

Morphologie: Morphologie der Argumentkodierung

Beschränkungen für Paradigmen

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Background

In Distributed Morphology, paradigms do not exist as genuine objects that, e.g., grammatical constraints can refer to. Rather, paradigms are epiphenomena – essentially, empirical generalizations that need to be derived in some way.

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Constraints on paradigms:

- **The Paradigm Economy Principle** (Carstairs (1987))
- **The No Blur Principle** (Carstairs-McCarthy (1994))
- **The Basic Instantiated Paradigm Principle** (Williams (1994) vs. Bobaljik (2002))
- **Optimal Paradigms** (McCarthy (2003))

The Paradigm Economy Principle

Background question:

What is the largest number of inflection classes (paradigms) which a given array of inflectional resources can be organized into?

(1) **The Paradigm Economy Principle** (Carstairs (1987, 51)):

When in a given language L more than one inflectional realization is available for some bundle or bundles of non-lexically-determined morphosyntactic properties associated with some part of speech N, the number of macroparadigms for N is no greater than the number of distinct “rival” macroinflections available for that bundle which is most generously endowed with such rival realizations.



The number of (macro-) inflection classes does not exceed the greatest number of allomorphs. (In practise, it is often identical to it – however, there can be allomorphic variation within a single (macro-) inflection class, so it does not have to be.)

An Impossible Paradigm

From Carstairs-McCarthy (1998):

(2)

	Class A	Class B	Class C	Class D
Cell 1	a	a	f	f
Cell 2	b	e	e	e
Cell 3	c	c	h	h
Cell 4	d	d	d	g

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- number of inflection classes: 4

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Cell 4	d	d	d	g

- number of inflection classes: 4
- greatest number of allomorphic variation: 2

Hungarian Present Indefinite Verb Inflection

(3)

		Indicative	Subjunctive
Sg	1	ok, ek, ök, om, em, öm	ak, ek am em
	2	(a)sz, (e)sz, ol, el, öl	Ø, ál, él
	3	Ø, ik	on, en, ön, ék
Pl	1	unk, ünk	unk, ünk
	2	(o)tok, (e)tek, (ö)tök	atok, etek
	3	(a)nak, (e)nek	anak, enek

Logical possibility (given complete independence of distribution of markers over (macro-) inflection classes):

276.480 inflection classes.

Actual (macro-) inflection classes: very few. How many exactly?

Some Hungarian Verbs

(4)

Indicative						
		olvasni 'read'	ülni 'sit'	enni 'eat'	érteni 'understand'	írni 'write'
Sg	1	olvas-ok	ül-ök	esz-em	ért-ek	ír-ok
	2	olvas-ol	ül-sz	esz-el	ért-esz	ír-sz
	3	olvas-Ø	ül-Ø	esz-ik	ért-Ø	ír-Ø
Pl	1	olvas-unk	ül-ünk	esz-unk	ért-ünk	ír-unk
	2	olvas-tok	ül-tök	esz-tek	ért-etek	ír-tok
	3	olvas-nak	ül-nek	esz-nek	ért-enek	ír-nak
Subjunctive						
Sg	1	olvas-ak	ülj-ek	egy-em	értj-ek	írj-ak
	2	olvas-Ø/-ál	ülj-Ø/-él	egy-él	értj-Ø/-él	írj-Ø/-ál
	3	olvas-on	ülj-en	egy-ek	értj-en	írj-on
Pl	1	olvas-unk	ülj-ünk	egy-ünk	értj-ünk	írj-unk
	2	olvas-atok	ülj-etek	egy-etek	értj-etek	írj-atok
	3	olvas-anak	ülj-enek	egy-enek	értj-enek	írj-anak

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	3	olvas-Ø	ül-Ø	esz-ik	ért-Ø	ír-Ø
Pl	1	olvas-unk	ül-ünk	esz-unk	ért-ünk	ír-unk
	2	olvas-tok	ül-tök	esz-tek	ért-etek	ír-tok
	3	olvas-nak	ül-nek	esz-nek	ért-enek	ír-nak

Subjunctive						
		olvas-ak	ülj-ek	egy-em	értj-ek	írf-ak
	2	olvas-Ø/-ál	ülj-Ø/-él	egy-él	értj-Ø/-él	írf-Ø/-ál
	3	olvas-on	ülj-en	egy-ek	értj-en	írf-on
Pl	1	olvas-unk	ülj-ünk	egy-ünk	értj-ünk	írf-unk
	2	olvas-atok	ülj-etek	egy-etek	értj-etek	írf-atok
	3	olvas-anak	ülj-enek	egy-enek	értj-enek	írf-anak

Conclusion: Abstracting away from differences that are (morpho-) phonologically predictable, there are only two (macro-) inflection classes: the **normal** conjugation and the **ik** conjugation (each with a back-vowel and a front-vowel version).

Hungarian Present Indefinite Conjugations: Analysis

(5)

		Indicative		Subjunctive	
		normal	ik	normal	ik
Sg	1	ok	om	ak	am
	2	ol (after sibilants) asz (elsewhere)	ol	Ø/ál	Ø/ál
	3	Ø	ik	on	ék
Pl	1	unk	unk	unk	unk
	2	(o)tok	(o)tok	(o)tok	(o)tok
	3	(a)nak	(a)nak	(a)nak	(a)nak

Macro-Paradigms

The Paradigm Economy Principle crucially relies on the notion of macro-paradigm (or macro-inflection class).

(6) **Macro-Paradigm:**

A macro-paradigm consists of:

- a. any two or more similar paradigms whose inflectional differences either can be accounted for phonologically, or else correlate consistently with differences in semantic or lexically determined syntactic properties (like gender);
or
- b. any paradigm which cannot be thus combined with other paradigm(s).

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Problem:

- Without a concept like that of a macro-paradigm, the Paradigm Economy Principle would be much too restrictive; it would exclude many of the attested inflection patterns in languages with inflection classes.
- However, assuming such a liberal notion of macro-paradigm takes away much of the Paradigm Economy Principle's predictive power; there is a constant danger of rendering this constraint on paradigms vacuous.

German Noun Inflection: The System

(7)

	I: masc, neut Hund_m ('dog'), Schaf_n ('sheep')	II: masc Baum_m ('tree')	III: neut, masc Buch_n ('book'), Mann_m ('man')	IV: masc, neut Strahl_m ('ray') Auge_n ('eye')
nom/sg	∅	∅	∅	∅
acc/sg	∅	∅	∅	∅
dat/sg	∅	∅	∅	∅
gen/sg	(e)s	(e)s	(e)s	(e)s
nom/pl	(e)	"(e)	"er	(e)n
acc/pl	(e)	"(e)	"er	(e)n
dat/pl	(e)n	"(e)n	"ern	(e)n
gen/pl	(e)	"(e)	"er	(e)n

	V: masc ('weak') Planet_m ('planet')	VI: fem Ziege_f ('goat')	VII: fem Maus_f ('mouse')	VIII: fem Drangsal_f ('distress')
nom/sg	∅	∅	∅	∅
acc/sg	(e)n	∅	∅	∅
dat/sg	(e)n	∅	∅	∅
gen/sg	(e)n	∅	∅	∅
nom/pl	(e)n	(e)n	"(e)	(e)
acc/pl	(e)n	(e)n	"(e)	(e)
dat/pl	(e)n	(e)n	"(e)n	(e)n
gen/pl	(e)n	(e)n	"(e)	(e)

German Noun Inflection and Paradigm Economy

The classification in (7) is that of Alexiadou & Müller (2005), but there is a similar taxonomy of inflection classes in Carstairs (1986, 8). (Carstairs actually has 14 inflection classes, including ones with /s/ as a plural marker.)

Observation:

The greatest number of allomorphic variation is 4 (nom/acc/gen plural; 5 if /s/ is included).

Conclusion:

There can at most be 4 (5) macro-inflection classes.

(8) Macro-inflection classes for German noun declension:

- a. III (/er/-plural)
- b. V (weak masculines)
- c. IV/VI (/en/-plural; gen/sg /s/ for masc/neut; gen/sg Ø for fem)
- d. II/VII (/e/-plural; gen/sg /s/ for masc/neut; gen/sg Ø for fem)
- e. I/VIII (/e/-plural; gen/sg /s/ for masc/neut; gen/sg Ø for fem)

Problem: It seems that (8-de) must be combined into a single macroclass, with Umlaut accounted for independently ('phonologically'). Carstairs (1987, 58): Stem allomorphy does indeed not give rise to different macro-inflection classes (there is "a distinction between affixal and non-affixal inflection").

Russian Noun Inflection

(9) Singular

	I _m	II _{f,m}	III _f	IV _n
nom/sg	∅	a	∅	o
acc/sg	∅/a	u	∅	o
dat/sg	u	e	i	u
gen/sg	a	i	i	a
inst/sg	om	oj	ju	om
loc/sg	e	e	i	e

Plural

	I _m	II _{f,m}	III _f	IV _n
nom/pl	y	y	i	a
acc/pl	y/ov	y/∅	i/ej	a/∅
dat/pl	am	am	jam	am
gen/pl	ov	∅	ej	∅
inst/pl	ami	ami	jami	ami
loc/pl	ax	ax	jax	ax

Problem:

- 1 If the [acc ← gen] animacy effect with class I noun stems and all plural noun stems gives rise to different inflection classes in each case, the number of inflection classes would have to be 8.
- 2 However, the greatest number of allomorphic variation is 4 (accusative singular).

Russian Noun Inflection

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	I _m	II _{f,m}	III _f	IV _n
nom/sg	∅	a	∅	o
acc/sg	∅/a	u	∅	o
dat/sg	u	e	i	u
gen/sg	a	i	i	a
inst/sg	om	oj	ju	om
loc/sg	e	e	i	e

Plural

	I _m	II _{f,m}	III _f	IV _n
nom/pl	y	y	i	a
acc/pl	y/ov	y/∅	i/ej	a/∅
dat/pl	am	am	jam	am
gen/pl	ov	∅	ej	∅
inst/pl	ami	ami	jami	ami
loc/pl	ax	ax	jax	ax

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- 1 If the [acc ← gen] animacy effect with class I noun stems and all plural noun stems gives rise to different inflection classes in each case, the number of inflection classes would have to be 8.
- 2 However, the greatest number of allomorphic variation is 4 (accusative singular).

Solution:

- The variation in acc/sg (class 1) and acc/pl (all classes) contexts correlates consistently with differences in semantic properties (**animacy**), and is thus predictable: 8 → 4.
- The differences between class 1 and class 4 are also predictable on the basis of **gender**: 4 → 3.
- Thus, there are only three macro-inflection classes in Russian noun declension.

The No Blur Principle

Background:

The No Blur Principle is proposed in Carstairs-McCarthy (1994) as a successor to his earlier Paradigm Economy Principle.

- (10) **The No Blur Principle** (Carstairs-McCarthy (1994, 742)):
Within any set of competing inflectional realizations for the same paradigmatic cell, no more than one can fail to identify inflection class unambiguously.

Underlying idea:

There is typically one **elsewhere marker** that is not specified for inflection class, but no more than that.

Note:

Just like the Paradigm Economy Principle, the No Blur Principle precludes the **constant re-use** of inflectional material in various inflection classes. (Comment: However, this is exactly what seems to happen in inflectional systems of various types, again and again. Moreover, No Blur, at least as a tendency, is in conflict with the existence of **trans-paradigmatic syncretism**.)

No Blur and Strong Feminine Declensions in Icelandic

(11) Strong feminine inflection classes

	Fa <i>vél</i> ('ma- (chine)')	Fa' <i>drottning</i> (‘queen’)	Fi <i>mynd</i> (‘picture’)	Fc1 <i>geit</i> (‘goat’)	Fc2 <i>vík</i> (‘bay’)
nom sg	<i>vél-∅</i>	<i>drottning-∅</i>	<i>mynd-∅</i>	<i>geit-∅</i>	<i>vík-∅</i>
acc sg	<i>vél-∅</i>	<i>drottning-u</i>	<i>mynd-∅</i>	<i>geit-∅</i>	<i>vík-∅</i>
dat sg	<i>vél-∅</i>	<i>drottning-u</i>	<i>mynd-∅</i>	<i>geit-∅</i>	<i>vík-∅</i>
gen sg	<i>vél-ar</i>	<i>drottning-ar</i>	<i>mynd-ar</i>	<i>geit-ar</i>	<i>vík-ur</i>
nom pl	<i>vél-ar</i>	<i>drottning-ar</i>	<i>mynd-ir</i>	<i>geit-ur</i>	<i>vík-ur</i>
acc pl	<i>vél-ar</i>	<i>drottning-ar</i>	<i>mynd-ir</i>	<i>geit-ur</i>	<i>vík-ur</i>
dat pl	<i>vél-um</i>	<i>drottning-um</i>	<i>mynd-um</i>	<i>geit-um</i>	<i>vík-um</i>
gen pl	<i>vél-a</i>	<i>drottning-a</i>	<i>mynd-a</i>	<i>geit-a</i>	<i>vík-a</i>

Analysis (Carstairs-McCarthy (1994, 740-742)):

- Genitive singular and nominative plural are the **leading forms** (cf. Wurzel (1987)).
- Markers for gen/sg: /ur/ ↔ gen/sg, class Fc2; /ar/ ↔ gen/sg.
- Markers for nom/pl: /ar/ ↔ nom/pl, class Fa; /ir/ ↔ nom/pl, class Fi; /ur/ ↔ nom/pl

The Complete System of Icelandic Noun Declension

Problem:

If nothing else is said, the No Blur Principle makes wrong predictions if the complete system of Icelandic noun declension is taken in to account: In both gen/sg and nom/pl contexts, there is more than one marker that fails to unambiguously identify inflection class.

(12) **All inflection classes** (Kress (1982), Müller (2005)):

	1 Ma	2 Na	3 Fa(')	4 Mi	5 Fi	6 Mu	7 Mc	8 Fc1	9 Fc2	10 Mw	11 Nw	12 Fw
nom sg	ur	∅	∅	ur	∅	ur	ur	∅	∅	i	a	a
acc sg	∅	∅	∅ (u)	∅	∅	∅	∅	∅	∅	a	a	u
dat sg	i	i	∅ (u)	∅	∅	i	i	∅	∅	a	a	u
gen sg	s	s	ar	ar	ar	ar	ar	ar	ur	a	a	u
nom pl	ar	∅	ar	ir	ir	ir	ur	ur	ur	ar	u	ur
acc pl	a	∅	ar	i	ir	i	ur	ur	ur	a	u	ur
dat pl	um	um	um	um	um	um	um	um	um	um	um	um
gen pl	a	a	a	a	a	a	a	a	a	a	(n)a	(n)a

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nom sg	ur	∅	∅	ur	∅	ur	ur	∅	∅	i	a	a
acc sg	∅	∅	∅ (u)	∅	∅	∅	∅	∅	∅	a	a	u
dat sg	i	i	∅ (u)	∅	∅	i	i	∅	∅	a	a	u
gen sg	s	s	ar	ar	ar	ar	ar	ar	ur	a	a	u
nom pl	ar	∅	ar	ir	ir	ir	ur	ur	ur	ar	u	ur
acc pl	a	∅	ar	i	ir	i	ur	ur	ur	a	u	ur
dat pl	um	um	um	um	um	um	um	um	um	um	um	um
gen pl	a	a	a	a	a	a	a	a	a	a	(n)a	(n)a

Solution:

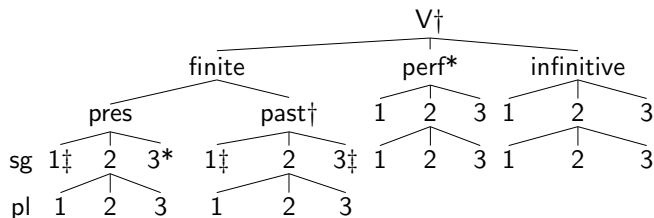
- No Blur holds only for a set of inflection classes of the same **gender**.
- However, this still does not seem to suffice: In masculine nom/pl contexts, neither /ar/ (Ma, Mw) nor /ir/ (Mi, Mu) unambiguously identifies inflection class.

The Basic Instantiated Paradigm Principle

Background (Williams (1994)):

Paradigms are real objects, but they are considerably more abstract than is traditionally assumed.

(13)



Entry points (points to which actual forms are assigned):

- † = modals
- †* = regular; go-went
- †† = be
- have, says, does – irregular in 3.sg.: *haves

The Constraint

- (14) **The Basic Instantiated Paradigm Principle** (Williams (1994, 27)):
When there are multiple related paradigms, there will be one instantiated paradigm, and all others will have its syncretic structure, and perhaps some more. But no other related paradigm will have a contrary syncretic structure, making distinctions where that one does not. We will call that one paradigm the basic paradigm.

Note:

In English verb inflection, the paradigm of *be* is the basic instantiated paradigm.

A Problem

Bobaljik (2002): There are inflectional systems where there simply is no basic instantiated paradigm that makes all the distinctions that other paradigms make, with no other paradigm instantiating contrary syncretic structure.

Example: Russian noun declension.

(15) Singular

	I _m	II _{f,m}	III _f	IV _n
nom/sg	∅	a	∅	o
acc/sg	∅/a	u	∅	o
dat/sg	u	e	i	u
gen/sg	a	i	i	a
inst/sg	om	oj	ju	om
loc/sg	e	e	i	e

Plural

	I _m	II _{f,m}	III _f	IV _n
nom/pl	y	y	i	a
acc/pl	y/ov	y/∅	i/ej	a/∅
dat/pl	am	am	jam	am
gen/pl	ov	∅	ej	∅
inst/pl	ami	ami	jami	ami
loc/pl	ax	ax	jax	ax

The paradigm for the feminine /a/-declension (class 2) comes closest, but its dative/locative syncretism – /e/ – is resolved in the masculine/neuter declension.

References

- Alexiadou, Artemis & Gereon Müller (2005): Class Features as Probes. Ms., Universität Stuttgart and Universität Leipzig. To appear in Asaf Bachrach and Andrew Nevins (eds.), *The Bases of Inflectional Identity*. Oxford University Press.
- Bobaljik, Jonathan (2002): Syncretism without Paradigms: Remarks on Williams 1981, 1994. In: G. Booij & J. van Marle, eds., *Yearbook of Morphology 2001*. Kluwer, Dordrecht, pp. 53–85.
- Carstairs, Andrew (1986): Macroclasses and Paradigm Economy in German Nouns, *Zeitschrift für Phonetik, Sprachwissenschaft und Kommunikationsforschung* 39, 3–11.
- Carstairs, Andrew (1987): *Allomorphy in Inflection*. Croom Helm, London.
- Carstairs-McCarthy, Andrew (1994): Inflection Classes, Gender, and the Principle of Contrast, *Language* 70, 737–787.
- Carstairs-McCarthy, Andrew (1998): Paradigm Structure: Inflectional Paradigms and Morphological Classes. In: A. Spencer & A. Zwicky, eds., *Handbook of Morphology*. Blackwell, Oxford, pp. 322–334.
- Kress, Bruno (1982): *Isländische Grammatik*. 1 edn, VEB Verlag Enzyklopädie, Leipzig.
- McCarthy, John (2003): Optimal Paradigms. Ms., University of Massachusetts, Amherst. Available from ROA: <http://roa.rutgers.edu>.
- Müller, Gereon (2005): Syncretism and Iconicity in Icelandic Noun Declensions: A Distributed Morphology Approach. In: G. Booij & J. van Marle, eds., *Yearbook of Morphology 2004*. Springer, Dordrecht, pp. 229–271.
- Williams, Edwin (1994): Remarks on Lexical Knowledge, *Lingua* 92, 7–34.
- Wurzel, Wolfgang Ullrich (1987): Paradigmenstrukturbedingungen: Aufbau und Veränderung von Flexionsparadigmen. In: W. U. Wurzel, ed., *Studien zur Morphologie und Phonologie II*. Number 156 in 'Linguistische Studien, Reihe A: Arbeitsberichte', Akademie der Wissenschaften der DDR, Zentralinstitut für Sprachwissenschaft, Berlin, pp. 135–155.