Generalized Impoverishment

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Basic Ideas

- **Simplify Distributed Morphology** (Halle & Marantz 1993): Supplant subset-based underspecification by impoverishment
- **Continue the Research program of LSLOT (Chomsky 1955):** Implement markedness as an evaluation metric on grammars
- **Explicit Ø-Exponence is evil** (Matthews 1974, Anderson 1992)

Claim

Markedness of a paradigm *P*

$\approx$

the minimal number of impoverishment rules

required to capture *P*

Overview

Underspecification, Competition, and Impoverishment in Standard DM

Underspecification and Competition in Standard DM

	masc	**neut**
Nom	d-er	d-as
Acc	d-en	

Syntax: [+masc +nom]

↑

Vocabulary Items

[+masc +acc] ↔ **-en**
[+masc] ↔ **-er**
[ ] ↔ **-as**

[+masc]:**er**

(German Pronominal Inflection)

The Subset Principle (Halle 1997)

1. Only VIs which specify a subset of a head's features can be inserted

2. Only the most specific VI is inserted

Where the Subset Principle is not Enough

	present	
	indefinite	**definite**
1sg	olvas-o-**k**	olvas-o-**m**

	past	
	definite	**indefinite**
1sg	olvas-t-a-**m**	

Vocabulary Items

[+1 –pl –def] ↔ **-k**
[+1 –pl] ↔ **-m**

Problem:

Violation of the Subset Principle

(Hungarian Verb Agreement)

Impoverishment in Standard DM

Syntax: [+1 –pl –def]

Impoverishment: **[def] → Ø / ____ [+past]**

[+1 –pl]

↑

[+1–pl]:m

Vocabulary Items

[+1 –pl –def] ↔ **-k**
[+1 –pl] ↔ **-m**

(Hungarian Verb Agreement)

Crucial Observation

(Enough)

impoverishment

makes underspecification unnecessary

(at the point of vocabulary insertion)

Supplanting Underspecification by Generalized Impoverishment

Supplanting the Subset Principle

Coextension Principle:

A vocabulary item is inserted into a head if its morphosyntactic features are coextensive to the ones specified in the head

Consequence:

Underspecified Vocabulary Items enforce massive impoverishment before insertion

Minor Assumption

Impoverishment makes features unaccessible for insertion

but does not delete them

Context specifications/allomorphy/impoverishment

may still refer to impoverished features

(see Noyer 1992 for a similar claim on vocabulary insertion)

Person Syncretism in Nobiin (Werner 1987)

	Indicative	Interrogative
1sg	-ir	-re
2sg	-nam	**-i**
3sg	-i	**-i**
1pl	-ir	**-ro**
2pl	-rokom	**-ro**
3pl	-inna	-inna

Derivation of Singular Syncretism (Interrogative)

	1sg	2sg	3sg
	[+1–3–pl]	[–1–3–pl]	[–1+3–pl]
Impoverishment:	[+1–3–pl]	[–1–3–pl]	[–1–3–pl]
Insertion:	re:[+1–3–pl]	i:[–1–pl]	

Impoverishment Rule: 3 → Ø /[_____–pl][+int]

Vocabulary Items

[+1–3–pl] ↔ **re**
[–1–3–pl] ↔ **nam**
[–1–pl] ↔ **i**

Derivation of Plural Syncretism (Interrogative)

	1pl	**2pl**	**3pl**
	[+1–3+pl]	[–1–3+pl]	[–1+3+pl]
Impoverishment:	[~~+1~~–3+pl]	[~~–1~~–3+pl]	[–1+3+pl]
Insertion:	ro:[–3+pl]		inna:[–1+3+pl]

Impoverishment Rule: 1 → Ø /[_____+pl][+int]

Vocabulary Items

[–1+3+pl] ↔ **inna**
[–1–3+pl] ↔ **rokom**
[–3+pl] ↔ **ro**

Derivation of Non-Syncretic Singular (Indicative)

With Underspecification

	1sg	2sg	3sg
	[+1–3–pl]	[–1–3–pl]	[–1+3–pl]
Insertion:	ir:[+1–3–pl]	nam:[–1–3–pl]	i:[–1–pl]

Without Underspecification

	1sg	2sg	3sg
	[+1–3–pl]	[–1–3–pl]	[–1+3–pl]
Impoverishment:	[+1–3–pl]	[–1–3–pl]	[–1[redacted]–pl]
Insertion:	ir:[+1–3–pl]	nam:[–1–3–pl]	i:[–1–pl]

Impoverishment Rule: +3 → Ø /[_____–pl]

Deriving Typological Asymmetries

Assumptions

- Strong Version of the Syncretism Principle (Müller 2004)
- The only person features are [+/–1] & [+/–3] (Nevins 2006)
- Learners prefer grammars with less impoverishment rules

Assumption on the Learner

For a given paradigm P, learners prefer grammars with a minimal number of impoverishment rules

The markedness of a paradigm $P \approx$ the number of impoverishment rules of a morphological grammar $G(P)$ such that there is no grammar $G'(P)$ with less impoverishment rules than G

Learners prefer less marked paradigms

$\Rightarrow$ marked paradigms should be typologically rare

Deriving Baerman's Generalization

Baerman's Generalization

"In the nonsingular, 1/2 and 2/3 both occur in roughly equal measures, while 1/3 is less common. A similar distribution is found where number is irrelevant, with examples of 1/2 and of 2/3 predominating. . . . Thus, cross-linguistically, there seems to be a preference for syncretism of first with second person, and of second person with third," (Baerman 2005:3)

Baerman's Generalization

Agreement

	singular	non-singular	number-neutral
1/3	Koiari*, Zoque	Aleut, German, Hindi	
2/3	Atakapa, Hindi, Nivkh*, Nubian	Amele, Kapau , Kewa, Kobon, Slovene	Chitimacha, Guambiano, Kiwai, Wambon
1/2		Burarra, Dogon, Manchad, Nubian, Prinmi Tetun	Hunzib, Ingush, Nez Perce, Sango Waskia

* Person distinguished in singular only.

Pronouns

	singular	non-singular	number-neutral
1/3		Dakar Wolof	
2/3		Amele*, Kalam*, Kamoro, Kobon, Korafe*, Meyah, Mansim, Nez Perce*, Sango*, Warekena*, Wolof	Kawesqar
1/2		Awa*, Fongbe, Slave*, Yimas	Winnebago

Deriving Natural Person Syncretism

2/3 Syncretism

	1	2	3
	[+1–3]	[–1–3]	[–1+3]
	[+1~~–3~~]	[–1~~–3~~]	[–1~~+3~~]
	[+1]	[–1]	

$3 \rightarrow \emptyset$

1/2 Syncretism

	1	2	3
	[+1–3]	[–1–3]	[–1+3]
	[~~+1~~–3]	[~~–1~~–3]	[~~–1~~+3]
	[–3]		[+3]

$1 \rightarrow \emptyset$

Deriving Unnatural Person Syncretism

1/3 Syncretism

	1	2	3
	[+1–3]	[–1–3]	[–1+3]
	[+1~~–3~~]	[–1–3]	[–1~~+3~~]
	[~~+1~~]	[–1–3]	[~~–1~~]
	[ ]	[–1–3]	[ ]

–3 → Ø/ ___ +1	+3 → Ø/ ___ –1
–1 → Ø/ ___ +3	+1 → Ø/ ___ –3

Added Value of the Analysis

"We know of no model of person features that will account precisely for . . . the rarity of 1/3 syncretism . . . For example Harley and Ritter (2002), in a model designed to account for the person values of pronominal forms, predict that 1/2 pronouns should be found, but not 2/3. However, as we have seen, not only are 2/3 pronouns found, they appear to be more common than 1/2 pronouns." (Baerman et al. 2005:60-61)

Deriving the Pertsova Hierarchy

The Pertsova Complexity Hierarchy for Syncretism

Type 0: No Syncretism

Type 1: Syncretism which can be captured by natural classes

Type 2: Syncretism which can be captured by natural classes and subset-based competition

Type 3: More complex syncretism

A Simple Example Paradigm

[–masc –pl]$_1$	[–masc +pl]$_2$
[+masc –pl]$_3$	[+masc +pl]$_4$

$\approx$

a_1	b_2
c_3	d_4

Pertsova's (2008) Complexity Classes

Type 0

a	b
c	d

Type 1

a	b

Type 2

a	
	b

Type 3

a	**b**
b	**a**

Deriving Type-0 Syncretism

	[–m –p]	[–m +p]	[-+m –p]	[+m +p]
Insertion:	a:[–m –p]	b:[–m +p]	c:[-+m –p]	d:[+m +p]

a	b
c	d

Deriving Type-1 Syncretism

	[–m –p]	[–m +p]	[+m –p]	[+m +p]
Impoverishment:	[–m]	[–m]	[+m]	[+m]
Insertion:	[–m]:a		[+m]:b	

$p \rightarrow \varnothing$

a	b

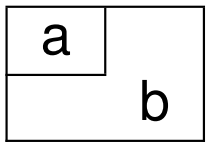
Deriving Type-2 Syncretism

	[–m –p]	[–m +p]	[+m –p]	[+m +p]
	[–m –p]	[+p]	[+m –p]	[+m +p]
	[–m]	[ ]	[+m]	[+m]
	[–m]	[ ]	[ ]	[ ]
	[–m]:a	[ ]:b		

$$-m \rightarrow \emptyset / [\_\_\_\_\_ +p]$$

$$p \rightarrow \emptyset$$

$$+m \rightarrow \emptyset$$



Why Type-3 Syncretism Cannot Derived

[–masc –pl]$_1$	[–masc +pl]$_2$
[+masc –pl]$_3$	[+masc +pl]$_4$

* $\Rightarrow$

a	**b**
b	**a**

To derive this paradigm, the single cells must be impoverished such that:

(i) $\text{Cell}_1 = \text{Cell}_4$

(ii) $\text{Cell}_2 = \text{Cell}_3$

(iii) $\text{Cell}_{1,4} \neq \text{Cell}_{2,3}$

Why Type-3 Syncretism Cannot Derived

[–masc –pl]$_1$	[–masc +pl]$_2$
[+masc –pl]$_3$	[+masc +pl]$_4$

* $\Rightarrow$

a	**b**
b	**a**

The only way to guarantee that Cell$_1$ = Cell$_4$
is to impoverish both cells to [ ]

The only way to guarantee that Cell$_2$ = Cell$_3$
is to impoverish both cells to [ ]

but this results in complete syncretism for all 4 cells (Cell$_{1,4}$ = Cell$_{2,3}$)

Work Around

Assume that all feature structures contain a generic categorial feature:

[–masc –pl Φ]$_1$	[–masc +pl Φ]$_2$
[+masc –pl Φ]$_3$	[+masc +pl Φ]$_4$

Deriving Type-3 Syncretism

	[–m –p ϕ]	[–m +p ϕ]	[+m –p ϕ]	[+m +p ϕ]
	[–p ϕ]	[+p ϕ]	[–p ϕ]	[+p ϕ]
	[ϕ]	[ϕ]	[ϕ]	[ϕ]
	[ ]	[ϕ]	[ϕ]	[ϕ]
	[ ]	[ϕ]	[ϕ]	[ ]
	[ ]:a	[ϕ]:b	[ϕ]:b	[ ]:a

m $\rightarrow$ Ø
p $\rightarrow$ Ø
$\phi \rightarrow$ Ø /[__–m–p]
$\phi \rightarrow$ Ø /[__ +m+p]

a	b
b	a

Added Value of the Analysis

There is a unified criterion for complexity in syncretism

For Pertsova:

- type 0 and type 1 differ by underspecification
- type 1 and type 2 differ by blocking rules
- type 2 and type 3 differ by homonymous lexical entries

Deriving the Markedness of Portmanteaus

Markedness of Portmanteaus

Portmanteau markers are more marked

than singleton affixes

(Wurzel 1989)

Portmanteau Agreement in Swahili (Past)

	V	IV	III	Stem
1sg		ni-	ta-	taka
2sg		u-	ta-	taka
3sg		a-	ta-	taka
1pl		tu-	ta-	taka
2pl		m-	ta-	taka
3pl		wa-	ta-	taka

Positive

1sg	**si-**		ta-	taka
2sg	**ha-**	u-	ta-	taka
3sg	**ha-**	a-	ta-	taka
1pl	**ha-**	tu-	ta-	taka
2pl	**ha-**	m-	ta-	taka
3pl	**ha-**	wa-	ta-	taka

Negative

Portmanteau Agreement in Swahili (Future)

	V	IV	III	Stem
1sg		ni-	li-	taka
2sg		u-	li-	taka
3sg		a-	li-	taka
1pl		tu-	li-	taka
2pl		m-	li-	taka
3pl		wa-	li-	taka

Positive

1sg	**si-**		**ku-**	taka
2sg	**ha-**	u-	**ku-**	taka
3sg	**ha-**	a-	**ku-**	taka
1pl	**ha-**	tu-	**ku-**	taka
2pl	**ha-**	m-	**ku-**	taka
3pl	**ha-**	wa-	**ku-**	taka

Negative

Portmanteaus as Allomorphy + Impoverishment

ha-	ni-

↓

si-	Ø-

- Head_1 has an overt allomorph contextually restricted to Head_2
- Head_2 is deleted by impoverishment contextually restricted to Head_1

(cf. Trommer 2007)

Portmanteaus as Allomorphy + Impoverishment: VIs

ta- ↔ [+Past]
ku- ↔ [+Fut] / [+Neg] ____
li- ↔ [+Fut]

si- ↔ [+1-pl] /____[+Neg]
ni- ↔ [+1-pl]
u- ↔ [+2-pl]
tu- ↔ [+1+pl]

[+Neg] → Ø / ____ [+1-pl]
ha- ↔ [+Neg]

Derivation of *si-ku-taka*, 'I won't want'

[+Neg]	[+1-pl]	[+Fut]	taka			
_____	_____	_____	_____	ta-	↔ [+Past]	
_____	_____	_____	**ku-**taka	ku-	↔ [+Fut]	/ [+Neg] _____
_____	_____	_____	_____	li-	↔ [+Fut]	
_____	_____	_____	**si-**ku-taka	si-	↔ [+1-pl]	/ _____ [+Neg]
_____	_____	_____	_____	ni-	↔ [+1-pl]	
_____	_____	_____	_____	u-	↔ [+2-pl]	
_____	_____	_____	_____	tu-	↔ [+1+pl]	
[~~+Neg~~]	_____	_____	si-ku-taka		[+Neg]	→ Ø/ _____ [+1-pl]
_____	_____	_____	_____	ha-	↔ [+Neg]	

Markedness of Portmanteaus

Portmanteaus are more marked

because they require impoverishment rules

Further Potential Extensions

Generalized Impoverishment can also derive:

- **Aalberse's Generalization:** Person syncretism is systematically sensitive to number, but not vice versa (Aalbberse 2009)
- **The Plural-Dual Asymmetry:** Dual neutralizes frequently to dual, but not vice versa (Nevins 2007)

Summary

- Conceptual simplification of theoretical machinery in DM
- Unified grammar metrics for the Pertsova hierarchy
- Unified grammar metrics for apparently diverse types of morphological markedness

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