Theorien der Morphologie 10

Modul 006-1006: Grammatiktheorie, SoSe 2019

Di, 11:15–12:45, HSG, HS 20

Impoverishment by Optimality Theory

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Topics:
Differential Marking and Three-Way Systems as Morphological Allomorphy

Ref.: Aissen (2003), Keine & Müller (2011; 2014), Müller & Thomas (2014)

1. Background

Strategy:
Against the background of the structure of grammar assumed in Distributed Morphology, Optimality Theory could in principle be relevant in three relevant domains:

[1] Syntax

[2] Syntax/Morphology Interface: Post-syntactic morphological operations that precede vocabulary insertion (i.e., that precede genuine morphological exponence)

[3] Morphology: Morphological exponence by vocabulary insertion

[1] is not the topic of this course.
[2] is the more conservative view: Optimality Theory as a theory of interfaces. (See, e.g., Pesetsky (1997; 1998) for this position.)
[3] is the more radical view: Optimality Theory directly covers morphological realization (plus, typically, what is otherwise handled in [2].)

Note:
I will address [2] in the present lecture; the rest of the course then focusses on [3].

Claims:

- Differential argument encoding should be analyzed as a purely morphological phenomenon that is based on selective post-syntactic case feature deletion.
- Three-way case systems should be analyzed as a purely morphological phenomenon that is based on selective post-syntactic case feature deletion.
- Post-syntactic case feature deletion is brought about by optimization procedures rather than by impoverishment rules: The latter would have to refer to unnatural classes.

2. Optimality Theory

Optimality Theory (OT) has been developed since the early nineties, by Alan Prince, Paul Smolensky, John McCarthy and others. At first, the focus was mainly on phonology; but the approach has since been extended to morphology, syntax, semantics, and pragmatics. The most comprehensive (and best) exposition of the theory is still Prince & Smolensky (1993; 2004).

(1) *Basic assumptions of Optimality Theory*:
   a. *Universality*:
   Constraints are universal.
   b. *Violability*:
   Constraints are violable.
   c. *Ranking*:
   Constraints are ranked.
   d. *Competition*:
   The wellformedness of a linguistic expression LE cannot solely be determined on the basis of LE's internal properties. Rather, external factors (more precisely, the competition of LE with other linguistic expressions) determine whether LE is grammatical or not. LEs are *candidates*.

Note:
LE stands for a grammatical unit that is subject to an optimization procedure deciding on its wellformedness. LE is the basic unit of a grammatical domain (phonology, morphology, syntax, semantics).

(2) *Optimality*:
A candidate C_i is optimal with respect to some constraint ranking $<Con_1 \gg Con_2 \gg ... \gg Con_n>$ iff there is no other candidate C_j in the same *candidate set* that has a better *constraint profile*.

(3) *Constraint profile*:
C_j has a better constraint profile than C_i if there is a constraint Con_k such that (i) and (ii) hold:
   a. C_j satisfies C_k better than Con_i.
   b. There is no constraint Con_l that is ranked higher than Con_k, and for which C_i and C_j differ.

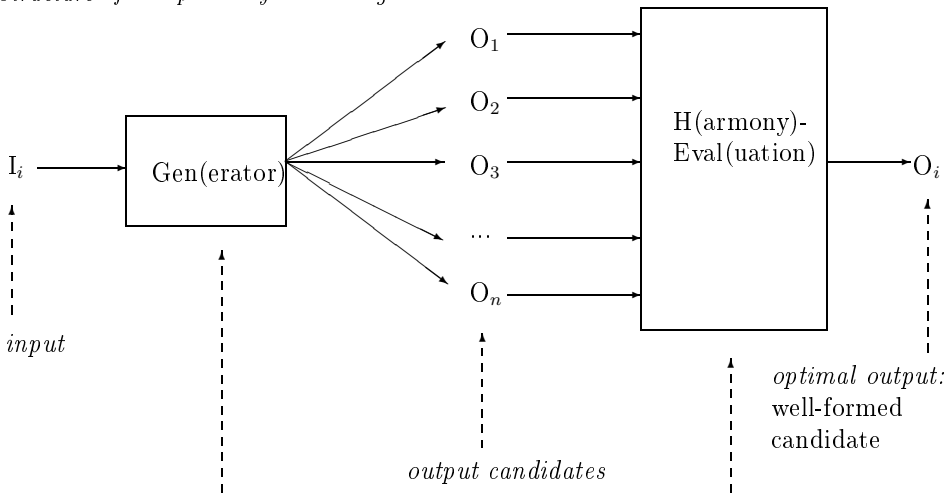
Note:
C_j satisfies a constraint Con better than C_i if C_j violates Con less often than C_i. (This includes the case where C_j does not violate Con at all, whereas C_i does.)

(4) *Candidate set*:
Two candidates are in the same candidate set iff they go back to the same *input* ('underlying representation').

(5) *Types of constraints*:
Standardly, two basic types of H-Eval constraints can be distinguished that often give rise to conflicts:

- *Faithfulness constraints* demand that input and output are identical with respect to some property

Structure of an optimality-theoretic grammar



part (i) of the grammar:
inviolable, unordered constraints; simple standard grammar

part (ii) of the grammar:
violable, ranked, universal constraints; genuine OT grammar

–DEP: no addition of items in the output.

–MAX: no deletion of items in the output.

–IDENT: no change of items in the output:

- *Markedness constraints* impose requirements on outputs that may necessitate a deviation from the input.

Note:
Optimality-theoretic competitions are often illustrated by tables, so-called *tableaux*.

(6) *The basic principle*

	A	B	C
☞ O_1			*
O_2			**!
O_3		*!	
O_4	*!		
O_5		*!	*

Generalization:
The optimal output is the candidate that has its first star furthest to the right in a tableau.

(7) *Cross-linguistic variation*:
Assumption: Languages differ with respect to their grammars. Grammatical differences between languages = parametrization. Parametrization in optimality theory: *constraint reranking*.

(8) *Parametrization*

	A	C	B
O_1		*!	
O_2		**!	
☞ O_3			*
O_4	*!		
O_5		*!	*

Note:
Optimality theory was developed out of so-called "Harmonic Grammar" approaches → theory of neural networks. (Further reading: Prince & Smolensky (2004, ch. 10), Smolensky & Legendre (2006, part I). I will come back to Harmonic Grammar at the end of the course.)
Main innovation: Quality before quantity; no number of violations of a lower-ranked constraint can outweigh a single violation of a higher-ranked constraint. This property is also known as *strict domination*.

(9) *Irrelevance of constraint violation numbers as such*

	A	B	C
☞ O_1			****
O_2			*****!**
O_3		*!	
O_4	*!		
O_5		*!	*

Caveat:
OT has introduced a means to undermine the irrelevance of constraint violation quantity as such: *(reflexive) local conjunction* (see Smolensky (1996; 2006); and Legendre et al. (1998), Fischer (2001), Aissen (1999; 2002), Keine (2009), and Keine & Müller (2011; 2014) for some syntactic applications of local conjunction).

(10) *Local Conjunction*:

a. Local conjunction of two constraints Con_1, Con_2 with respect to a local domain D yields a new constraint $Con_1\&_DCon_2$ that is violated iff there are two separate violations of Con_1 and Con_2 in a single domain D.
b. Universal ranking: $Con_1\&_DCon_2 \gg \{Con_1, Con_2\}$
c. If $Con_1 = Con_2$, local conjunction is reflexive.
d. Notation: $B^2 = B\&B$, $B^3 = B^2\&B$, etc.

(11) *A consequence of reflexive local conjunction*

	C^4	A	B	C
O_1	*!			****
O_2	*!			*******
☞ O_3			*	
O_4		*!		
O_5			*!	*

3. Differential Marking

3.1. Harmonic Alignment

(12) *Harmonic Alignment* (Prince & Smolensky (2004)):
Suppose given a binary dimension D_1 with a scale X > Y on its elements {X,Y}, and another dimension D_2 with a scale a > b > ... > z on its elements {a,b,...,z}. The *harmonic alignment* of D_1 and D_2 is the pair of Harmony scales H_X, H_Y:

a. H_X: X/a ≻ X/b ≻ ... ≻ X/z
b. H_Y: Y/z ≻ ... ≻ Y/b ≻ Y/a

The *constraint alignment* is the pair of constraint hierarchies C_X, C_Y:

a. C_X: *X/z ≫ ... ≫ *X/b ≫ *X/a
b. C_Y: *Y/a ≫ *Y/b ≫ ... ≫ *Y/z

Proposal (Aissen (1999; 2003)):
By combining (i) *harmonic alignment* applied to the scales identified by Hale (1972) and Silverstein (1976) as in (13) and (ii) *local conjunction* with markedness constraints in an OT grammar, alternations between zero and non-zero exponence can be derived (differential subject marking, differential object marking).

(13) *Scales*:

a. *GF scale* (basic):
Subject > Object
("Subject" = "specifier of vP", object = "complement of V": Chomsky (1965; 2001))
b. *θ scale*:
Agent > Patient
c. *Person scale*:
Local Pers. (1,2) > 3. Pers.
d. *Prominence scale*:
X > x (discourse-prominent argument > non-discourse-prominent argument)
e. *Animacy scale*:
Hum(an) > Anim(ate) > Inan(imate)
f. *Definiteness scale*:
Pro(noun) > Name (PN) > Def(inite) > Indefinite Specific (Spec) > NonSpecific (NSpec)

(14) *Markedness constraints*:

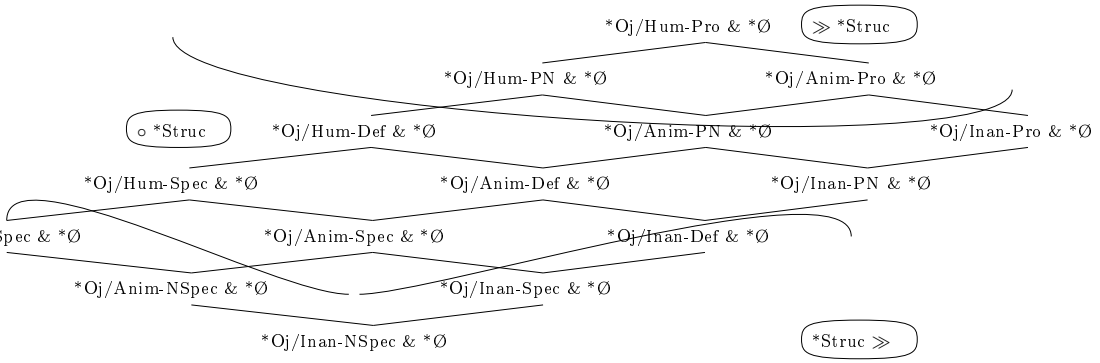
a. *$Ø_C$ (Star-Zero(Case)): (*is conjoined with a hierarchy of constraints*)
"penalizes the absence of a value for the feature Case"
b. *$\textsc{Struc}_C$ (Star-Structure(Case)): (*is <u>not</u> conjoined with a hierarchy of constraints*)
"penalizes a value for the morphological category Case"

(15) *A consequence for differential object marking*:

← *$\textsc{Struc}_C$ Kalkatungu: no objects case-marked
*Obj/Pro & *$Ø_C$ ≫
← *$\textsc{Struc}_C$ Catalan: only pronominal objects case-marked
*Obj/PN & *$Ø_C$ ≫
← *$\textsc{Struc}_C$ Pitjantjatjara: only pronominal and PN objects case-marked
*Obj/Def & *$Ø_C$ ≫
← *$\textsc{Struc}_C$ Hebrew: only pronominal, PN, and definite objects case-marked
*Obj/Spec & *$Ø_C$ ≫
← *$\textsc{Struc}_C$ Turkish: all objects case-marked except non-specific objects
*Obj/NSpec & *$Ø_C$
← *$\textsc{Struc}_C$ Written Japanese: all objects case-marked

3.2. Two-Dimensional Differential Object Marking

(16) *DOM in El Cid Spanish*:



3.3. Problem

Problem:
Aissen's approach only permits yes/no decisions concerning morphological marking. This does not take into account the possibility that there might be *degrees* of morphological marking: iconicity.

Proposal:
Differential argument encoding results from harmonic alignment of scales, but it is a purely *morphological* phenomenon, not a *syntactic* phenomenon (as assumed in Aissen (1999; 2003)).

3.4. Impoverishment

Impoverishment Rules
(i) Impoverishment rules are a fundamental concept of Distributed Morphology. They are deletion transformations that remove morpho-syntactic features (which need to be realized

by morhological exponents in a post-syntactic morphological component) before marker (= vocabulary item) insertion takes place (see Bonet (1991), Noyer (1998), Halle & Marantz (1993; 1994), Bobaljik (2002), Frampton (2002)). As a consequence of impoverishment, inflectional morphology applies to reduced feature matrices, and there is a *retreat to the general case*: a less specific marker is inserted than would otherwise be expected.
(ii) Impoverishment can be viewed as insertion of highly specific zero exponents (see Trommer (1999)).
(iii) Impoverishment can be viewed as being triggered by general filters blocking the co-occurrence of features (Noyer (1992)), or by interacting optimality-theoretic constraints with the same effect (Grimshaw (2001), Kiparsky (2001), Trommer (2001; 2006), Wunderlich (2004), Lahne (2007), Opitz (2007)).

Observation:
Aissen's analyses can be reanalyzed in terms of impoverishment:
(i) As before, impoverishment is a post-syntactic operation that deletes morpho-syntactic features.
(ii) Deletion applies so as to satisfy complex faithfulness constraints created by harmonic alignment of scales.
(iii) On this view, impoverishment is essentially functionally motivated.

3.5. Iconicity

Background assumption:
Syncretism is derived by *underspecification* of exponents with respect to morpho-syntactic features (which may be more abstract than is motivated by syntactic considerations – e.g., [±obj], [±obl] as more primitive, decomposed case features whose cross-classification yields the four cases of German, with underspecification capturing natural classes of cases).

Observation (Wiese (1999; 2003; 2004)):
Iconicity holds of inflectional systems.

(17) *Iconicity Meta-Principle*:
Similarity of form implies similarity of function (within a certain domain, and unless there is evidence to the contrary).

Remarks:
(i) Similarity of form: phonological properties (size of exponents, sonority of exponents)
(ii) Similarity of function: *underspecified* features associated with an exponent (and matched against fully specified feature matrices). (Note: This is where Wiese's proposal involves a radical break with the tradition, where iconicity is measured based on fully specified forms (Plank (1979), Wurzel (1984)) – but then, it does not work.)
(iii) There is a feature hierarchy: [+masc] > [+obl] > [+fem] > [+gov]. Rules that involve [+masc] are more specific than rules that don't; etc.

(18) *Wiese (1999) on determiner inflection in German*

a. (i) /m/ ↔ [+masc,+obl,+gov] (Dat.Masc.Sg./Neut.Sg.)
(ii) /s/ ↔ [+masc,+obl] (Gen.Masc.Sg./Neut.Sg.)
(iii) /s/ ↔ [+masc,+fem] (Nom./Acc.Neut.Sg.)

b. (i) /n/ ↔ [+masc,+gov] (Acc.Masc.Sg.)
(ii) /r/ ↔ [+masc] (Nom.Masc.Sg.)
(iii) /r/ ↔ [+obl,+fem] (Dat./Gen.Fem.Sg.)
(iv) /n/ ↔ [+obl,+gov] (Dat.Pl.)
(v) /r/ ↔ [+obl] (Gen.Pl.)

c. (i) /e/ ↔ [ ] (Nom./Acc.Fem.Sg./Pl.)

Conclusion:
This *abstract*, highly theory-dependent concept of iconicity (which only works once underspecification of exponents is postulated) is a recurring feature of inflectional systems (see, e.g., Müller (2004; 2005; 2007), Georgi (2008), Opitz (2006)).

3.6. Proposal

Suggestion:
(i) Differential marking is not necessarily a categorical yes/no phenomenon; rather, it can be gradient phenomenon.
(ii) Differential marking is brought about by impoverishment. Impoverishment consists of post-syntactic deletion of morpho-syntactic features, triggered by faithfulness constraints derived from harmonic alignment of scales.
(iii) Impoverishment requires insertion of a less specific marker. It may lead to zero exponence winning (/Ø/ is often the elsewhere marker), but it may also lead to a selection of other markers that instantiate a "retreat to the general case", and that are formally closer to zero exponence than the marker that would otherwise be expected (iconicity).

Basic assumptions:
(i) The organization of grammar is as assumed in Distributed Morphology: Syntax precedes inflectional morphology; and syntactic structures can be manipulated before morphological realization ('vocabulary insertion') takes place.
(ii) The only crucial difference is that impoverishment is brought about not by specific rules, but by a system of conflicting constraints (Grimshaw (2001), Kiparsky (2001), Trommer (2001; 2006), Wunderlich (2004), Lahne (2007), Opitz (2007)).

(19) *Late vocabulary insertion* (Halle & Marantz (1993)):

a. Functional morphemes contain fully specified bundles of morpho-syntactic features in syntax; however, they do not yet contain phonological material.
b. Inflection markers are vocabulary items that pair phonological and (often underspecified) morpho-syntactic features; they are inserted post-syntactically in accordance with the Subset Principle.

(20) *Subset Principle* (Halle (1997)):
A vocabulary item V is inserted into a functional morpheme M iff (i) and (ii) hold:
(i) The morpho-syntactic features of V are a subset of the morpho-syntactic features of M.
(ii) V is the most specific vocabulary item that satisfies (i).

(21) *Specificity of vocabulary items* (Lumsden (1992), Noyer (1992), Wiese (1999)):
A vocabulary item V_i is more specific than a vocabulary item V_j iff there is a class of features F such that (i) and (ii) hold.

(i) V_i bears more features belonging to F than V_j does.
(ii) There is no higher-ranked class of features F′ such that V_i and V_j have a different number of features in F′.

(22) *Impoverishment* (Grimshaw (2001), Kiparsky (2001), Trommer (2001; 2006), Wunderlich (2004), Opitz (2007)):
a. Syntactic structures (inputs) are mapped onto structures that serve as the input to vocabulary insertion (outputs).
b. This mapping is subject to optimization (Prince & Smolensky (2004)).
c. Markedness constraints may force feature deletion, in minimal violation of faithfulness (MAX) constraints.
d. Vocabulary insertion may face an impoverished structure.

3.7. Case Studies

3.7.1. Two-Dimensional Differential Object Marking in Mannheim German

Observation:

- In all varieties of German, feminine, neuter and plural DPs are morphologically indistinguishable in nominative and accusative environments.
- In the substandard variety of Mannheim German (and elsewhere in Palatine and Rhine areas), the same holds for non-pronominal masculine DPs, in contrast to what is the case in Standard German. ("Rheinischer Akkusativ"; Behaghel (1911), Bräutigam (1934), Karch (1975a;b), Post (1990), Müller (2003), Keine (2010)).

(23) *Nominative/accusative syncretism in masculine DPs in Mannheim German*:
a. Ich wünsch Ihnen [DP ein-Ø schön-er Tag] noch
I wish you.DAT a-ACC nice-ACC day PRT
b. Wir haben [DP pädagogisch-er Planungstag]
we have pedagocial-ACC planning day
c. Ich hab auch [DP ein-Ø schön-er Ball], meinst du, bloß du hast [DP ein-er] ?
I have also a-ACC nice-ACC ball, think you, just you have a-ACC
d. Man müsste mal wieder so richtig [DP einer] drauf machen
one should PRT again PRT really one-ACC on it make
'We should really have a night on the town again.'
e. Hol mir mal [DP der Eimer]
fetch me PRT the-ACC bucket

Note:
There are two exceptions, which gives rise to differential object marking.

(24) *I. Pronouns*: *-n vs. r* (Keine & Müller (2011; 2014)):
Hol [DP en/*er] mir mal her
fetch him-ACC/*he-ACC me-DAT PRT PRT

(25) *II. Definite human referents* (Kalin (2016), based on Philipp Weisser (p.c.) & Müller (2003)):
a. Du hast [DP den/*der Mann] gesehen
you have the-ACC/*the-ACC man seen

b. Die find' [DP kein-Ø anderer Mann]
she.DEM finds no-ACC other-ACC man

Side remark:
There is substantial variation with respect to differential object marking in Mannheim German. Evidence from spoken language corpora suggests that speakers who employ the Rheinischer Akkusativ regularly also employ the Standard German forms; e.g., Karch (1975a) documents two cases where a single speaker switches between the two options within a single recording, with no obvious systematic difference of linguistic context.

(26) *Variation within speakers*:
a. Dann mach ich [DP mein-Ø Spaziergang]
then make I my-ACC walk
b. Nachher hat man ja [DP den Parkring]
afterwards has one PRT the-ACC park ring road
c. [DP Ein-Ø großer Raum in unserer Versorgung] spielt die Jugendarbeit
a_{acc} great room in our logistics plays the streetwork
d. Er muss [DP den Aufbau der Photographie] erlernen
he must the-ACC structure of the photography learn

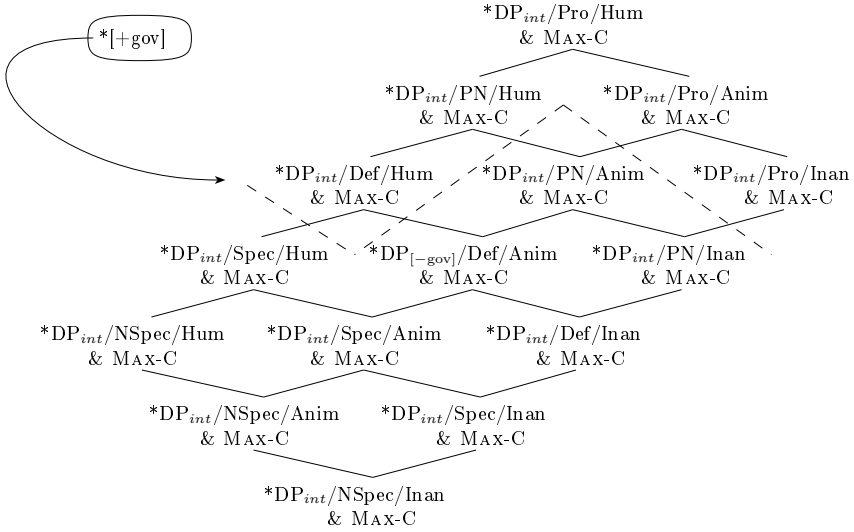
(27) *Harmonic alignment of animacy and definiteness scales*:
a. *DP_{int}/Hum ≫ *DP_{int}/Anim ≫ *DP_{int}/Inan
b. *DP_{int}/Pro ≫ *DP_{int}/PN ≫ *DP_{int}/Def ≫ *DP_{int}/Spec ≫ *DP_{int}/NSpec

Two-dimensional local conjunction of two hierarchies (Aissen (2003)):
Each constraint of one hierarchy is locally conjoined with each constraint of the other hierarchy, preserving original orders.

Notational convention (Aissen (2003)):
*DP_{int}/Hum/Pro = *DP_{int}/Hum &$_{XP}$ *DP_{int}/Pro

(28) *Two-dimensional local conjunction*:
a. (i) *DP_{int}/Pro/Hum ≫ *DP_{int}/PN/Hum ≫ *DP_{int}/Def/Hum ≫ *DP_{int}/Spec/Hum ≫ *DP_{int}/NSpec/Hum
(ii) *DP_{int}/Pro/Anim ≫ *DP_{int}/PN/Anim ≫ *DP_{int}/Def/Anim ≫ *DP_{int}/Spec/Anim ≫ *DP_{int}/NSpec/Anim
(iii) *DP_{int}/Pro/Inan ≫ *DP_{int}/PN/Inan ≫ *DP_{int}/Def/Inan ≫ *DP_{int}/Spec/Inan ≫ *DP_{int}/NSpec/Inan
b. (i) *DP_{int}/Pro/Hum ≫ *DP_{int}/Pro/Anim ≫ *DP_{int}/Pro/Inan
(ii) *DP_{int}/PN/Hum ≫ *DP_{int}/PN/Anim ≫ *DP_{int}/PN/Inan
(iii) *DP_{int}/Def/Hum ≫ *DP_{int}/Def/Anim ≫ *DP_{int}/Def/Inan
(iv) *DP_{int}/Spec/Hum ≫ *DP_{int}/Spec/Anim ≫ *DP_{int}/Spec/Inan
(v) *DP_{int}/NSpec/Hum ≫ *DP_{int}/NSpec/Anim ≫ *DP_{int}/NSpec/Inan

(29) *Two-dimensional differential object marking in Mannheim German*



(30) *Sample optimization I: deletion of [+gov]*:

I: DP$_{int}$:[+masc,−def, +hum,+gov,−obl]	*DP$_{int}$/Def/Hum & MAX-C	*[+gov]	*DP$_{int}$/Spec/Hum & MAX-C	*DP$_{int}$/Def/Anim & MAX-C
☞O$_1$: DP$_{int}$[−obl]			*	
O$_2$: DP$_{int}$[+gov,−obl]		*!		

(31) *Sample optimization II: preservation of [+gov]*:

I: DP$_{int}$:[+masc,+def, +hum,+gov,−obl]	*DP$_{int}$/Def/Hum & MAX-C	*[+gov]	*DP$_{int}$/Spec/Hum & MAX-C	*DP$_{int}$/Def/Anim & MAX-C
O$_1$: DP$_{int}$[−obl]	*!			
☞O$_2$: DP$_{int}$[+gov,−obl]		*		

(32) *Masculine exponents for structural case in German*:

a. *-n* → [+masc,+gov,−obl]
b. *-r* → [+masc,−obl]

(33) *Rule-based impoverishment is not a viable alternative*

a. [+gov] → ∅ / DP$_{[+hum,-def]}$__
b. [+gov] → ∅ / DP$_{[-hum,-pro]}$__

Against impoverishment:

1. Impoverishment cannot derive the implicational generalizations that hold with differential argument encoding.
2. The contexts in which case feature deletion takes place in Mannheim German do not form a natural class that can be referred to by a single impoverishment rule.
3. The contexts in which deletion occurs do form a natural class in the OT approach: It is defined as being dominated by the markedness constraint *[+gov].

(34) *How local conjunction derives cumulative effects*:

a. (i) *DP$_{int}$/Def is ranked below *[+gov].
   (ii) MAX-C is ranked below *[+gov].
   (iii) *DP$_{int}$/Def &$_{XP}$ MAX-C is ranked below *[+gov].
b. (i) *DP$_{int}$/Hum is ranked below *[+gov].
   (ii) MAX-C is ranked below *[+gov].
   (iii) *DP$_{int}$/Hum &$_{XP}$ MAX-C is ranked below *[+gov].
c. (i) *DP$_{int}$/Def &$_{XP}$ *DP$_{int}$/Hum is ranked below *[+gov].
   (ii) MAX-C is ranked below *[+gov].
d. *DP$_{int}$/Def &$_{XP}$ *DP$_{int}$/Hum &$_{XP}$ MAX-C is ranked **above** *[+gov].

Consequence:

- The cumulative interaction of *DP$_{int}$/Def, *DP$_{int}$/Hum and MAX-C can outweigh high-ranked *[gov] and thereby suppress case feature deletion.
- There is **no cumulative interaction** of *[+gov] and *DP$_{int}$/Def, *DP$_{int}$/Hum.

3.7.2. Another Case Study: Differential Encoding of Objects in Finnish

Refs.: Kiparsky (1998; 2001), Wunderlich (2000)

3.7.2.1. The Phenomenon Observation:

(i) Finnish objects can be structurally case-marked by *four* different exponents, only one of which is zero: /t/, /n/, /a/, /∅/.

(ii) The principles that determine choice of the correct exponents are exactly the ones that Aissen (1999; 2003) shows to underlie zero/non-zero alternations in differential argument encoding.

(iii) This strongly suggests a unified approach; but a unified approach is not available if the theory of differential argument encoding can only account for a difference between zero and non-zero encoding.

Conclusion:

Differential case marking of objects in Finnish is best treated as a morphological phenomenon. (Note: To some extent, suggestions along these lines can already be found in Kiparsky (2001) and Wunderlich (2000), and what follows owes a lot to these works. However, the analysis below is much more radical in its treatment of objective case, and also fairly different in several other respects.)

(35) *Case marking of objects in Finnish* (Kiparsky (2001)):

a. Tuo-n häne-t
   bring-1.SG he-ACC
   'I'll bring him.'
b. Tuo-n karhu-n
   bring-1.SG bear-GEN
   'I'll bring the/a bear.'
c. Tuo-∅ karhu-∅
   bring-IMP bear-NOM
   'Bring the/a bear!'

d. Etsi-n karhu-a
seek-1.SG bear-PART
'I'm looking for the/a bear.'

(36) *Structural case markers (singular)* (traditional grammar):

	nouns: 'bear'	pronouns: 'you'
NOM	/Ø/	/Ø/
ACC	/Ø/, /n/	/t/
GEN	/n/	/n/
PART	/a/	/a/

(37) *Structural case markers (singular)* (Kiparsky's (2001) reconstruction):

	nouns: 'bear'	pronouns: 'you'
NOM	/Ø/	/Ø/
ACC	–	/t/
GEN	/n/	/n/
PART	/a/	/a/

Generalizations (Kiparsky (2001)):
(i) Objects of predicates that give rise to an *unbounded* (atelic) interpretation always take the partitive exponent.
(ii) Objects of predicates that give rise to a *bounded* (telic) (resultative, or quasi-resultative) interpretation take the partitive marker if they have a "quantitatively indeterminate denotation.'
(iii) Otherwise, objects of the latter predicates take the accusative marker if they are personal pronouns;
(iv) and they take the genitive marker if they are non-pronominal, and c-commanded by an overt subject.
(v) In all other cases, a structurally case-marked object NP takes the nominative marker.

Conclusion:
(i) Pronouns are marked differently from other NPs.
(ii) Non-specific NPs are marked differently from other NPs.
(iii) This suggests harmonic alignment with the definiteness scale.

3.7.2.2. Analysis Claim:
(i) There is only one kind of object case in (35): accusative.
(ii) Marker variation is a morphological phenomenon resulting from impoverishment.

(38) *Structural cases in Finnish* (see Bierwisch (1967), Levin (1986), Alsina (1996), Wiese (1999) for the primitive case features adopted here):
a. NOM: [–gov,–obl,+subj]
b. GEN: [+gov,+obl,±subj]
c. ACC: [+gov,–obl,–subj]

(39) *Scales*
a. *GF scale* (basic):
Subject > object
(Spec(v) > Comp(V))
b. *Definiteness scale*:
Pro(noun) > Name (PN) > Def(inite) > Indefinite Specific (Spec) > NonSpecific (NSpec)
c. *Boundedness scale*:
Bounded > unbounded (Bd > NBd)

(40) *Constraint alignments*:
a. *Obj/Pro ≫ *Obj/PN ≫ *Obj/Def ≫ *Obj/Spec ≫ *Obj/NSpec
b. *Obj/Bd ≫ *Obj/NBd

Local conjuction of members of the two constraint hierarchies preserves order. It ultimately yields two-dimensional differential argument encoding.

(41) *Local conjunction*:
a. *Obj/Pro & *Obj/Bd ≫ *Obj/PN & *Obj/Bd ≫ *Obj/Def & *Obj/Bd ≫ *Obj/Spec & *Obj/Bd ≫ *Obj/NSpec & *Obj/Bd
b. *Obj/Pro & *Obj/NBd ≫ *Obj/PN & *Obj/NBd ≫ *Obj/Def & *Obj/NBd ≫ *Obj/Spec & *Obj/NBd ≫ *Obj/NSpec & *Obj/NBd

(42) *Notational variant (simplification)*:
a. *Obj/Pro/Bd ≫ *Obj/PN/Bd ≫ *Obj/Def/Bd ≫ *Obj/Spec/Bd ≫ *Obj/NSpec/Bd
b. *Obj/Pro/NBd ≫ *Obj/PN/NBd ≫ *Obj/Def/NBd ≫ *Obj/Spec/NBd ≫ *Obj/NSpec/NBd

(43) *Order-preserving local conjunction with* MAX-CASE *(formerly *Ø$_C$)*:
a. *Obj/Pro/Bd & Max-C ≫ *Obj/PN/Bd & Max-C ≫ *Obj/Def/Bd & Max-C ≫ *Obj/Spec/Bd & Max-C ≫ *Obj/NSpec/Bd & Max-C
b. *Obj/Pro/NBd & Max-C ≫ *Obj/PN/NBd & Max-C ≫ *Obj/Def/NBd & Max-C ≫ *Obj/Spec/NBd & Max-C ≫ *Obj/NSpec/NBd & Max-C

Note:
(i) *Obj/Pro/Bd & Max-C is violated if a case feature of a VP-internal pronoun in a clause with a bounded interpretation of the predicate is deleted post-syntactically (before morphological realization).
(ii) *Obj/NSpec/NBd & Max-C is violated if a case feature of a VP-internal indefinite non-specific NP in a clause with an unbounded interpretation of the predicate is deleted post-syntactically (before morphological realization).
(iii) Constraints of this type are *gradient* – multiple violations add up.

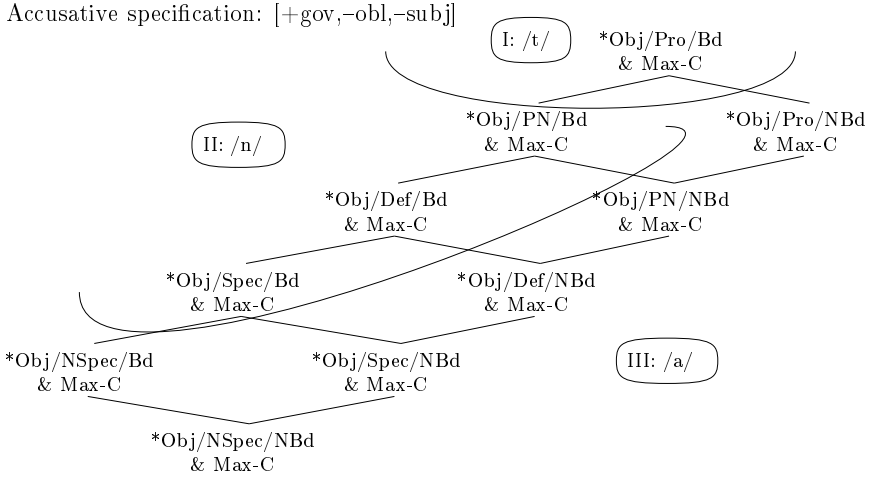
(44) *Conflicting constraints that trigger case feature deletion* (versions of *STRUC$_C$):
a. *[–obl]
b. *[+gov]
c. *[–subj]

(45) *Ranking*:
a. I: *Obj/Pro/Bd & Max-C ≫
b. *[–obl] ≫
c. II: *Obj/PN/Bd & Max-C ≫ *Obj/Def/Bd & Max-C ≫ Obj/Spec/Bd & Max-C ≫
d. *[+gov] ≫
e. III: *Obj/NSpec/Bd & Max-C, { *Obj/Pro/NBd & Max-C ≫ *Obj/PN/NBd & Max-C ≫ *Obj/Def/NBd & Max-C ≫ *Obj/Spec/NBd & Max-C } ≫ *Obj/NSpec/NBd & Max-C

f. *[–subj]

(46) *The overall picture*:

Accusative specification: [+gov,–obl,–subj]



(47) *Impoverishment effects with object case derived*:

a. [–obl] → Ø/__[¬(Pro,Bd)]
b. [+gov] → Ø/__[Nbd∨(NSpec,Bd)]

Note:
(47) reveals that, in a canonical impoverishment approach (that does not rely on optimization), it would be difficult to characterize the relevant environments as *natural classes* – negation and disjunction are needed (at least this holds as long one does not postulate a more fine-grained feature structure underlying the various categories).

(48) *Vocabulary items*:

a. /t/ ↔ [+gov,–obl,–subj]
b. /n/ ↔ [+gov]
c. /a/ ↔ [–subj]
d. /Ø/ ↔ [ ]

Note:
(i) Assuming that the genitive is defined as [+gov,+obl,+subj], /n/ cannot be characterized by [+gov,–subj] (because then the syncretism cannot be captured).
(ii) Under this assumption, a partial hierarchy of features [+gov] > [–subj] must then be assumed to ensure the correct choice of exponent in II contexts.

(49) *Sample optimizations 1*: /t/

Input: Type I [+gov,–obl,–subj],[Pro],[Bd]	I	*[–obl]	II	*[+gov]	III	*[–subj]
☞ O_1: [+gov,–obl,–subj]		*		*		*
O_2: [+gov,–obl]	*!	*		*		
O_3: [+gov,–subj]	*!			*		*
O_4: [–obl,–subj]	*!	*				*
O_5: [+gov]	*!*			*		
O_6: [–obl]	*!*	*				
O_7: [–subj]	*!*					*
O_8: [ ]	*!**					

Consequence:
Output O_1: [+gov,–obl,–subj] is optimal; there is no impoverishment. Therefore, /t/ is the most specific vocabulary item that fits, and it is inserted.

(50) *Sample optimizations 2*: /n/

Input: Type II [+gov,–obl,–subj],[Def],[Bd]	I	*[–obl]	II	*[+gov]	III	*[–subj]
O_1: [+gov,–obl,–subj]		*!		*		*
O_2: [+gov,–obl]		*!	*	*		
☞ O_3: [+gov,–subj]			*	*		*
O_4: [–obl,–subj]		*!	*			*
O_5: [+gov]			**!	*		
O_6: [–obl]		*!	**			
O_7: [–subj]			**!			*
O_8: [ ]			**!*			

Consequence:
Output O_3: [+gov,–subj] is optimal; there is impoverishment (post-syntactic deletion of [–obl]) Therefore, /t/ cannot be inserted anymore (because of the Subset Principle), and there is a (minimal) retreat to the more general case: The next-specific marker /n/ is inserted.

(51) *Sample optimizations 3*: /a/

Input: Type III [+gov,–obl,–subj],[Nspec],[Nbd]	I	*[–obl]	II	*[+gov]	III	*[–subj]
O_1: [+gov,–obl,–subj]		*!		*		*
O_2: [+gov,–obl]		*!		*	*	
O_3: [+gov,–subj]				*!	*	*
O_4: [–obl,–subj]		*!			*	*
O_5: [+gov]				*!	**	
O_6: [–obl]		*!			**	
☞ O_7: [–subj]					**	*
O_8: [ ]					***!	

Consequence:
Output O_7: [–subj] is optimal; impoverishment deletes [+gov] and [-obl], but no more than

that. Therefore, /a/ is the most specific marker that fits (blocking /Ø/).

Note:
Zero exponence results from massive impoverishment (a deletion of all case features). Simplifying a bit, it shows up when there is no overt subject argument present (e.g., in imperatives). Again, this would seem to suggest a clear functional motivation. There are two analytic possibilites; the first one is adopted here for the sake of simplicity. (Both solutions presuppose that whether a subject argument is overtly present or not can be read off syntactic structures, before post-syntacatic morphology takes place.)
(i) Objects do not participate in harmonic alignment in the first place when they are not accompanied by an overt subject. Hence, sole objects do not obey any of the constraints in I-III, and the *[case] constraints demand full deletion of case features.
(ii) Sole objects participate in harmonic alignment and thus fall under I-III. However, there is an undominated constraint that demands deletion of case features in object positions when no (relevant) subject is present.

(52) *Sample optimizations 4*: /Ø/

Input: Type IV [+gov,–obl,–subj], [no subject]	I	*[–obl]	II	*[+gov]	III	*[–subj]
O_1: [+gov,–obl,–subj]		*!		*		*
O_2: [+gov,–obl]		*!		*		
O_3: [+gov,–subj]				*!		*
O_4: [–obl,–subj]		*!				*
O_5: [+gov]				*!		
O_6: [–obl]		*!				
O_7: [–subj]						*!
☞ O_8: [ ]						

Consequence:
Output O_8: [ ] is optimal; impoverishment deletes all case features. Therefore, /Ø/ is the only remaining marker that fits – a full retreat to the general case.

Final remark:
The system reveals iconicity, as argued by Wiese (1999) for German: /t/ is less sonorous than /n/, which is less sonorous than /a/ (assuming the initial *t* that shows up with *a* in certain morpho-phonologically defined contexts to be truly epenthetic, and irrelevant to the abstract system as such); /Ø/ is least marked. This corresponds to the exponents' degree of specificity.

3.7.3. Yet Another Case Study: Differential Encoding of Objects in Cavineña

Ref.: Guillaume (2008, 569ff., 603f.) (Bolivia, Tacanan family, <1,200 speakers)

3.7.3.1. The Phenomenon Observation:

Two dative/genitive markers can appear: *-kwe* and *-ja*. The choice depends on person and number features of the stem—*-kwe* can only be attached to local persons (i. e., first or second person) in the singular. All other combinations select *-ja*.
This constitutes a case of differential object marking since singular first or second person objects are highly marked. All other combinations are marked less in terms of Hale/Silverstein

scales. We argue that it is not a coincidence that for such highly marked objects a phonologically more complex case exponent is chosen. Phonological complexity of markers and hierarchical markedness are again correlated.

(53) *Distribution of markers*:

Person	SG	DL	PL
1	e-Ø-**kwe**	ya-tse-**ja**	e-kwana-**ja**
2	mi-Ø-**kwe**	me-tse-**ja**	mi-kwana-**ja**
3	tu-Ø-**ja**	ta-tse-**ja**	tu-na-**ja**
3PROX	riya-Ø-**ja**	re-tse-**ja**	re-na-**ja**

(54) *Dative/genitive markers in Cavineña*:

a. E-**kwe** ani-kware [maletero ari-da$_{CC}$=ke$_{RC}$]$_S$
1SG-DAT sit-REM.PAST bag big-ASF=LIG
'I had a big bag (lit. a big bag sat to me).' (Guillaume 2008: 567)

b. Sergio=**ja** ani-ya [ata Ramón bakani]$_S$
Sergio=DAT sit-IMPFV relative Ramsón name
'Sergio had a relative called Ramón (lit. a relative called Ramón was sitting to Sergio).' (Guillaume 2008: 603)

c. Tume =tuna-**ja** =tu-ke =Ø$_A$ be-ti-wa budari$_O$
then =3PL-DAT =3SG-FM (=1SG.ERG) bring-GO.TEMP-PERF banana
'I will go and bring bananas for them.' (Guillaume 2008: 575)

(55) a. *Person scale*
Loc(al) (1/2) ≻ N(on)loc(al)
b. *Number scale*
Sg ≻ Non-sg
c. *GF scale*
Subj ≻ Obj

(56) *Ranking*:
a. *Obj/Loc/Sg & Max-C ≫ *Obj/Loc/Non-sg & Max-C
b. *Obj/Nloc/Sg & Max-C ≫*Obj/Nloc/Non-sg & Max-C

Note:
We assume that the dative consists of the subfeature in (57). The relevant markers *-kwe* and *-ja* are analysed as in (58). The phonological markedness of these exponents correlates with their morpho-syntactic markedness; they thus obey iconicity.

(57) DATIVE: [+obl, +obj]

(58) *Marker specification*
a. /-kwe/ ↔ [+obl, +obj]
b. /-ja/ ↔ [+obj]

3.7.3.2. Analysis

A markedness constraint penalizing the presence of a case feature [+obl] is then inserted into the ranking (56), triggering case feature deletion for all but highly marked objects (i.e. those high on both the person and the number scale). After this case feature is deleted, insertion of *-kwe* is no longer possible. The system therefore falls back to a more

general marker (*-ja*).

(59) *Markedness constraint*
*[+obl]

(60) *Ranking*:

$$\text{*Obj/Loc/Sg \& Max-C} \gg \text{*[+obl]} \gg \left\{ \begin{array}{l} \text{*Obj/Loc/Non-sg \& Max-C} \\ \text{*Obj/Nloc/Sg \& Max-C} \\ \text{*Obj/Nloc/Non-sg \& Max-C} \end{array} \right\}$$

Note:
As in Finnish, an explicit statement of the context of the impoverishment rule would involve a disjunction: The case feature [+obl] has to be deleted if the object is *either* non-singular *or* non-local. Since these two contexts arguably do not form a natural class, two impoverishment rules are effectively needed in standard approaches. If, however, the context in which impoverishment applies is derived by local conjunction of scales, the case feature is deleted in all environments that are dominated by the markedness constraint *[+obl]. (60) shows that this comprises exactly the context that proved problematic for an approach employing explicit statements of contexts—i. e. if the object is either non-singular or non-local or both. The approach developed here is therefore preferable on conceptual grounds.
The Cavineña data clearly conform to what is expected from the point of view of Hale/Silverstein hierarchies|more marking for unexpected objects. These data are nevertheless surprising if scales can only lead to a total reduction in morphological marking.

3.8. Outlook and Conclusion

Outlook:
The same kind of analyses can be given for various other cases of scale-driven non-zero/non-zero alternations with structural cases:

- differential encoding of subjects and objects in Dyirbal (Carnie (2005), Haspelmath (2007), based on Dixon (1972; 1994))
- differential encoding of subjects and objects in Djapu (Legate (2008), Morphy (1983a))
- differential encoding of subjects in Kambera (Klamer (1998a;b), Georgi (2008))
- direct-inverse Marking (Blake (1994), Macaulay (2005))
- differential encoding of objects in Russian (Comrie (1978))
- differential encoding of objects in Proto-Indo-European (Filimonova (2005))

Consequences for the modelling of interfaces:

- Impoverishment rules are ultimately *functionally motivated* and implemented via harmonic alignment of scales.
- Optimality Theory emerges as a theory of the morphology-syntax interface, much as in Pesetsky (1998); syntax and morphology as such can be assumed to work without violable and ranked constraints.

4. Three-Way Systems

4.1. Background

(61) a. *Ergative system*

DP_{ext}-V_i	DP_{int}-V_i
DP_{ext}-V_t	DP_{int}-V_t
erg	abs

b. *Accusative system*

DP_{ext}-V_i	DP_{int}-V_i
DP_{ext}-V_t	DP_{int}-V_t
nom	acc

c. *Active system*

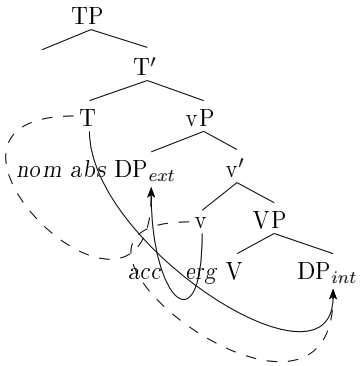
DP_{ext}-V_i	DP_{int}-V_i
DP_{ext}-V_t	DP_{int}-V_t
erg/nom	abs/acc

A simple approach that will be adopted in what follows:
(i) ergative = accusative = structural case from v
(ii) nominative = absolutive = structural case from T
(Murasugi (1992), Jelinek (1993), Ura (2000; 2006), Müller (2009), Assmann et al. (2012))

An alternative:
(i) ergative = nominative = structural case from T
(ii) accusative = absolutive = structural case from v
(Levin & Massam (1985), Chomsky (1995, ch.3), Bobaljik (1993), Laka (1993), Rezac (2003), Bobaljik & Branigan (2006))

(In what follows, accusative encoding is represented by dashed lines, ergative encoding by full lines.)

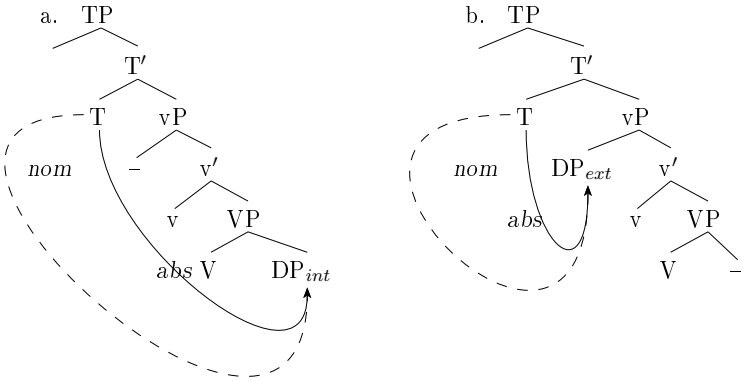
(62) *Transitive context*



Parameter:
The parameter distinguishing ergative and accusative systems exclusively concerns v: Both upward and downward case assignment must be possible in principle, but there is a preference for upward case assignment in ergative systems, and a preference for downward case assignment in accusative systems.

Note:
Ergative and accusative systems work in exactly the same way in intransitive contexts: Only T remains as a case-assigning head here. This corresponds directly to tendencies of morphological marking: The case associated with T is typically morphologically less marked than verbal case assigned by v.

(63) *Intransitive unaccusative and unergative contexts*



Active systems:

- Option (i): v can be the case-assinging head in unergative contexts.
- Option (ii): Unergative structures can be hidden transitives.

(64) *Three-way systems*:

DP$_{ext}$-V$_i$	DP$_{int}$-V$_i$
nom/abs	
DP$_{ext}$-V$_t$	DP$_{int}$-V$_t$
erg	acc

(65) *Three-way encoding in Antekerrepenhe (Central Australia)* (Bittner & Hale (1996a)):

a. Arengke-le aye-nhe ke-ke
dog-ERG me-ACC bite-PST
'The dog bit me.'

b. Apwerte-le athe arengke-nhe we-ke
stones-INS I-ERG dog-ACC pelt-PST
'I pelted the dog with stones.'

c. Arengke nterre-ke
dog-NOM run-PST
'The dog ran.'

Note:
Three-way systems are potentially problematic for the type of analysis sketched above, where two case assigners (T, v) are responsible for two structural cases and each of {erg, acc} is identified with exactly one case of the other system.

Observation:
Three-way systems are cross-linguistically rare. They qualify as *non-canonical* from a typological perspective (Corbett (2005); Corbett & Fedden (2014)).

Note:
This argues against approaches where structural case assignment in transitive contexts is *relational* (Marantz (1991), Bittner & Hale (1996b), Wunderlich (1997a; 2006), Kiparsky

(1999), Stiebels (2002), McFadden (2004), Schäfer (2012), Baker (2015)).

Proposal:
Three-way systems are regular (ergative or accusative) two-way systems in *syntax*; the phenomenon can and should be relocated to *morphology*.

Independent evidence: case as a syntactic category vs. case as a morphological marking

- One and the same morphological case exponent may correspond to two different syntactic cases; see Legate (2008) on zero marking, which may be morphological default marker or a syntactic nominative, depending on the language.
- One and the same syntactic case may correspond to two different morphological case exponents in a given language; see Keine & Müller (2011; 2014) on scale-based differential object marking as a morphological phenomenon (scale-driven allomorphy) .

Observation:
Three-way systems typically also involve scale effects (such that, e.g., only non-prototypical DP$_{int}$ arguments receive what looks like an accusative, or only non-prototypical DP$_{ext}$ arguments bear what looks like an ergative). The situation in Nez Perce: Accusative for DP$_{int}$ of V$_t$, ergative for DP$_{ext}$-3rd-person of V$_t$, and nominative for DP$_{int}$, DP$_{ext}$ of V$_i$, and for DP$_{ext}$-1st/2nd-person of V$_t$.

(66) *Three-way encoding in Nez Perce (Rude (1985), Woolford (1997))*:

a. Kaa wéet'u' núun-e ká'la hinéesqicxne
and not 1PL-ACC just 3NOM.PLDO.take.care.of.PERF
'And he just didn't take care of us.' (Rude (1985, 93))

b. 'Iceyéeye-nm xáxaasna hináaswapci'yawna
coyote-ERG grizzly-ACC 3NOM.PLDO.kill.PERF
'Coyote killed the grizzlies.' (Rude (1985, 88))

c. (i) Núun Ø-papáayna
we 1/2NOM-PL.NOM.arrive.PERF
'We arrived.'

(ii) núun 'epe'wíye
we 1/2TR.shoot.PERF
'We shot him.' (Rude (1985, 85))

Goal:
We extend the morphological approach to differential object marking in terms of scale-driven impoverishment developed in Keine & Müller (2011; 2014) (on the basis of Aissen (1999; 2003)) to three-way systems. Only one important new assumption is required: In addition to the standard prominence scales related to person, animacy, and definiteness (going back to Hale (1972) and Silverstein (1976)), there is also a *transitivity scale* which participates in harmonic alignment processes that eventually bring about post-syntactic impoverishment.

4.2. Theoretical assumptions

Background:
The reconstruction of the optimality-theoretic analysis developed in Aissen (2003) as a post-

syntactic impoverishment operation at the syntax/morphology interface in Keine & Müller (2014).

(67) *Feature decomposition of cases*

a. ergative/accusative: [+gov–obl] (assigned by v)
b. absolutive/nominative: [–gov,–obl] (assigned by T)

(68) *Scales*:

a. *Person scale*:
Local Pers. (1,2) > 3. Pers.
b. *Animacy scale*:
Hum(an) > Anim(ate) > Inan(imate)
c. *Definiteness scale*:
Pro(noun) > Name (PN) > Def(inite) > Indefinite Specific (Spec) > NonSpecific (NSpec)
d. *Transitivity scale:*
$v_{t(rans)} > v_{i(ntrans)}$

Note:
(68-abc) go back to Hale (1972), Silverstein (1976), and Aissen (2003). (68-d) is new. It presupposes that transitive and intransitive v can be distinguished, in both ergative and accusative languages. This is straightforward if v is uniformly the inactive head in intransitive contexts.

(69) *Harmonic Alignment* (Prince & Smolensky (2004)):
Suppose given a binary dimension D_1 with a scale X > Y on its elements {X,Y}, and another dimension D_2 with a scale a > b > ... > z on its elements {a,b,...,z}. The *harmonic alignment* of D_1 and D_2 is the pair of Harmony scales H_X, H_Y:

a. H_X: X/a ≻ X/b ≻ ... ≻ X/z
b. H_Y: Y/z ≻ ... ≻ Y/b ≻ Y/a

The *constraint alignment* is the pair of constraint hierarchies C_X, C_Y:

a. C_X: *X/z ≫ ... ≫ *X/b ≫ *X/a
b. C_Y: *Y/a ≫ *Y/b ≫ ... ≫ *Y/z

(70) *A binary scale: The DP case scale:*
$DP_{[+gov]} > DP_{[-gov]}$

(71) *Consequences of harmonic alignment*:

a. $*DP_{[+gov]}/v_i \gg *DP_{[+gov]}/v_t$
b. $*DP_{[-gov]}/v_t \gg *DP_{[-gov]}/v_i$

(72) *Local conjunction* (Smolensky (1995))
Local conjunction is a mechanism which conjoins two distinct constraints to form a new constraint. The new constraint is violated if both conjoined constraints are violated. Local conjuction of members of the two constraint hierarchies preserves order.

(73) *Further constraints*:

a. MAX(case):
Preserve case features.

b. *[–gov]:
Avoid the feature [–gov].

Note:
MAX(case) can be conjoined with a constraint hierarchy derived from harmonic alignment; *[–gov] cannot be conjoined with a constraint hierarchy. (This is exactly as in Aissen (2003), Keine & Müller (2014).)

(74) *Local conjunction*:
$*DP_{[-gov]}/v_t$ & MAX(case) ≫ $*DP_{[-gov]}/v_i$ & MAX(case)

Input sensitivity: $*DP_{[-gov]}/v_t$ & MAX(case) is violated by a post-syntactic (pre-vocabulary insertion) representation if there is a nominative/absolutive DP in a transitive clause that has its [–gov] feature deleted. Thus, it must be ensured that a case feature like [–gov] that is deleted (thereby violating MAX(case)) can still be accessed so as to determine the violation (i.e., [–gov] is needed to characterize the class of DPs that are subject to the constraint). *Assumption*: Constraints like $*DP_{[-gov]}/v_t$ & MAX(case) are not only output-sensitive, but also input-sensitive (Trommer (2006)). Thus, [–gov] in "$*DP_{[-gov]}/v_t$" refers to the input (i.e., the syntactic representation where feature deletion is not yet an issue), whereas [–gov] in "MAX(case)" refers to the output (i.e., the post-syntactic representation in which feature deletion may or may not have applied).

(75) *A ranking that gives rise to selective feature deletion and differential marking*:
$*DP_{[-gov]}/v_t$ & MAX(case) ≫ *[–gov] ≫ $*DP_{[-gov]}/v_i$ & MAX(case)

Prediction:
The feature [–gov] will be preserved post-syntactically in transitive contexts but deleted in intransitive contexts. Subsequent vocabulary insertion can then lead to a [–gov]-marked exponent as a case marker for DP in transitive contexts, but given that vocabulary insertion obeys the Subset Principle (Halle & Marantz (1993), Halle (1997)), it will have to resort to an underspecified (typically zero) exponent not bearing [–gov] in intransitive contexts.

(76) *An impoverishment rule as an alternative*?
[–gov] → Ø / DP__[v_i]

No:

- (76) simply *stipulates* the context in which deletion takes place, (75) *derives* this context.
- (75) (again in contrast to (76)) predicts that there can be no language where deletion of [–gov] takes place in transitive but not in intransitive contexts.
- Three-way systems typically also involve (other) scale effects; so it remains to be shown how harmonic alignment and local conjunction with the other scales can be brought into the picture. It will turn out that the optimization approach captures these multi-dimensional scale effects in a fairly straightforward way whereas a standard, rule-based impoverishment approach will face what look like insurmountable obstacles because the deletion contexts do not form natural classes.

Locality:
In order to evaluate a constraint like *$DP_{[-gov]}/v_t$ & MAX(case) or *$DP_{[-gov]}/v_i$ & MAX(case), both the properties of the DP (either DP_{ext} or DP_{int}) and the properties of v must be taken into account. This suggests that the local domain for constraint evaluation at the interface is the phase (see Chomsky (2001)), with feature deletion and vocabulary insertion applying cyclically.

4.3. Case studies

4.3.1. Kham

4.3.1.1. Data

(77) *Distribution of case markers in Kham (Tibeto-Burman)* (Watters (2002))

	1st	2nd	3rd, definite	3rd, indefinite
DP_{ext}-V_t	-∅	-∅	-e/-ye	-e/-ye
$DP_{ext/int}$-V_i	-∅	-∅	-∅	-∅
DP_{int}-V_t	-lai	-lai	-lai	-∅

Syntax:
Kham exhibits a standard ergative system in the syntax, with *-e/-ye* as the canonical ergative marker and *-lai* as the canonical absolutive marker.

Morphology:
The simple person-based split in ergative contexts, and the more complex transitivity-/definiteness-based split in absolutive contexts, are instances of allomorphic variation reducible to scale-driven optimization.

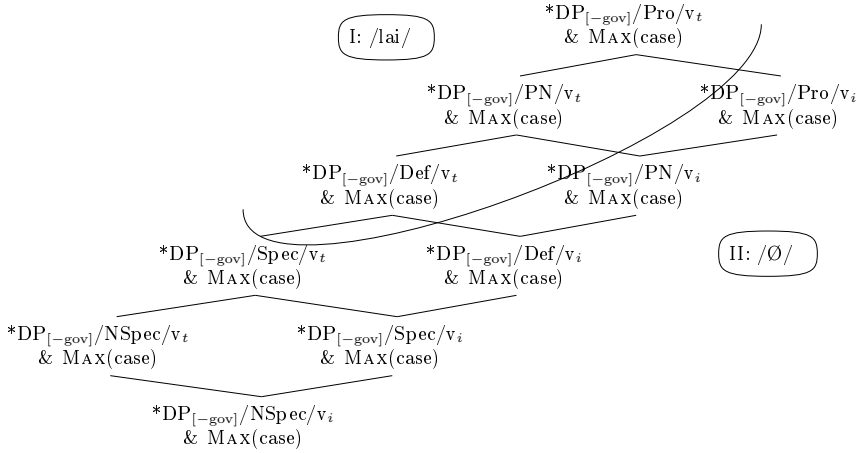
4.3.1.2. Absolutive marking

(78) *Harmonic alignment of case scale with transitivity and definiteness scales*:
   a. *$DP_{[-gov]}/v_t \gg$ *$DP_{[-gov]}/v_i$
   b. *$DP_{[-gov]}$/Pro $\gg$ *$DP_{[-gov]}$/PN $\gg$ *$DP_{[-gov]}$/Def $\gg$ *$DP_{[-gov]}$/Spec $\gg$ *$DP_{[-gov]}$/NSpec

(79) *Two-dimensional local conjunction of both constraint alignments* (simplified notational variant):
   a. *$DP_{[-gov]}/Pro/v_t \gg$ *$DP_{[-gov]}/PN/v_t \gg$ *$DP_{[-gov]}/Def/v_t \gg$ *$DP_{[-gov]}/Spec/v_t \gg$ *$DP_{[-gov]}/NSpec/v_t$
   b. *$DP_{[-gov]}/Pro/v_i \gg$ *$DP_{[-gov]}/PN/v_i \gg$ *$DP_{[-gov]}/Def/v_i \gg$ *$DP_{[-gov]}/Spec/v_i \gg$ *$DP_{[-gov]}/NSpec/v_i$
   c. *$DP_{[-gov]}/Pro/v_t \gg$ *$DP_{[-gov]}/Pro/v_i$
   d. *$DP_{[-gov]}/PN/v_t \gg$ *$DP_{[-gov]}/PN/v_i$
   e. *$DP_{[-gov]}/Def/v_t \gg$ *$DP_{[-gov]}/Def/v_i$
   f. *$DP_{[-gov]}/Spec/v_t \gg$ *$DP_{[-gov]}/Spec/v_i$
   g. *$DP_{[-gov]}/NSpec/v_t \gg$ *$DP_{[-gov]}/NSpec/v_i$

Final step:
Order-preserving local conjunction of the hierarchies in (79) with MAX(case).

(80) *Absolutive allomorphy in Kham: Interleaving of *[–gov]*



Note:
All the constraints in (80) demand case feature preservation. At this point, the ranking of the conflicting constraint demanding case feature deletion becomes relevant: *[–gov] leads to zero-marking for DPs with the feature combinations identified by the constraints that are ranked below it. In Kham, this constraint must be ranked above *$DP_{[-gov]}/Spec/v_t$ & MAX(case) and *$DP_{[-gov]}/Pro/v_i$ & MAX(case), and below *$DP_{[-gov]}/Def/v_t$ & MAX(case) and *$DP_{[-gov]}/Pro/v_t$ & MAX(case), thereby separating the system in (80) into two discrete areas I and II. The absolutive case feature [–gov] is preserved in area I and removed in area II, which leads to the fully specified exponent /lai/ in I configurations and to the elsewhere exponent /Ø/ in II configurations.

Scale-driven optimization vs. stipulated impoverishment rules:

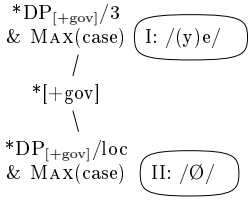
- One would have to postulate *two separate* impoverishment rules, as in (81), since the contexts in which [–gov] deletion takes place (viz., intransitive clause and indefinite interpretation of DP) cannot be referred to as a *natural class*.
- (81) would give rise to redundancies with indefinite (specific or non-specific) DPs in intransitive contexts.

(81) a. $[-gov] \rightarrow \emptyset$ / $DP\_\_[v_i]$
   b. $[-gov] \rightarrow \emptyset$ / $DP_{[indef]}\_\_$

4.3.1.3. Ergative marking

(82) *Harmonic alignment of case scale and person scale plus local conjunction with* MAX*(case)*:
*$DP_{[+gov]}$/3 & MAX(case) $\gg$ *$DP_{[+gov]}$/loc & MAX(case)

(83) *Ergative allomorphy in Kham: Interleaving of *[+gov]*



4.3.2. Djapu

4.3.2.1. Data

(84) *Distribution of case markers in Djapu (Pama-Nyungan)* (Morphy (1983b))

	Pron	+HU	−HU
DP_{ext}-V_t	-Ø	-DHu	-DHu
$DP_{ext/int}$-V_i	-Ø	-Ø	-Ø
DP_{int}-V_t	-NHA	-NHA	-Ø

Syntax:
Djapu underlyingly exhibits an ergative system, with *-DHu* as the regular (i.e., most specific) ergative marker and *-NHA* as the regular absolutive marker.

Morphology:
Overt absolutive marking is suspended in intransitive contexts and for non-human objects; overt ergative marking does not show up on pronominal transitive subjects.

4.3.2.2. Absolutive marking The relevant scales determining the distribution of morphological case exponents are the transitivity scale and the animacy scale. Both are harmonically aligned with the basic case scale, yielding (85-a) and (85-b) for absolutive contexts.

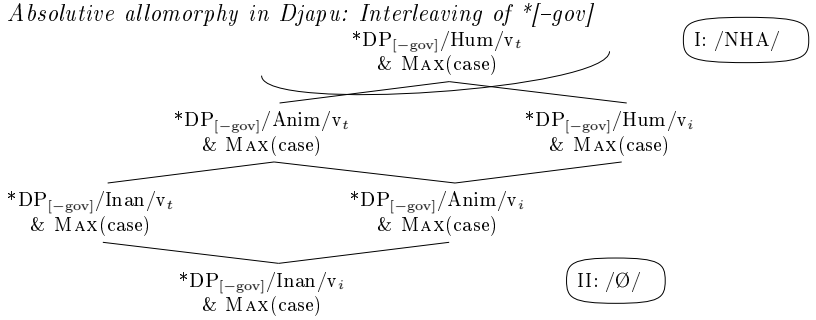
(85) *Harmonic alignment of case scale with transitivity and animacy scales*:
a. *$DP_{[-gov]}/v_t \gg$ *$DP_{[-gov]}/v_i$
b. *$DP_{[-gov]}$/Hum $\gg$ *$DP_{[-gov]}$/Anim $\gg$ *$DP_{[-gov]}$/Inan

Local conjunction among the members of these constraint hierarchies with fixed internal order produces the strict rankings in (86).

(86) *Two-dimensional local conjunction of both constraint alignments*:
a. *$DP_{[-gov]}$/Hum/$v_t \gg$ *$DP_{[-gov]}$/Anim/$v_t \gg$ *$DP_{[-gov]}$/Inan/v_t
b. *$DP_{[-gov]}$/Hum/$v_i \gg$ *$DP_{[-gov]}$/Anim/$v_i \gg$ *$DP_{[-gov]}$/Inan/v_i
c. *$DP_{[-gov]}$/Hum/$v_t \gg$ *$DP_{[-gov]}$/Hum/v_i
d. *$DP_{[-gov]}$/Anim/$v_t \gg$ *$DP_{[-gov]}$/Anim/v_i
e. *$DP_{[-gov]}$/Inan/$v_t \gg$ *$DP_{[-gov]}$/Inan/v_i

Finally, order-preserving local conjunction with MAX(case) gives rise to the two-dimensional system in (87).

(87) *Absolutive allomorphy in Djapu: Interleaving of *[−gov]*



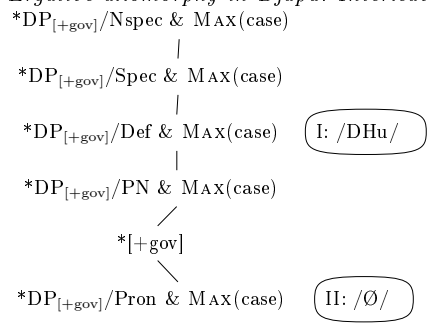
Note:
Again, and impoverishment rule would fail because it cannot refer to the deletion contexts as a natural class.

4.3.2.3. Ergative marking

(88) *Harmonic alignment of case scale and definiteness scale*:
*$DP_{[+gov]}$/Nspec $\gg$ *$DP_{[+gov]}$/Spec $\gg$ *$DP_{[+gov]}$/Def $\gg$ *$DP_{[+gov]}$/PN $\gg$ *$DP_{[+gov]}$/Pron

Local conjunction with MAX(case) and interleaving of *[+gov] between *$DP_{[+gov]}$/PN & MAX(case) and *$DP_{[+gov]}$/Pron & MAX(case) yields a distribution of the overt ergative exponent /DHu/ that involves all DP_{ext} arguments of transitive contexts except for pronouns.

(89) *Ergative allomorphy in Djapu: Interleaving of *[+gov]*:



4.3.3. Nez Perce

4.3.3.1. Data

(90) *Distribution of case markers in Nez Perce* (Rude (1985))

	1/2 pronouns	3 pronouns	proper names	common nouns
DP_{ext}-V_t	-Ø	-(n(i))m	-(n(i))m	-(n(i))m
$DP_{ext/int}$-V_i	-Ø	-Ø	-Ø	-Ø
DP_{int}-V_t	-ne	-ne	-ne	-ne

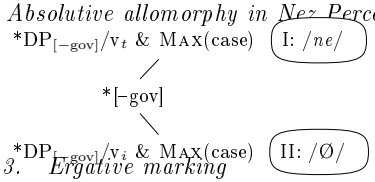
Syntax:
The pattern instantiates a canonical ergative system.

Morphology:
Scale-driven allomorphy affects both ergative and absolutive contexts.

4.3.3.2. Absolutive marking

(91) *Harmonic alignment of case scale and transitivity scale*: *$DP_{[-gov]}/v_t$ & Max(case) ≫ *$DP_{[-gov]}/v_i$ & Max(case)

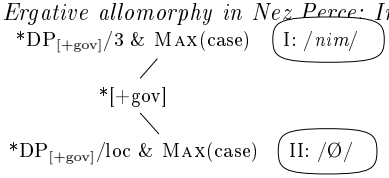
(92) *Absolutive allomorphy in Nez Perce: Interleaving of *[–gov]*:



4.3.3.3. Ergative marking

(93) *Harmonic alignment of case scale and person scale*: *$DP_{[+gov]}$/3 & Max(case) ≫ *$DP_{[+gov]}$/loc & Max(case)

(94) *Ergative allomorphy in Nez Perce: Interleaving of *[+gov]*:



4.3.4. Dyirbal

4.3.4.1. Data

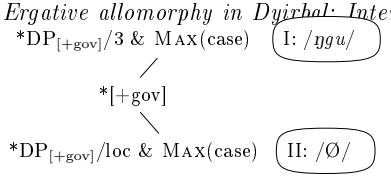
(95) *Distribution of Case markers in Dyirbal* (Dixon (1972; 1994)))

	1st/2nd pronouns	3rd pronouns	proper names	common nouns
DP_{ext}-V_t	-Ø	-ŋgu	-ŋgu	ŋgu
$DP_{ext/int}$-V_i	-Ø	-Ø	-Ø	-Ø
DP_{int}-V_t	-na	-Ø	-Ø	-Ø

4.3.4.2. Ergative marking

(96) *Harmonic alignment of case scale and person scale*: *$DP_{[+gov]}$/3 & Max(case) ≫ *$DP_{[+gov]}$/loc & Max(case)

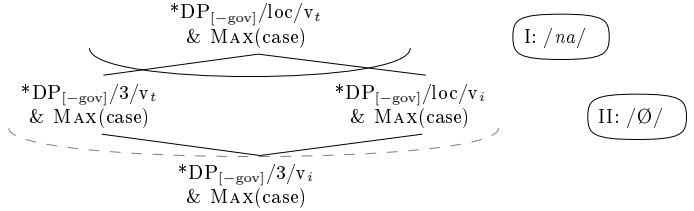
(97) *Ergative allomorphy in Dyirbal: Interleaving of [*gov]*:



Note:
This accusative system is thus completely identical to the system of ergative allomorphy in Nez Perce.

4.3.4.3. Absolutive marking Observation:
The basic case scale is harmonically aligned with both the transitivity scale and the person scale, and subsequently, local conjunction with Max(case) applies to the two constraint hierarchies thus generated, yielding a multidimensional system

(98) *Absolutive allomorphy in Dyirbal: Interleaving of *[–gov]*



Note:
As before, no single impoverishment rule could capture this distribution of zero and non-zero absolutive markers since the contexts in which deletion takes place do not form a natural class.

4.3.5. Interim conclusion

- Three-way case systems can be reanalyzed as standard two-way (ergative or accusative) case systems, with all the marker variation derived by scale-driven optimization operations at the syntax/morphology interface.
- Given that case marker allomorphy based on person, animacy, and definiteness is independently known to occur, and given that these effects also show up in all the languages addressed here, the only additional assumption that is needed to capture all effects in a maximally simple way – viz., the postulation of a transitivity scale on a par with other Hale/Silverstein scales – seems well motivated.
- The crosslinguistic rarity of three-way systems can now be explained under the assumption that non-homogeneous post-syntactic case-feature deletion is inherently marked.
- The fact that putative three-way systems are typically accompanied by Hale/Silverstein scale effects, and that the fact that these effects, though subject to implicational generalizations, are not uniform across languages, together pose an enormous challenge for a syntactic approach recognizing three different cases; ambitious recent attempts notwithstanding (see in particular Deal (2014)) I would like to contend that it is hardly possible to come up with a comprehensive syntactic approach to the phenomenon that qualifies as both simple and elegant, and that covers both an individual language's pattern in detail, and captures cross-linguistic variation as well.

4.4. Syntactic evidence

Prediction:
The present morphology-based approach to three-way systems differs from syntactic approaches in that it reanalyzes what at first sight looks like an accusative DP (in Kham, Djapu, Nez Perce, and Dyirbal) as a non-zero-encoded absolutive DP. There should be independent

evidence for the status of the pertinent DPs as absolutive/nominative (i.e., [–gov,–obl], assigned by T). More generally, we expect to find evidence for a morphological approach in terms of case allomorphy based on identical syntactic behaviour of the non-zero-marked and zero-marked DPs; in the same way, different syntactic behaviour might provide counter-evidence against the proposal. Here I will discuss only one case (there are many more, cf. Müller & Thomas (2014)): topic chaining in Dyirbal.

(99) *Case matching in Dyirbal topic chaining constructions* (Dixon (1972; 1994)):
[$_{CP_1}$ ŋuma yabu-ŋgu bura-n] [$_{CP_2}$ *pro* banaga-n^{y}u]
father-ABS mother-ERG see-NONFUT pro-ABS return-NONFUT

'Mother saw father and he/*she returned.'

Observation ((100-b)):
(i) An absolutive argument in an intransitive second conjunct is coreferent with a *na*-marked object in a transitive first conjunct.
(ii) An absolutive argument in an intransitive second conjunct cannot be coferent with a zero-marked subject in a transitive first conjunct.
(iii) This shows that the *na*-marked object bears absolutive case, and that the zero-marked subject bears ergative case.

(100) *An argument for a standard ergative system* (Morgenroth & Salzmann (2013)):

a. [$_{CP_1}$ ŋana-Ø banaga-n^{y}u] [$_{CP_2}$ n^{y}urra-Ø pro bura-n]
we-ABS return-NONFUT you all-ERG pro-ABS see-NONFUT
'We returned and you all saw us.'

b. [$_{CP_1}$ n^{y}urra-Ø ŋana-na bura-n] [$_{CP_2}$ pro banaga-n^{y}u]
you all-ERG we-ABS see-NONFUT pro-ABS return-NONFUT
'You all saw us and we returned.'

References

Aissen, Judith (1999): Markedness and Subject Choice in Optimality Theory, *Natural Language and Linguistic Theory* 17, 673–711.

Aissen, Judith (2002): Bidirectional Optimization and the Problem of Recoverability in Head Marking Languages. Ms., University of California, Santa Cruz.

Aissen, Judith (2003): Differential Object Marking: Iconicity vs. Economy, *Natural Language and Linguistic Theory* 21, 435–483.

Alsina, Alex (1996): Passive Types and the Theory of Object Asymmetries, *Natural Language and Linguistic Theory* 14, 673–723.

Assmann, Anke, Doreen Georgi, Fabian Heck, Gereon Müller & Philipp Weisser (2012): Ergatives Move Too Early. Ms., Universität Leipzig (*Linguistische Arbeits Berichte* 90, 2013). To appear in *Syntax*.

Baker, Mark (2015): *Case. Its Principles and Parameters*. Cambridge University Press, Cambridge.

Behaghel, Otto (1911): *Geschichte der deutschen Sprache*. Trübner, Straßburg.

Bierwisch, Manfred (1967): Syntactic Features in Morphology: General Problems of So-Called Pronominal Inflection in German. In: *To Honor Roman Jakobson*. Mouton, The Hague/Paris, pp. 239–270.

Bittner, Maria & Ken Hale (1996a): Ergativity: Toward a Theory of a Heterogeneous Class, *Linguistic Inquiry* pp. 531–604.

Bittner, Maria & Ken Hale (1996b): The Structural Determination of Case and Agreement, *Linguistic Inquiry* pp. 1–68.

Blake, Barry (1994): *Case*. Cambridge University Press, Cambridge.

Blevins, James (1995): Syncretism and Paradigmatic Opposition, *Linguistics and Philosophy* 18, 113–152.

Bobaljik, Jonathan (1993): Ergativity and Ergative Unergatives. In: C. Phillips, ed., *Papers on Case and Agreement II*. Vol. 19 of *MIT Working Papers in Linguistics*, MITWPL, MIT: Cambridge, Mass., pp. 45–88.

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.

Bobaljik, Jonathan & Phil Branigan (2006): Eccentric Agreement and Multiple Case Checking. In: A. Johns, D. Massam & J. Ndayiragije, eds., *Ergativity*. Springer, pp. 47–77.

Bonet, Eulàlia (1991): Morphology after Syntax. PhD thesis, MIT, Cambridge, Mass.

Bräutigam, Kurt (1934): Die Mannheimer Mundart. PhD thesis, Universität Heidelberg.

Carnie, Andrew (2005): Some Remarks on Markedness Hierarchies, *Coyote Working Papers in Linguistics* 14.

Chomsky, Noam (1965): *Aspects of the Theory of Syntax*. MIT Press, Cambridge, MA.

Chomsky, Noam (1995): *The Minimalist Program*. MIT Press, Cambridge, Mass.

Chomsky, Noam (2001): Derivation by Phase. In: M. Kenstowicz, ed., *Ken Hale. A Life in Language*. MIT Press, Cambridge, Mass., pp. 1–52.

Comrie, Bernard (1978): Morphological Classification of Cases in the Slavonic Languages, *The Slavonic and East European Review* 56, 177–191.

Corbett, Greville (2005): The Canonical Approach in Typology. In: Z. Frajzyngier, A. Hodges & D. Rood, eds., *Linguistic Diversity and Language Theories*. John Benjamins, Amsterdam, pp. 25–49.

Corbett, Greville & Sebastian Fedden (2014): Multiple Categorization: The Case of Mian. Ms., Surrey Morphology Group.

Deal, Amy Rose (2014): Person-Based Split Ergativity in Nez Perce is Syntactic. Ms., University of California, Santa Cruz.

Dixon, R.M.W. (1972): *The Dyirbal Language of North Queensland*. Cambridge University Press, Cambridge.

Dixon, R.M.W. (1994): *Ergativity*. Cambridge University Press, Cambridge.

Filimonova, Elena (2005): The Noun Phrase Hierarchy and Relational Marking: Problems and Counterevidence, *Linguistic Typology* 9, 77–113.

Fischer, Silke (2001): On the Integration of Cumulative Effects into Optimality Theory. In: G. Müller & W. Sternefeld, eds., *Competition in Syntax*. Mouton/de Gruyter, Berlin, pp. 151–173.

Fischer, Silke (2006): Zur Morphologie der deutschen Personalpronomina – eine Spaltungsanalyse. In: G. Müller & J. Trommer, eds., *Subanalysis of Argument Encoding in Distributed Morphology*. Vol. 84 of *Linguistische Arbeitsberichte*, Universität Leipzig, pp. 77–101.

Frampton, John (2002): Syncretism, Impoverishment, and the Structure of Person Features. In: M. Andronis, E. Debenport, A. Pycha & K. Yoshimura, eds., *Papers from the Chicago Linguistics Society Meeting*. Vol. 38, Chicago, pp. 207–222.

Georgi, Doreen (2008): A Distributed Morphology Approach to Argument Encoding in Kambera, *Linguistische Berichte* 213, 45–63.

Grimshaw, Jane (2001): Optimal Clitic Positions and the Lexicon in Romance Clitic Systems. In: G. Legendre, J. Grimshaw & S. Vikner, eds., *Optimality-Theoretic Syntax*. MIT Press, Cambridge, Mass., pp. 205–240.

Guillaume, Antoine (2008): *A Grammar of Cavineña*. Mouton de Gruyter, Berlin.

Hale, Ken (1972): A New Perspective on American Indian Linguistics. In: A. Ortiz, ed., *New Perspectives on the Pueblos*. University of New Mexico Press, Albuquerque, pp. 87–103.

Halle, Morris (1997): Distributed Morphology: Impoverishment and Fission. In: B. Bruening, Y. Kang & M. McGinnis, eds., *Papers at the Interface*. Vol. 30, MITWPL, pp. 425–449.

Halle, Morris & Alec Marantz (1993): Distributed Morphology and the Pieces of Inflection. In: K. Hale & S. J. Keyser, eds., *The View from Building 20*. MIT Press, Cambridge, Mass., pp. 111–176.

Halle, Morris & Alec Marantz (1994): Some Key Features of Distributed Morphology. In: A. Carnie, H. Harley & T. Bures, eds., *Papers on Phonology and Morphology*. Vol. 21 of *MIT Working Papers in Linguistics*, MITWPL, Cambridge, Mass., pp. 275–288.

Haspelmath, Martin (2007): Prominence Scales in Differential Object Marking: A Critique of Aissen (2003). Ms., MPI-EVA, Leipzig.

Jelinek, Eloise (1993): Ergative 'Splits' and Argument Type. In: J. Bobaljik & C. Phillips, eds., *Papers on Case and Agreement I*. Vol. 18 of *MIT Working Papers in Linguistics*, MITWPL, MIT: Cambridge, Mass., pp. 15–42.

Kalin, Laura (2016): Phi-Features as Derivational Time Bombs: A New Model of Nominal Licensing. Ms., Princeton University.

Karch, Dieter (1975a): *Mannheim: Umgangssprache*. Number 8 *in* 'Phonai Monographien', Niemeyer, Tübingen.

Karch, Dieter (1975b): *Zur Morphologie vorderpfälzischer Dialekte*. Niemeyer.

Keine, Stefan (2009): Impoverishment Effects on Agreement. Master's thesis, Universität Leipzig. To appear in the series *Linguistische Arbeiten*; Tübingen: Niemeyer.

Keine, Stefan (2010): *Case and Agreement from Fringe to Core. Impoverishment Effects on Agree*. Linguistische Arbeiten, Mouton de Gruyter, Berlin.

Keine, Stefan & Gereon Müller (2011): Non-Zero/Non-Zero Alternations in Differential Object Marking. In: S. Lima, K. Mullin & B. Smith, eds., *Proceedings of the 39th Meeting of the North East Linguistics Society*. GLSA, Amherst, Mass., pp. 441–454.

Keine, Stefan & Gereon Müller (2014): Differential Argument Encoding by Impoverishment. In: I. Bornkessel-Schlesewsky, A. Malchukov & M. Richards, eds., *Scales and Hierarchies*. Trends in Linguistics, Mouton de Gruyter, Berlin, pp. 75–130.

Kiparsky, Paul (1998): Partitive Case and Aspect. In: M. Butt & W. Geuder III, eds., *The Projection of Arguments*. CSLI Publications, Stanford University, pp. 265–307.

Kiparsky, Paul (1999): Analogy and OT: Morphological Change as Emergence of the Unmarked. Ms., Stanford University.

Kiparsky, Paul (2001): Structural Case in Finnish, *Lingua* 111, 315–376.

Klamer, Marian (1998a): *A Grammar of Kambera*. Mouton de Gruyter, Berlin.

Klamer, Marian (1998b): Kambera Intransitive Argument Linking, *Studia Linguistica* pp. 77–111.

Lahne, Antje (2007): A Multiple Specifier Approach to Left Peripheral Architecture. Ms., Universität Leipzig. To appear in *Linguistic Analysis*.

Laka, Itziar (1993): Unergatives that Assign Ergative, Unaccusatives that Assign Accusative. In: J. Bobaljik & C. Phillips, eds., *Papers on Case and Agreement I*. Vol. 18 of *MIT Working Papers in Linguistics*, MITWPL, MIT: Cambridge, Mass., pp. 149–172.

Legate, Julie Anne (2008): Morphological and Abstract Case, *Linguistic Inquiry* 39(1), 55–101.

Legendre, Géraldine, Paul Smolensky & Colin Wilson (1998): When is Less More? Faithfulness and Minimal Links in Wh-Chains. In: P. Barbosa, D. Fox, P. Hagstrom, M. McGinnis & D. Pesetsky, eds., *Is the Best Good Enough?*. MIT Press and MITWPL, Cambridge, Mass., pp. 249–289.

Levin, Juliette & Diane Massam (1985): Surface Ergativity: Case/Theta Relations Reexamined. In: S. Berman, ed., *Proceedings of NELS 15*. BLS, Amherst, Mass.

Levin, Lorraine (1986): Operations on Lexical Forms: Unaccusative Rules in Germanic Languages. Ph.d. thesis, MIT, Cambridge, Mass.

Lumsden, John (1992): Underspecification in Grammatical and Natural Gender, *Linguistic Inquiry* 23, 469–486.

Macaulay, Monica (2005): On the 2 > 1 Prominence Hierarchy of Algonquian, *LSO Working Papers in Linguistics* 5, 1–24.

Marantz, Alec (1991): Case and Licensing. In: German Westphal, B. Ao & H.-R. Chae, eds., *Proceedings of the Eigth Eastern States Conference on Linguistics*. University of Maryland, pp. 234–253.

McFadden, Thomas (2004): The Position of Morphological Case in the Derivation: A Study on the Syntax-Morphology Interface. PhD thesis, University of Pennsylvania.

Morgenroth, Lisa & Martin Salzmann (2013): Reanalyse syntaktischer Ergativität. Ms., Universität Leipzig.

Morphy, Frances (1983a): Djapu, a Yolngu Dialect. In: R. Dixon & B. Blake, eds., *Handbook of Australian Languages, Vol. 3*. Benjamins, Amsterdam, pp. 1–188.

Morphy, Frances (1983b): Djapu, A Yolngu Dialect. In: R. M. Dixon & B. J. Blake, eds., *Handbook of Australian languages, Vol. 3*. John Benjamins Publishing, Amsterdam, pp. 1–189.

Müller, Gereon (2003): Zwei Theorien der pronominalen Flexion im Deutschen (Versionen Standard und Mannheim), *Deutsche Sprache* 30, 328–363.

Müller, Gereon (2004): A Distributed Morphology Approach to Syncretism in Russian Noun Inflection. In: O. Arnaudova, W. Browne, M. L. Rivero & D. Stojanovic, eds., *Proceedings of FASL 12*. University of Ottawa.

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.

Müller, Gereon (2007): Notes on Paradigm Economy, *Morphology* 17, 1–38.

Müller, Gereon (2009): Ergativity, Accusativity, and the Order of Merge and Agree. In: K. K. Grohmann, ed., *Explorations of Phase Theory. Features and Arguments*. Mouton de Gruyter, Berlin, pp. 269–308.

Müller, Gereon & Daniela Thomas (2014): Three-Way Systems Do Not Exist. Ms., Universität Leipzig. To appear in Jessica Coon, Lisa Travis & Diane Massam (eds.), *The Oxford Handbook of Ergativity*. Oxford: Oxford University Press.

Murasugi, Kumiko (1992): Crossing and Nested Paths. PhD thesis, MIT, Cambridge, Mass.

Noyer, Rolf (1992): Features, Positions, and Affixes in Autonomous Morphological Structure. PhD thesis, MIT, Cambridge, Mass.

Noyer, Rolf (1998): Impoverishment Theory and Morphosyntactic Markedness. In: S. Lapointe, D. Brentari & P. Farrell, eds., *Morphology and its Relation to Phonology and Syntax*. CSLI, Palo Alto, pp. 264–285.

Opitz, Andreas (2006): A Reanalysis of Definiteness-Markers in Albanian Noun Inflection. In: G. Müller & J. Trommer, eds., *Subanalysis of Argument Encoding in Distributed Morphology*. Vol. 84 of *Linguistische Arbeitsberichte*, Universität Leipzig, pp. 103–114.

Opitz, Andreas (2007): Case and Markedness in Tlapanec. In: J. Trommer & A. Opitz, eds., *1 2 Many*. Vol. 85 of *Linguistische Arbeitsberichte*, Universität Leipzig, pp. 173–203.

Pesetsky, David (1997): Optimality Theory and Syntax: Movement and Pronunciation. In: D. Archangeli & T. Langendoen, eds., *Optimality Theory. An Overview*. Blackwell, Oxford, pp. 134–170.

Pesetsky, David (1998): Some Optimality Principles of Sentence Pronunciation. In: P. Barbosa, D. Fox, P. Hagstrom, M. McGinnis & D. Pesetsky, eds., *Is the Best Good Enough?*. MIT Press and MITWPL, Cambridge, Mass., pp. 337–383.

Plank, Frans (1979): Ikonisierung und De-Ikonisierung als Prinzipien des Sprachwandels, *Sprachwissenschaft* 4, 121–158.

Post, Rudolf (1990): *Pfälzisch*. Pfälzische Verlagsanstalt, Landau.

Prince, Alan & Paul Smolensky (1993): Optimality Theory. Constraint Interaction in Generative Grammar. Book ms., Rutgers University.

Prince, Alan & Paul Smolensky (2004): *Optimality Theory. Constraint Interaction in Generative Grammar*. Blackwell, Oxford.

Rezac, Milan (2003): The Fine Structure of Cyclic Agree, *Syntax* 6, 156–182.

Rude, Noel Emerson (1985): Studies in Nez Perce Grammar and Discourse. PhD thesis, University of Oregon.

Schäfer, Florian (2012): Local Case, Cyclic Agree, and the Syntax of Truly Ergative Verbs. In: A. Alexiadou, T. Kiss & G. Müller, eds., *Local Modelling of Non-Local Dependencies in Syntax*. De Gruyter, Berlin, pp. 273–304.

Silverstein, Michael (1976): Hierarchy of Features and Ergativity. In: R. Dixon, ed., *Grammatical Categories in Australian Languages*. Australian Institute of Aboriginal Studies, Canberra, pp. 112–171.
Smolensky, Paul (1995): On the Internal Structure of Con, the Constraint Component of UG. Ms., Johns Hopkins University.
Smolensky, Paul (1996): On the Comprehension/Production Dilemma in Child Language, *Linguistic Inquiry* 27, 720–731.
Smolensky, Paul (2006): Harmonic Completeness, Local Constraint Conjunction, and Feature Domain Markedness. In: P. Smolensky & G. Legendre, eds., *The Harmonic Mind*. Vol. II, MIT Press, Cambridge, Mass., chapter 14, pp. 27–160.
Smolensky, Paul & Geraldine Legendre (2006): *The Harmonic Mind*. MIT Press, Cambridge, Mass.
Stiebels, Barbara (2002): *Typologie des Argumentlinkings: Ökonomie und Expressivität*. Akademie Verlag, Berlin.
Trommer, Jochen (1999): Morphology Consuming Syntax' Resources. In: *Procceedings of the ESSLI Workshop on Resource Logics and Minimalist Grammars*. University of Nijmegen, pp. 37–55.
Trommer, Jochen (2001): Distributed Optimality. PhD thesis, Universität Potsdam.
Trommer, Jochen (2005): Markiertheit und Verarmung. Ms., Universität Leipzig. Presented at the Honorary Doctorate Colloquium for Manfred Bierwisch, Leipzig 2005.
Trommer, Jochen (2006): Person and Number Agreement in Dumi, *Linguistics* 44, 1011–1057.
Ura, Hiroyuki (2000): *Checking Theory and Grammatical Functions in Universal Grammar*. Oxford University Press, New York.
Ura, Hiroyuki (2006): A Parametric Syntax of Aspectually Conditioned Split-Ergativity. In: A. Johns, D. Massam & J. Ndayiragije, eds., *Ergativity*. Springer, pp. 111–141.
Watters, David E. (2002): *A Grammar of Kham*. Cambridge University Press, Cambridge.
Wiese, Bernd (1999): Unterspezifizierte Paradigmen. Form und Funktion in der pronominalen Deklination, *Linguistik Online* 4. (www.linguistik-online.de/3_99).
Wiese, Bernd (2001): Paradigmen aus formbezogener Sicht. Handout, IDS Mannheim.
Wiese, Bernd (2003): Zur lateinischen Nominalflexion: Die Form-Funktions-Beziehung. Ms., IDS Mannheim. www.ids-mannheim.de/gra/personal/wiese.html.
Wiese, Bernd (2004): Categories and Paradigms: On Underspecification in Russian Declension. In: G. Müller, L. Gunkel & G. Zifonun, eds., *Explorations in Nominal Inflection*. Mouton de Gruyter, Berlin, pp. 321–372.
Woolford, Ellen (1997): Four-Way Case Systems: Ergative, Nominative, Objective and Accusative, *Natural Language and Linguistic Theory* 15, 181–227.
Wunderlich, Dieter (1997a): Cause and the Structure of Verbs, *Linguistic Inquiry* 27, 27–68.
Wunderlich, Dieter (1997b): Der unterspezifizierte Artikel. In: C. Dürscheid, K. H. Ramers & M. Schwarz, eds., *Sprache im Fokus*. Niemeyer, Tübingen, pp. 47–55.
Wunderlich, Dieter (2000): Reconsidering Structural Case in Finnish. Ms., Universität Düsseldorf.
Wunderlich, Dieter (2004): Is There Any Need for the Concept of Directional Syncretism?. In: G. Müller, L. Gunkel & G. Zifonun, eds., *Explorations in Nominal Inflection*. Mouton de Gruyter, Berlin, pp. 373–395.
Wunderlich, Dieter (2006): Towards a Structural Typology of Verb Classes. In: D. Wunderlich, ed., *Advances in the Theory of the Lexicon*. Mouton de Gruyter, Berlin, pp. 57–166.
Wurzel, Wolfgang Ullrich (1984): *Flexionsmorphologie und Natürlichkeit*. Akademie Verlag, Berlin.