –men [+1,+pl] –k [+3,+pl]	*!			
☞ b. –a [P,–1,–2] –men [+1,+pl]				*
c. –a [P,–1,–2] –k [+3,+pl]		*!		

Blocking in OT: Discussion I

- to account for the blocking in Potawatomi, at least 4 different impoverishment constraints are necessary

(12) *Impoverishment constraints in Potawatomi*

a. Impoverishment $[+2]^{[+1,+\text{pl}]}$
b. Impoverishment $[+3]^{[\text{A},+1,+\text{pl}]}$
c. Impoverishment $[+\text{obv}]^{[\text{A},+1,+\text{pl}]}$
d. Impoverishment $[-\text{anim}]^{[\text{A},+1,+\text{pl}]}$

A\P	1p	2p	3p	obv	–anim
1p		–men***–m** [+2,+pl]	–men***–k** [+3,+pl]	–men***–n** [+obv]	–men***–n** [−anim]
2p	–men***–m** [+2,+pl]				

Blocking in OT: Discussion II

- in addition, the concept of impoverishment constraints is a quite stipulated mechanism and can in principle be stated for any feature in any context

Impoverishment Rules: Discussion

Impoverishment is a quite powerful and stipulated mechanism and should be avoided.

We rather argue that **morphological deletion generally follows from marker insertion**. The markers themselves are responsible for the blocking of other markers:

1. markers that **do not** trigger blocking
2. markers that **do** trigger blocking

An Alternative: Collateral Feature Discharge

- markers that trigger blocking
- they discharge more than the features which are necessary for their insertion
  - = VI with the property of **Collateral Feature Discharge** (CFD)

Potawatomi revisited

A \P	1pe	1pi	2p	3p	obv	–anim p
1p			–men	–men	–men	–men
2p	–men			–wa–k	–wa–n_1	–wa–n_2
3p	–nan–k	–nan–k	–wa–k		–wa–n_1	–wa–n_2

- two markers for [+1,+pl]: *–nan* and *–men*
- blocking effect is marker specific
- happens only after *–men*

/–men/ has the CFD-property

head:

$$\left[\begin{array}{l} A,+1,-2,-3,+pl \\ P,-1,-2,+3,+pl \end{array}\right]$$

$$\left[\begin{array}{l} A,+1,-2,-3,+pl \\ P,-1,-2,+3,+pl \end{array}\right]$$

insertion of:

$\textit{-men}_{cfd} \leftrightarrow [+1,+pl]$

–a–men

CFD Summary

- the CFD approach allows to treat the blocking as a marker specific property
- the cyclic insertion allows to capture the fact that the blocking does only affect subsequent markers

Discussion of CFDs

vs. Impoverishment rules (DM)

- impoverishment rules can not handle this marker sensitivity: they are not bound to the presence of a certain marker but manipulate the context before insertion

vs. Impoverishment constraints (OT)

- although impoverishment constraints only refer to features that are already realized by a marker, the marker sensitivity cannot be handled: it is irrelevant *which* marker is inserted
- the fact that only *subsequent* markers are blocked can only be captured with the questionable reintroduction of serialism into an originally parallel model (McCarthy 2000, Wolf 2008)

Summary

- the order of affixes and the marker sensitivity in Potawatomi followed from:
  1. Specificity in concepts of feature hierarchies
  2. Feature Discharge
  3. Collateral Feature Discharge as special property of certain markers
- it easily implements the prominence hierarchy: affix order does not follow an arbitrary stipulation as in e.g. templatic approaches (Stump 2001)
- this approach works for the most other Algonquian languages in the same way

Migwe'c!

Thank you!

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