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One-to-many relations in grammar

Edited by

Jochen Trommer & Andreas Opitz

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Universität Leipzig
Beethovenstraße 15
D-04107 Leipzig

Tel.: +341 97 37 610
Fax: +341 97 37 609
E-mail: infl@rz.uni-leipzig.de

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Preface

Jochen Trommer & Andreas Opitz

One-to-many relations play a crucial role in two major research areas of current grammatical theory: quirky identity and paucity of resources. This volume collects ten papers addressing these topics from different perspectives, focussing on new theoretical approaches to long-standing empirical problems. The ideas and analyses documented in these contributions have emerged in the context of the international scientific network *Core Mechanisms of Exponence* and the research project *Argument Encoding in Morphology and Syntax* (as part of the DFG-Forschergruppe 742). As in the predecessor volume *Linguistische Arbeits Berichte 84*, language data are drawn from a large sample of Indoeuropean (Hindi, Old French, Bulgarian, Romanian, German, Latin, Old Irish) and non-Indoeuropean languages (Southern Tiwa, Siroi, Bonan, Yurok, Diyari, Seerer-Siin, Tlapanec). The theoretical frameworks adopted range from the Minimalist Program over Distributed Morphology to different versions of Optimality Theory.

Paucity of resources is a prominent theme in current research on "Person-Case-Constraint" (PCC) effects (Bonet, 1991), where specific cooccurrences of two clitics or agreement markers corresponding to different object DPs lead to ungrammaticality. According to the prevalent view, PCC effects result from configurations where two DPs are within the domain of a single probing head, and effectively compete for the featural resources of the probe (Rezac, 2004; Anagnostopoulou, 2006). In the paper by Heck and Richards, this line of research is extended to the polysynthetic system of Southern Tiwa which shows a complex array of restrictions on agreement for three arguments and incorporation. A second syntactic incarnation of resource paucity addressed in the paper by Georgi and Müller can be found in constructions where a single syntactic head serves multiple duty, and reprojects in a higher position to satisfy different checking requirements of the same argument. In morphological theory, paucity of resources pops up wherever different morphosyntactic categories compete for realization in the same morphological slot (Anderson, 1992; Noyer, 1992; Stump, 2001) or conversely where a single category could be realized in different slots (e.g. a clitic and an agreement slot), but is restricted by the morphological

system to one position (Woolford, 2003). These still poorly understood phenomena are addressed in detail in the papers by Biskup, Opitz, and Trommer raising substantial questions on the extent of these restrictions in the face of obvious redundancy in morphology, and on their interplay with the pervasive effects of prominence scales in morphosyntax (Aissen, 2003).

Syncretism, i.e. paradigmatic identity, is one of the best-known instances of one-to-many relations: one word form (or one part of a word form) is used in different paradigmatic slots. Recent work in morphological typology (Cysouw, 2003; Baerman et al., 2005) has shown that there are a number of generalizations not captured by existing analyses, and challenging counter-examples to apparent crosslinguistic generalizations on possible syncretism ("quirky syncretism"). Current approaches to quirky syncretism either try to reduce it to more natural types of syncretism (Trommer, 2006), or resort to formally unrestrictive rules of referral (Baerman, 2005), both strategies having their specific shortcomings. A number of papers in this volume explore more radical cures: Müller develops a morphological system which replaces traditional rules or units of exponence by "meaning-less" markers whose distribution is governed by the interaction of morphological-phonological cooccurrence restrictions and a strictly phonologically driven preference for more sonorous formants. The papers by Weisser and Lahne attack quirky syncretism from another angle, and interestingly enough the approaches they propose are based on embracing paucity of resources: unusual syncretism patterns are triggered by paradigmatic cells which must be filled by exponents also used in other cells due to the lack of better-suited markers and subject to specific wellformedness and minimality conditions. Two more papers address quirky identity under an interface perspective: The paper by Keine argues that previously syntactically analyzed syncretism patterns in the case marking system of Hindi are actually due to standard morphological means. Zimmermann and Trommer defend a correspondence-theoretic analysis of fixed-segmentism reduplication, i.e. formations where reduplication comes along with overwriting affixation, which may backcopy to the base of reduplication.

References

Aissen, J. (2003). Differential object marking: Iconicity vs. economy. *Natural Language and Linguistic Theory*, 23(3):435–483.

Anagnostopoulou, E. (2006). Strong and weak person restrictions: A feature checking analysis. In Heggie, L. and Ordoez, F., editors, *Clitics and Affixation*, pages 199–235. Amsterdam.

Anderson, S. R. (1992). *A-Morphous Morphology*. Cambridge: Cambridge University Press.

Baerman, M. (2005). Directionality and (un)natural classes in syncretism. *Language*, 80(4):807–827.

Baerman, M., Brown, D., and Corbett, G. (2005). *The syntax-morphology interface: a study of syncretism*. Cambridge: Cambridge University Press.

Bonet, E. (1991). *Morphology after syntax: Pronominal clitics in Romance*. PhD thesis, MIT.

Cysouw, M. (2003). *The Paradigmatic Structure of Person Marking*. Oxford: Oxford University Press.

Noyer, R. R. (1992). *Features, Positions and Affixes in Autonomous Morphological Structure*. PhD thesis, MIT.

Rezac, M. (2004). *Elements of Cyclic Syntax: Agree and Merge*. PhD thesis, University of Toronto.

Stump, G. T. (2001). *Inflectional Morphology*. Cambridge: Cambridge University Press.

Trommer, J. (2006). Plural insertion is constructed plural. In Müller, G. and Trommer, J., editors, *Subanalysis of Argument Encoding in Distributed Morphology*, volume 84 of *Linguistische Arbeits Berichte*, pages 197–228. Institut für Linguistik: Universität Leipzig.

Woolford, E. (2003). Clitics and agreement in competition: Ergative cross-referencing patterns. In Carpenter, A. C., Coetzee, A. W., and de Lacy, P., editors, *Papers in Optimality Theory II*, volume 26 of *University of Massachusetts Occasional Papers*, pages 421–449. Amherst: GLSA.

On Deriving Polarity Effects

Antje Lahne*

Abstract
In this paper, I argue for a new, theory-neutral approach to polarity effects resting upon the idea that the choice of marker for a given feature specification is determined by the choice of marker for a minimally different specification. In paradigms instantiating polarity effects, the matching of morpho-syntactic and phonological features proceeds by natural class based-rules, but is partly overriden by two principles, Discreteness of Environment and Minimality, the latter of which is an independently motivated assumption underlying syntactic derivations, and arguably a basic property of language in general.

1. Background

The concept of natural classes is one of the most basic concepts of linguistic description. However, there are data that seem to escape analyses making use of natural classes. The arguably most striking example are polarity effects in inflectional paradigms, that is, "complementary distributions of inflectional markers in such a way that syncretism constitutes itself in mirror-image identity of non-contiguous paradigmatic cells" (Baerman et al. 2005:104). These effects can be found in Old French masculine o-stems (Rheinfelder 1976), where the syncretism pattern that occurs is that of a chessboard: nominative singular syncretises with the accusative plural, and the nominative plural syncretises with the accusative singular (table 1). Likewise, in the Somali definite article (Saeed 1999:112), the masculine singular and the feminine plural are syncretic, and the masculine plural and the feminine singular are syncretic (table 2).

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Table 1
Old French
Masculine o-stems

	SG	PL
NOM	-s	-ø
OBJ	-ø	-s

Table 2
Somali
Definite article

	SG	PL
FEM	-ta	-ka
MASC	-ka	-ta

These "chessboard distributions" do not seem to be analysable by having recourse to natural classes (cf. Baerman et al. 2005), as the two morpho-syntactic feature specifications associated with one phonological form do not have a common value for any given feature (or do not have a common distinctive structure for any given dimension), no matter which particular feature representation is chosen, and therefore cannot be referred to by means of standard natural class-based rules.

2. On the Systematicity of Polarity Effects

Chess board distributions can be treated by morphological theories in two different ways:

(I) Natural classes are taken to be the sole underlying concept. Consequently, polarity effects come as a completely accidental pattern (i.e., they are ignored by the morphological theory).

(II) The systematicity of chess board distributions is integrated into the morphological theory. There are basically two ways of accomplishing this:

a. The theory defines new natural classes such that seemingly un-unifiable specifications come out as forming a class (e.g. exactly *because* of their property of being un-unifiable);

b. The matching of morpho-syntactic and phonological features is modeled in such a way that it proceeds according to natural class based-rules, but can be overriden by other morphological principles or processes.

Section 2.1 discusses theories of type (I). Two powerful techniques of type (II–a) are discussed in section 2.2. To my knowledge, there is no type (II–b) theory of polarity effects up to now (though Weißer (2007), an analysis of L-shaped syncretisms, can perhaps be extended to account for polarity effects). In this paper I would like to propose a new analysis of the data which makes use of strategy (II–b).

2.1. Polarity Effects as an Accidental Pattern

It seems at first sight that polarity effects are not a systematic, but an accidental pattern. The seeming syncretisms in the paradigms in tables 1 and 2 could therefore be seen as a case of marker homonymy, as shown in (1) for the Old French example.[1]

(1) Vocabulary items for Old French noun inflection:
/-s/ ↔ [+obj +pl +m +x[2]]
/-s/ ↔ [–obj –pl +m +x]
/-ø/ ↔ [ ]

The alternative – if polarity effects are understood as an accidental pattern – is to assume that impoverishment rules, or rules of referral, respectively (Halle and Marantz 1993; Noyer 1997; Bobaljik 2002; Stump 1993, 2001) are at work in these data. The basic idea of this device is that a marker which is expected to appear in the context of a certain morphosyntactic feature specification is replaced by a different marker due to a feature modification operation which is prioritised in the sense that it applies before matching with phonological features takes place. As a result, when the phonological features are inserted, the set containing the modified feature(s) is matched with a previously unexpected, potentially underspecified marker. (2) shows the prioritised rule for the Somali definite article in two notational variants: (2a) is a possible impoverishment rule from the Distributed Morphology framework (multiple non-standard feature-changing impoverishment as pro-

[1]Throughout the paper, the association of markers and forms is given in the notation used in Distributed Morphology. The analysis is however theory-neutral; it can be implemented in any mophological theory.

[2]x= class feature defining o-stems.

posed in Noyer 1998), and (2b) is a rule of referral from the framework of Word-and-Paradigm Morphology.

(2) a. Impoverishment rule for the Somali definite article:
[+f +pl] > [–f –pl] / [+art +def]
b. Rule of referral for the Somali definite article:[3]
$I_{\{[+f\ +pl]\}} \rightarrow I_{\{[-f\ -pl]\}}$ / [+art +def]__.

The effect of this prioritised rule is that whenever the system encounters the morphosyntactic context [+f +pl], this context is changed to [–f –pl]. The vocabulary items for the Somali definite article are given in (3).

(3) Vocabulary items for the Somali definite article:
/-ka/ ↔ [–f –pl]
/-ta/ ↔ [ ]

The *a priori* expected marker for the context [+f +pl] is /-ta/. However, as the features [+f +pl] of the head (or cell) have been overwritten by [–f –pl], the morphosyntactic context now matches the specification for /-ka/, thus /-ka/ is inserted in the context [+f +pl].
A difference between impoverishment rules and rules of referral is that impoverishment rules are conceived as being more restrictive inasfar as they are either deletions of features or changes of values from [+x]→[–x], or [±x]→[x] (i.e., a retreat to the general case causing the insertion of a less specific marker; Halle and Marantz 1993, 1994; Noyer 1998), whereas rules of referral by definition modify features without restrictions.

2.2. Polarity Effects as a Systematic Pattern

As has been shown by Baerman (2007), polarity effects are far from being a rare phenomenon in the world's languages; they occur e.g. in Hebrew gender marking, Old Church Slavonic neuter noun and adjective suffixes, voicing reversal in Luo, Estonian partitive endings, Nehan definite articles, Tübatulabal aspect marking, and tense marking in Trique. It therefore seems to be reasonable to model morphological

[3] $I_{\{+x\}}$ represents the inflection marker for context {+x}, and → represents "is replaced by".

theory in such a way that polarity effects follow as a systematic pattern. Two solutions have been previously suggested.

One possible way of capturing polarity effects as a systematic pattern is to establish natural classes by abstracting over feature values (*α-notation*, Chomsky and Halle 1968). (4) shows the vocabulary items for the Somali definite article using α-notation.

(4) Vocabulary items for Somali definite article:
/-ta/ ↔ [αf −αpl]
/-ka/ ↔ [ ]

This solution has been modelled as a powerful device of forming natural classes. However, as is shown in (5) for the Somali definite article, if the variable in the insertion rule is resolved, then *α-notation* turns out to be a mere notational variant for homonymous markers.

(5) /-ta/ ↔ {[+f −pl], [−f +pl]}

A second possible solution, proposed by Béjar and Hall (1999), is to assume a new form of underspecification by which seemingly un-unifiable specifications come out as forming a natural class. The basic idea of this geometry-based approach is that natural classes are defined by the degree of featural markedness (where markedness is defined in terms of presence or absence of structure in a feature-geometrical representation). Let me sketch this approach for the Old French data. The analysis is based on the following case and number decomposition:[4]

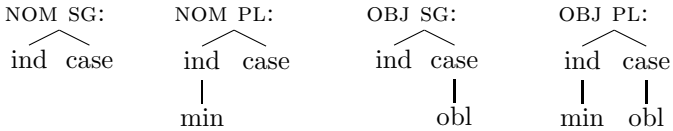
(6) Old French: feature geometry

SINGULAR:	PLURAL:	NOMINATIVE:	OBJECTIVE:
ind	ind	case	case
|	|	|	|
min	group	subj	obj

The combination of case and number features yields the featural representations of the four contexts:

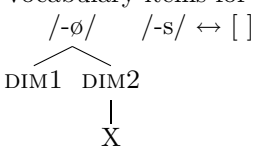
[4]Abbreviations in this paper: ind=individuation; min=minimal; part=participant; spk=speaker; addr=addressee; subj=subject; obj=object; obl=oblique.

(7) Old French: case-number combinations



The specifications that form a natural class in this approach are OBJ SG and NOM PL in that both are specified for the dimension node on one branch ([ind] in the case of OBJ SG, and [case] in NOM PL), and the dimension node plus a further node on the other branch ([case|obj] in OBJ SG, and [ind|group] in NOM PL). The vocabulary items for Old French are given in (8).

(8) Vocabulary items for Old French:



In this case, the zero marker is the most specific vocabulary item. It is inserted in NOM PL and OBJ SG contexts. /-s/ is the elsewhere marker and thus matches all other contexts (NOM SG, OBJ PL). The zero marker cannot be inserted in the context NOM SG: though on one branch this context is specified for a dimension node only ([ind] or [case], respectively), it is not specified for a dimension node plus a further node on the other branch. Note that the system crucially relies on the assumption that underspecification is not at work in vocabulary insertion operating on degrees of structural markedness; thus, the zero marker cannot be inserted in OBJ PL contexts. This assumption is potentially incompatible with the need for full underspecification (i.e., the specification of /-s/ as the elsewhere marker). This dilemma can possibly be solved by assuming that the grammar allows for a mixed system of both feature-based and markedness-based insertion rules, where the former are subject to underspecification, and the latter must be fully specified for the context where they can be inserted.

2.3. A Motivation for Polarity Effects

Up to now, a single argument has been given in favour of a systematic analysis of polarity effects: that it is not unknown among the world's

6000 languages. The desideratum however is to recover a deeper motivation for why this seemingly random pattern is actually systematic. The starting point for such a motivation is the empirical observation that the matching of phonological forms with morphological or syntactic specifications can be accomplished by embarking on one of three basic strategies:

(A) Targeting minimal ambiguity with maximal formal inventory (i.e., yielding no syncretisms at all);

(B) Making use of syncretisms in natural classes;

(C) Targeting minimal ambiguity with minimal formal inventory (i.e. yielding evenly distributed syncretisms).

Strategy (A) occurs e.g. in Greek aorist or Russian present indicative, while strategy (B) seems to be favoured in the world's languages. The typical chessboard distributions of morphological polarity are instantiations of strategy (C). The implication of this typology of matching strategies is that polar distribution of inflectional markers is in no way unexpected, but the most efficient way of referring to feature specifications minimally ambiguously with a minimal formal inventory (i.e., minimal formal inventory, but at the same time minimal ambiguity).

3. Claim

The goal of this paper is to propose a new analysis of polarity effects as a systematic pattern resting upon the idea that the choice of marker for a given feature specification is determined by the choice of marker for a minimally different specification. In the new approach, polarity effects are a result of the interaction of natural class-based rules and two economy principles, Discreteness of Environment and Minimality.

(9) **Discreteness of Environment (general version)**
Adjacent cells must be discretely marked.

(10) **Minimality**
If the association of a marker M_1 with a matching morpho-syntactic environment $[\alpha]$ violates a principle P, then insert a marker M_2 such that M_2 meets P and the features of M_2 are minimally distinct from the features of M_1.

The effect of (9) and (10) is that the choice of marker for a given feature specification is determined by the choice of marker for a minimally different specification: whenever a marker matches a feature specification but is prohibited by Discreteness, a marker with a minimally different specification is chosen to fill the given cell.

Minimality is one of the basic properties of language (alongside e.g. compositionality, double articulation, and cyclicity). Syntactic examples of minimality effects are manifold, e.g. wh-movement in English:

(11) a. (I wonder) who$_1$ t$_1$ invented what$_2$
b. * (I wonder) what$_2$ who$_1$ invented t$_2$
c. * What$_2$ did who$_1$ invent t$_2$?

Data like (11) show that in English multiple wh-questions, extraction of the lower wh-item is accepted by native speakers to a much lesser degree than extraction of the higher wh-item. The same principle is at work in extraction from complex NPs:

(12) a. They heard [$_{DP_1}$ a rumour that [$_{DP_2}$a linguist] dined and dashed at Café Kowalski]
b. [$_{DP_1}$What] did they hear t$_1$?
c. * [$_{DP_2}$Who] did they hear [$_{DP_1}$ a rumour that t$_2$ dined and dashed at Café Kowalski?]

A third example is object shift in Icelandic, where the higher, but not the lower object can be moved above the negation (Collins and Thráinsson 1996):

(13) a. Ég lána Maríu$_1$ ekki t$_1$ bækurnar$_2$
I lend Maria.DAT not books.ACC
b. * Ég lána bækurnar$_2$ ekki Maríu$_1$ t$_2$
I lend books.ACC not Maria.DAT
I do not lend the books to Maria

The underlying principle has been formulated first in Chomsky (1964) as *A-over-A Principle*, of which a generalised version (*F-over-F*) is given in (14a). It was reformulated as *Superiority Condition* (14b).[5]

[5]The difference between (14a) and (14b) is that β dominates γ in the F-over-F Principle, whereas in the Superiority Condition, β c-commands γ.

(14) a. **F-over-F Principle**
In a structure $\alpha_{[*F*]}$ ... $[\beta_{[F]}$... $[\gamma_F$ ...] ...] ..., movement to [*F*] can only affect the category bearing the [F] feature that is closer to [*F*].

b. **Superiority Condition** (Chomsky 1973):
In a structure $\alpha_{[*F*]}$ ... [... $\beta_{[F]}$ ... [... γ_F ...] ...] ..., movement to [*F*] can only affect the category bearing the [F] feature that is closer to [*F*].

The most recent formulation of the minimality principle is the combination of these two constraints, known as the *Minimal Link Condition*:

(15) **Minimal Link Condition** (Chomsky 2000, 2001):
If β and γ both match a probe α and β asymmetrically c-commands γ, a syntactic operation cannot involve α and γ.

Minimality is also an underlying principle in language processing (Late Closure, Minimal Chain Principle, Minimal Attachment; see e.g. Frazier and Fodor 1978; Bornkessel and Schlesewsky 2006) and phonology (e.g. association lines in autosegmental phonology; Goldsmith 1976). It therefore seems reasonable to assume that the minimality property of language is at work in morphology, too (Müller 2007).

4. Formal Implementation

The new analysis works independently of a particular feature representational system. Section 4.1 demonstrates the implementation in an approach resting upon feature geometry; in section 4.2 the analysis is implemented for a binary feature system.

4.1. Implementation for Feature Geometry Representations

The basic assumption of approaches working with feature geometries is that grammatical categories are represented as decomposed into geometrically organized privative features (Harley and Ritter 2002, among many others). The feature geometry for Old French masculine o-stems is the one given in (6). The basic idea of this analysis is that paradigms are generated in such a way that the system detects the most specific vocabulary item and the morphosyntactic specification associated with

it, and then detects a contiguous specification and the marker associated with it. The system thus proceeds until all cells have been filled. The transition from cell to cell (or specification to specification) is accomplished by detecting that the featural specification of the "new" cell can be reached starting from the feature specification of the "old" cell by a transition from a node α in the feature geometry to an adjacent node β. In paradigms showing polar distributions, this transition from node to node is subject to the Discreteness Principle, which is given in (16) in its feature geometry version.

(16) **Discreteness of Environment (feature geometry version)**
Adjacent nodes in the geometry must be discretely marked.

This constraint has the effect that whenever a marker M_β is detected by a transition from a node α to a node β, then the marker associated with M_β has to be phonologically distinct from M_α. If M_α and M_β are associated with the same phonological features, then the choice of marker is determined by the Minimality Principle (10). The vocabulary items for Old French masculine o-stems are given in (17).

(17) Vocabulary items for Old French (masc. o-stems)
/-s/ ↔ [case|obj ind|group]
/-ø/ ↔ [ ]

The paradigm develops in such a way that at first the most specific vocabulary item (/-s/ ↔ [case|obj ind|group]) is inserted in the matching context (Specificity Principle).

(18)

MORPHOSYNTACTIC REPRESENTATION	PHON. REPRES.
ind|group case|obj	-s

Now the most proximate specification is detected (either [ind|group case|subj] or [ind|min cas|obj]; it is of no import which way the system takes in unfolding the paradigm). The transition to either of these specifications is achieved by a transition to an adjacent node in the geometry ([group→ind→min], or [obj→case→subj]). The matching marker for these nodes is /-ø/ (underspecification; cf. Identity Default Rule, Stump 2001). The insertion of the zero marker conforms to the Discreteness Principle: adjacent nodes in the geometry are marked differently.

(19)

MORPHOSYNTACTIC REPRESENTATION	PHON. REPRES.
ind|group case|**subj**	-ø
↑	
ind|*min* case|obj ⟵ ind|*group* case| **obj**	-ø -s

The system now detects the remaining specification [ind|min case|subj], which can only be matched with the zero marker. However, the insertion of this marker is prevented by the Discreteness Principle: [ind|min case|subj] and [ind|min case|obj] are adjacent, and [ind|min case|subj] and [ind|group case|subj] are adjacent, but in both cases the adjacent specifications are both associated with the zero marker, thus they are not discretely marked:

(20)

MORPHOSYNTACTIC REPRESENTATION	PHON. REPRES.
ind|*min* case|**subj** ← ind|*group* case|subj	*ø -ø
↑	
ind|min case| **obj** ind|group case|obj	-ø -s

In this case the choice of marker is determined by a principle of vocabulary insertion, Minimality:

(21) (=10) **Minimality**
If the association of a marker M_1 with a matching morphological environment [α] violates a principle P, then insert a marker M_2 that meets P iff. the feature specification of M_2 is minimally distinct from that of M_1.

The effect of this principle is that a marker with a minimally different specification is chosen to fill the given cell. The avaliable marker for [ind|min case|subj] with minimally different specification in Old French is the only alternative marker available in the Old French case system: /-s/. Thus, /-s/ is inserted in the context [ind|min case|subj].

(22)

MORPHOSYNTACTIC REPRESENTATION	PHON. REPRES.
ind|*min* case|**subj** ← ind|*group* case|subj	-s -ø
↑	
ind|min case| **obj** ind|group case|obj	-ø -s

4.2. Implementation for Binary Feature Representations

In a system based upon a binary feature representation, the principles of Discreteness and Minimality can be formulated in the form of the following algorithm:[6]

(23) **Discreteness of Environment/ Minimality (binary feature version):**

a. Let x,y = associations of morpho-syntactic and phonological features ("cells").
Let F = morpho-syntactic feature $\in$ x,y.
Let P= set of phonological features $\in$ x,y.

b. f(sim(x,y)) = n =
{
n=0;
for all F
if val(x)(F_i)= val(y)(F_i)
then n=n+1:
}

c. {
if n=1, then $P_x \neq P_y$.
if n$\neq$1, then $P_x = P_y$
}

(23b) is a function over the morphosyntactic similarity of a "cell" (i.e., associations of morpho-syntactic and phonological features) x and a "cell" y. In 4-cell paradigms, two primitive features are minimally needed (and thus optimal) to uniquely characterise each of the cells. These features can be cross-classified, as shown in (24):

(24) Feature distribution in 4-cell paradigms:

	$-F_1$	$+F_1$
$-F_2$	$-F_1$ $-F_2$	$+F_1$ $-F_2$
$+F_2$	$-F_1$ $+F_2$	$+F_1$ $+F_2$

[6] Andrew Nevins, p.c.

The function f(sim(x,y)) operates with all possible pairs of (x,y), that is, all possible pairs of "cells". In a 4-cell paradigm, there are 6 possible combinations:

(25) $\{-F_1\ -F_2, -F_1\ +F_2\}$;
$\{-F_1\ -F_2, +F_1\ -F_2\}$;
$\{-F_1\ -F_2, +F_1\ +F_2\}$;
$\{+F_1\ +F_2, -F_1\ +F_2\}$;
$\{+F_1\ +F_2, +F_1\ -F_2\}$;
$\{+F_1\ -F_2, -F_1\ +F_2\}$.

For any given pair (x,y), f compares the values of a given feature F_i. If the value F_i of x equals the value F_i of y, then the counter n is set to 1. If the value F_i of x is not equal to the value F_i of y, then n is not raised. Now (23c), the algorithm controlling the phonological realisation, comes into effect: if f returns a number unequalling 1 for a given pair of "cells", then the set of phonological features of x and y must be identical; if f returns 1 for a given pair of "cells", then the phonological features of x and y must not be identical.

Let me exemplify the analysis by means of the Old French masculine o-stem paradigm. The case and number features are decomposed as given in table 3.

Table 3

Old French Masculine o-stems

	SG	PL
NOM	–pl –obj /-s/	+pl –obj /-ø/
OBJ	–pl +obj /-ø/	+pl +obj /-s/

Let x equal [–pl –obl], and y=[+pl –obl]. F_1 is thus [pl], and F_2 = [obl]. The algorithm starts with n=0. The value of (x)([pl]) equals '–', and val(y)([pl])='+', thus val(x)(F_1) $\neq$ val(y)(F_1); n is not raised. Now x and y are compared with regard to F_2. The value of (x)([obl]) equals '–', and val(y)(obl])='–', thus val(x)(F_2) = val(y)(F_2). The equation f(sim([+pl –obl],[+pl –obl])) thus returns 0+1 = 1. As a result, (23c) requires P_x to unequal P_y.
If x=[–pl +obl] and y=[+pl –obl], then val(x)(pl) $\neq$ val(y)(pl), and val(x)(obl) $\neq$ val(y)(obl). In this case, f returns 1+1=2. (23c) thus requires P_x to equal P_y.

5. Partial Polarity Effects

Partial polarity effects are complementary distributions of markers embedded in larger paradigms (Baerman et al. 2005). Examples are Romanian i-stem verbs with -esc/eşt-infix (Popovici 2003) and Old Irish masculine o-stems (Lühr 2004):

Table 4

Romanian I-stem verbs with -esc/eşt-infix

	SING	PLURAL
1	**-esc**	-im
2	-eşti	-iţi
3	-eşte	**-esc**

Table 5

Old Irish Masculine o-stems

	SING	PLURAL	DUAL
NOM	fer	fir	(dá) ḟer
ACC	fer	firu	(dá) ḟer
GEN	fir	fer	(dá) ḟer
DAT	fiur	feraib	(dib) feraib

The Romanian data can still be described in terms of an epiphenomenon by natural class-based rules alone. The marker /-esc/ then must be the elsewhere marker:

(26) Vocabulary items for Romanian i-stem verbs with -esc/eşt-infix:
/-eşte/ ↔ [–1 –2 –pl]
/-iţi/ ↔ [+2 +pl]
/-im/ ↔ [+1 +pl]
/-eşti/ ↔ [+2 –pl]
/-esc/ ↔ [ ]

However, such an analysis is impossible in the case of Old Irish unless a special device (prioritised operation, α-notation) or a homonymous form /fir/ (or /fer/) is assumed, as the morpho-syntactic environments associated with /fir/ (and, likewise, /fer/) do not have a common value for any given feature.

I would like to put forth a uniform solution for full and partial polarity. So far, however, the new analysis can only satisfactorily account for polarity effects that constitute themselves in strict chessboard distributions of inflectional markers. The solution is a refined notion of Discreteness: recall from section 4.1 that in the new theory, paradigms "unfold" by first inserting the most specific vocabulary item into

its morphosyntactic context, and then moving on to a contiguous cell, inserting the matching marker there, and so on; the transition from cell to cell is accomplished by a transition from node to node in the feature geometry. These node transitions are subject to the Discreteness Principle, which requires adjacent nodes in the geometry to be marked discretely. Partial polarity effects can be integrated into the theory by assuming that the Discreteness Principle can be active only on certain node transitions.

Let me illustrate this by means of the Romanian and Old Irish data. In Romanian verb inflection, there are two basic patterns: pattern A shows number syncretism in the 3rd person; pattern B is constituted by a syncretism of the 1st singular and 3rd plural forms.[7] This is illustrated in tables 6 and 7:

Table 6

Romanian C-final A-stems (PATTERN I)

	SING	PLURAL		SING	PLURAL
1	-ø	-ăm	1	A	D
2	-i	-aţi	2	B	E
3	**-ă**	**-ă**	3	**C**	**C**

Table 7

Romanian infixal I-stems (PATTERN II)

	SING	PLURAL		SING	PLURAL
1	**-esc**	-im	1	**A**	D
2	-eşti	-iţi	2	B	E
3	-eşte	**-esc**	3	C	**A**

The feature geometry relevant to these data is given in (27):

(27) Romanian: feature geometry

SING:	PLURAL:	1ST:	2ND:	3RD:
ind	ind	part	part	part
|	|	|	|	
min	group	spk	addr	

The new assumption made is that for verb classes following pattern II

[7]Pattern A occurs in a-stems, V-final i-stems, î-stems without infix, and some "irregular" verbs in the present indicative; Pattern B occurs in ea-stems, e-stems, C-final i-stems, i-stems with -esc/eşt-infix, î-stems with ăsc/ăşt-infix, and some "irregular" verbs in the present indicative.

there is a Discreteness constraint D_r on the transition SG → PL (i.e., [min → ind → group]):

(28) **Discreteness constraint for Romanian (D_r):**
[min → ind → group] must be discretely marked /__+V +y[8]

The paradigm generation proceeds analogously to Old French (cf. section 4.1), using the vocabulary items given in (29).

(29) Vocabulary items for Romanian I-stems with -esc/eşt-infix:

/-esc/ ↔ [ind|min part|spk]	*(1 sg)*
/-eşti/ ↔ [ind|min part|addr]	*(2 sg)*
/-im/ ↔ [ind|group part|spk]	*(1 pl)*
/-iţi/ ↔ [ind|group part|addr]	*(2 pl)*
/-eşte/ ↔ [ ]	*(3)*

According to the vocabulary specifications, the marker for 3 PL is the elsewhere marker /-eşte/. However, the insertion of /-eşte/ is prevented by D_r. Now the Minimality Principle comes into effect. The candidates for filling the cell in question and their feature specifications are shown in table 8 (/-eşte/, which is not a possible candidate, is marked grey).

Table 8

Romanian Candidates for minimal discreteness

	SG	PL
1	/-esc/ ind part min spk	/-im/ ind part group spk
2	/-eşti/ ind part min addr	/-iţi/ ind part group addr
3	/-eşte/ ind part min	? ind part group

The detection of a minimally distinct marker is accomplished by comparing the two nodes A=3 SG and B=3 PL between which Discreteness

[8] y=class feature(s) defining verbs following pattern 2.

is violated. The constraint by which the minimally distinct marker /-c/ is detected is given in (30):

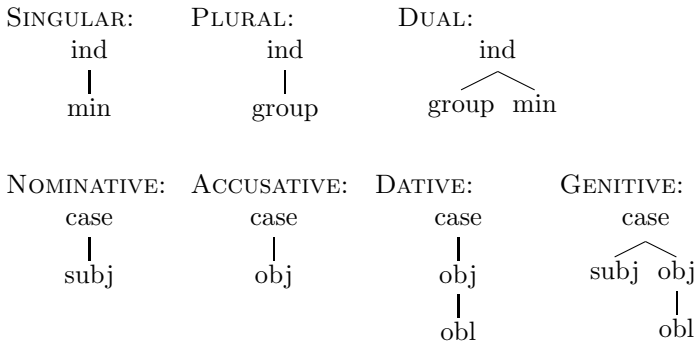
(30) **Minimal Distinctness**
A marker /c/ associated with a node C in the feature geometry is minimally distinct from two nodes A and B in the geometry iff.
a. C is reached from A by a node transition in a single dimension.
b. C retains at least 1 feature of B.

In the case of Romanian verb inflection, C has to be identical with A=3 SG in one dimension (30a). There are two specifications meeting this constraint, 1SG and 2SG. (30b), on the other hand, has no effect here: with B=3PL being underspecified for [part], all nodes that have a [part] dimension meet (30b). (30) thus does not help to decide between the candidates 1SG and 2SG. However, [part|spk] (1SG) is preferred over [part|addr] (2SG) because 'speaker' is the default interpretation for the organising node 'participant' (Harley and Ritter 1999). Consequently, the marker associated with 1SG is inserted into the 3PL context.
A question that comes up at this point is, why is it the NOM PL marker that is adjusted, and not the NOM SG marker? The answer is that the Discreteness constraint is defined only for the transition from singular to plural ([min→ind→group]), not for [group→ind→min]. Thus, the transition from 3PL to 3SG does not lead to a violation of D_r. The constraint will however not fail to apply, as each single possible node transition is used in the paradigm generation.

The polarity effect in the Old Irish nominal inflection constitutes itself in the *i*/*e* umlaut.[9] The analysis is based on the following feature geometry:

[9]The umlaut is due to *i > *e /__ [ă/o in IE.

(31) Old Irish: feature geometry



For Old Irish masculine o-stems, too, there is a Discreteness constraint on the transition SG → PL ([min → ind → group]). As shown in (33), /fir/ is the marker for genitive singular, and /fer/ is the elsewhere marker.

(32) **Discreteness constraint for Old Irish (D_i):**
[min → ind → group] must be discretely marked /__+N +z[10] +m

(33) Vocabulary items for Old Irish *fir* 'man':[11]

/fir/ ↔ [case|subj|obj|obl ind|min]	*(gen sg)*
/fiur/ ↔ [case|obj|obl ind|min]	*(dat sg)*
/feraib/ ↔ [case|obj|obl ind]	*(dat pl, dual)*
/firu/ ↔ [case|obj ind|group]	*(acc pl)*
/fer/ ↔ [case ind]	*(elsewhere)*

The only matching marker for both NOM SG and NOM PL is the elsewhere marker /fer/. The insertion of /fer/ in the context NOM PL however is banned by D_i, so that a different marker has to be chosen. As can be seen from table 9, the possible candidates are /firu/ (ACC PL), /fir/ (GEN SG), /fiur/ (DAT SG), and /feraib/ (DAT PL+DUAL). The

[10] z= class feature(s) defining o-stems.

[11] Though Old Irish masculine o-stems are arguably best analysed by means of subanalysis (/fir-/, /fer-/, /-aib/, /-u/), I will stick to the pattern instantiated by the whole word forms for the purpose of demonstration.

other feature specifications fail to be legitimate candidates (and are thus marked grey), as they are associated with the marker /fer/, which is disallowed for insertion into the NOM PL context.

Table 9 *Old Irish*
Candidates for minimal discreteness

	SG	PL	DUAL
NOM	/fer/ ind case min subj	? ind case group subj	/fer/ ind case min group subj
ACC	/fer/ ind case min obj	/firu/ ind case group obj	/fer/ ind case min group obj
GEN	/fir/ ind case min subj obj obl	/fer/ ind case group subj obj obl	/fer/ ind case min group subj obj obl
DAT	/fiur/ ind case min obj obl	/feraib/ ind case group obj obl	/feraib/ ind case min group obj obl

The marker for the NOM PL context is determined by the definition of Minimal Distinctness: The nodes that can be reached by A=NOM SG by node transitions in one dimension only are GEN SG and DAT SG (condition (30a); both are identical with A in their [ind|min] node, and there is no legitimate candidate which is identical with A in its [case|subj] node). Of those two, GEN SG wins, as it also has the features [case|subj] in common with NOM PL, whereas ACC SG has no feature in common with NOM PL (condition (30b)).

6. Consequences

The new analysis has a number of advantages. Firstly, only two insertion rules are needed to model full polarity effects, while the morphology is now making use of two principles, the latter of which is an independently well motivated assumption underlying syntactic derivations. Secondly, the choice of marker is predictable (in contrast to impoverishment rules or rules of referral, where the choice is to a high degree arbitrary). Thirdly, the analysis can be implemented in any morphological theory; it is fully compatible with lexical-incremental approaches (Lieber 1992; Wunderlich 1996), lexical-realisational approaches such as Distributed Morphology (Halle and Marantz 1993, 1994), and inferential-realisational approaches such as the Word-and-Paradigm model (Spencer 2001; Stump 2001). Fourthly, in this analysis, polar distributions of inflectional markers come for free as a systematic pattern.

References

Baerman, Matthew (2007): 'Morphological Reversals', *Journal of Linguistics* **43**, 33–61.

Baerman, Matthew, Dunstan Brown and Greville G. Corbett (2005): *The Syntax-Morphology Interface: A Study of Syncretism.* Cambridge University Press, Cambridge.

Béjar, Susana and Daniel Currie Hall (1999): Marking Markedness: The Underlying Order of Diagonal Syncretisms. *In:* R. Daly and A. Riehl, eds, *Proceedings of the 1999 Eastern States Conference on Linguistics.* Cornell Linguistic Circle Publications, Ithaca, N.Y.

Bobaljik, Jonathan (2002): Syncretism without Paradigms: Remarks on Williams 1981, 1994. *In:* G. Booij and J. van Marle, eds, *Yearbook of Morphology 2001.* Kluwer, Dordrecht, pp. 53–85.

Bornkessel, Ina and Matthias Schlesewsky (2006): 'The Extended Argument Dependency Model: A Neurocognitive Approach to Sentence Comprehension Across Languages', *Psychological Review* **113**(4), 787–821.

Chomsky, Noam (1964): *Current Issues in Linguistic Theory.* Mouton, The Hague.

Chomsky, Noam (1973): Conditions on transformations. *In:* S. R. Anderson and P. Kiparsky, eds, *A Festschrift for Morris Halle*. Holt, New York, pp. 232–286.

Chomsky, Noam (2000): Minimalist Inquiries: The Framework. *In:* R. Martin, D. Michaels and J. Uriagereka, eds, *Step by Step: Essays on minimalist syntax in honor of Howard Lasnik*. MIT Press, Cambridge, Mass., pp. 89–155.

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

Chomsky, Noam and Morris Halle (1968): *The Sound Pattern of English*. Harper Row, New York.

Collins, Chris and Höskuldur Thráinsson (1996): 'VP-Internal Structure and Object Shift in Icelandic', *Linguistic Inquiry* .

Frazier, Lynn and Jane Fodor (1978): 'The Sausage Machine: A new two-stage parsing model', *Cognition* **6**, 1–34.

Goldsmith, John (1976): Autosegmental Phonology. PhD thesis, MIT.

Hale, Kenneth and Samuel Jay Keyser, eds (1993): *The View from Building 20: Essays in Linguistics in Honor of Sylvain Bromberger*. MIT Press, Cambridge, Mass.

Halle, Morris and Alec Marantz (1993): Distributed Morphology and the Pieces of Inflection. *In* Hale and Keyser (1993), pp. 111–176.

Halle, Morris and Alec Marantz (1994): Some Key Features of Distributed Morphology. *In:* H. H. Andrew Carnie and T. Bures, eds, *MITWPL: Papers on Phonology and Morphology*. Vol. 21, MITWPL, Cambridge, pp. 275–288.

Harley, Heidi and Elizabeth Ritter (1999): 'Meaning in morphology: Motivating a feature-geometric analysis of person and number'. Manuscript, University of Arizona, University of Calgary.

Harley, Heidi and Elizabeth Ritter (2002): 'Person and Number in Pronouns: A Feature-Geometric Analysis', *Language* **78**(3), 482–526.

Lieber, Rochell (1992): *Deconstructing Morphology*. University of Chicago Press, Chicago.

Lühr, Rosemarie (2004): Lectures on Old Irish, 2002-2004, Universität Jena.

Müller, Gereon (2007): 'Linguistische Mythen'. Talk delivered at "Studium Universale – Kosmos Sprache", Leipzig, 17 October 2007.

Noyer, Rolf (1997): *Features, Positions and Affixes in Autonomous Morphological Structure*. Garland, New York.

Noyer, Rolf (1998): Impoverishment theory and morphosyntactic markedness. *In:* S. G. Lapointe, D. K. Brentari and P. M. Farrell, eds, *Morphology and its Relation to Morphology and Syntax*. CSLI, Stanford, pp. 264–286.

Popovici, Victoria (2003): Lectures and Courses in Romanian, 2000-2003, Universität Jena.

Rheinfelder, Hans (1976): *Altfranzösische Grammatik. Formenlehre*. Vol. 2, Hueber, München.

Saeed, John (1999): *Somali*. John Benjamins, Amsterdam.

Spencer, Andrew (2001): 'The Word-and-Paradigm Approach to Morphosyntax', *Transactions of the Philological Society* **99**, 279–313.

Stump, Gregory T. (1993): 'On Rules of Referral', *Language* **69**(3), 449–479.

Stump, Gregory T. (2001): *Inflectional Morphology*. Cambridge University Press, Cambridge.

Weißer, Philip (2007): 'Gap Morphology and the Theory of Case Borrowing', *Linguistische Arbeitsberichte* **85**.

Wunderlich, Dieter (1996): Minimalist Morphology: The Role of Paradigms. *In:* G. Booij and J. van Marle, eds, *Yearbook of Morphology*. Kluwer, Dordrecht, pp. 93–114.

Case Borrowing

Philipp Weisser*

Abstract
The aim of this paper is to provide a plausible possibility to analyse bidirectional syncretism patterns of the type Stump (2001) has described for several languages. For many morphological frameworks an analysis of these syncretism patterns poses several problems, because one must stipulate directional rules to ensure the right marker distribution. The mechanism can be seen as a possible extension for many morphological frameworks. The starting point of this mechanism is the assumption that there need not be a radically underspecified elsewhere marker, because one can think of other possibilities to avoid paradigmatic gaps. One of these possibilities is Case Borrowing which allows us to derive many bidirectional syncretism patterns without difficulties.

1. Introduction

Many morphological theories are confronted with a dilemma. On one hand, any theory is supposed to be restrictive enough to make helpful predictions about possible and impossible systems. On the other hand, it is hardly feasible to propose rules that hold throughout all languages, because of the large amount of empirical data. Therefore, any theory has to strike a balance between restrictiveness and empirical coverage.

One strategy of solving this dilemma is to postulate a system of fairly strict mechanisms that can explain many but not all data sets. In addition, these theories allow special mechanisms, i. e. rules that may apply nearly unrestricted so that they can explain apparent counterexamples. This strategy is, for example, chosen by several frameworks, such as Stump's Paradigm Function Morphology and Distributed Mor-

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phology. Both theories propose a set of rules (rules of referral or impoverishment rules) that derive many syncretism patterns of the world's languages, but both systems provide for some additional rules, so that more complex patterns can be analysed. This strategy of solving the dilemma, of course, entails some problems. The major criticism probably is that these rules undermine the whole system, and their application is arbitrary and completely unpredictable. In fact, in many analyses these rules are descriptive rather than explanatory.

The main goal of this paper is to propose a mechanism that manages to control these directional rules, in that their application as well as their direction can be predicted. For this purpose, one needs to give up some assumptions made by most frameworks, but I hope to show that this need not necessarily be seen as a great disadvantage.

The first part of this paper will deal with the theoretical background, the major theses and the compatibility of the approach with other morphological theories. The second part tries to provide empirical evidence that points out the necessity of a theory like the one I present. To illustrate the advantages of the mechanism I propose, I will provide an analysis of an interesting part of Latin noun declension. Furthermore I will present an analysis of the noun inflection system of the Pama-Nyungan language Diyari and compare it to the Distributed Morphology analysis of Bierkandt(2006).

Before turning to the theoretical part, I would like to make some remarks about the terminology used throughout this paper:

The mechanism that I propose is not restricted to a certain morphological approach. As I will show later, it does not presuppose systems or entities and can thus be combined with many existing approaches. But since the mechanism can be understood as an extension of any morphological framework, one needs to follow an existing theory to demonstrate the advantages of the systems. Thus I decided to use the framework of Distributed Morphology for the analysis of the empirical data and most of the terminology. Nevertheless, it is necessary to keep in mind that the proposed system does not depend on Distributed Morphology in any way.

2. Theoretical Background

2.1. Paradigmatic Gaps

As I already indicated, the starting point of this approach is one assumption which many morphological theories are (implicitly or explicitly) based on. The one below is from Müller(2006), but there are many similar versions in the literature, including the 'Default Rule' in Stump(2001).

(1) Elsewhere (Müller(2006)):
There is always one elsewhere marker that is radically underspecified with respect to inflection class (and more generally). Other markers may be underspecified to an arbitrary degree (including not at all).

In the following, I will contradict the assumption above and postulate the opposite, namely that there need not be an elsewhere marker. Of course, many analyses in the recent literature are crucially based on the concept of a completely underspecified marker, but as far as I can see, there is no theoretical reason why every language should make use of that concept.

The most important job of an elsewhere marker is to avoid the emergence of paradigmatic gaps. It is to assure that any feature combination is assigned a phonological marker. Furthermore it is often held responsible for discontinuous syncretism with one or more paradigms, but since not all languages show such syncretism patterns, this is not a convincing argument for a cross-linguistic concept of an elsewhere marker. Denying the obligatory existence of a radically underspecified marker, I must come up with a mechanism that also serves to avoid paradigmatic gaps. This mechanism is explained in the following section.

2.2. Case Borrowing

The mechanism I propose is called Case Borrowing. It always applies when there is no suitable form for the present feature combination in the lexicon. Intuitively, the procedure is the following: If there is no specific form available, the one is chosen which comes closest to the one that is needed. The question is what it means to come close to another form and what the criteria for deciding are. A plausible answer

to that question is provided by several case hierarchies that have been frequently discussed in typological literature (e.g. Blake (1994)).

All these typologically estabilshed case hierarchies are formulated as implicational universals of one dimension. I will follow Wiese(2003,2004) who interprets these hierarchies as logical results of binary features that distinguish between several cases. On the basis of such hierarchies we can now make precise what it means to be close to another form:

(2) Nearest Neighbour Principle:
In absence of an adequate marker, the marker of the
Nearest Neighbour must be chosen.

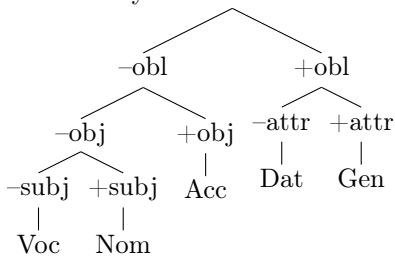
(3) Nearness
The terminal node α is β's Nearest Neighbour,
iff there is no such γ ($\gamma \neq \alpha \wedge \gamma \neq \beta$) that a) or b) hold:

a) γ is c-commanded by α and γ c-commands β

b) γ is c-commanded by β asymmetrically and
the last feature within β's hierarchy has the same value as γ's last feature.

This definition can probably be understood best by applying it to an example. The following tree in (4) shows a possible hierarchy for a system with five cases such as Ancient Greek. The cases are distinguished by binary features, such as ±obl which separates the structural from the oblique cases. I follow Wiese's approach to case hierarchies insofar as all negative feature values within the hierarchies that will be discussed throughout this paper branch to the left and the the positive ones to the right. Nevertheless this assumption is not important for the process of case borrowing.

(4) A possible case hierarchy for ancient Greek



Following the definition in (3), every terminal node in (4) can now be assigned a nearest neighbour:

(5) Nearest Neighbours

Terminal Node		Nearest Neighbour
Vocative	⇒	Nominative
Nominative	⇒	Vocative
Accusative	⇒	Nominative
Dative	⇒	Genitive
Genitive	⇒	Dative

As the theoretical explanation of the mechanism that I propose is complete for now, one can compare it to common directional rules, such as rules of referral (e.g. Stump (2001), Anderson (1992). When directional rules apply, they establish a link between two cells in a paradigm, but whether these rules apply or not is not triggered in any way. Thus one cannot foresee which cells of a paradigm (i.e. which feature value combinations) will be affected. In most cases a directional rule establishes a link between two (or more) unrelated cells, but it remains unclear why exactly these cells are involved, because there had already been a satisfying result of insertion before.

By contrast, case borrowing makes it possible to control directional rules in that it allows the prediction of when and where they apply. Case borrowing always applies when the lexicon has not provided an ending for a special case, i. e. it is triggered by the lack of an available marker. Furthermore it is predictable which cells are involved, namely the empty one and its nearest neighbour. Last but not least, it is clear what the result of the whole mechanism will look like. Directional rules are stipulations which are specifically invented for this situation,

whereas case borrowing is an general process that does not need to be arranged for a special case.

Before testing case borrowing on empirical data, I will complete the theoretical part of this paper by making some remarks on the two definitions in (2) and (3). The NNP in (2) is a well established algorithm in computer science, mathematical statistics and computational neuroscience and can be seen as one strategy of logically solving problems. In computer science it can also be used to compress the size of a given data set, because it enables the programs to leave out (and later recover) redundant information. And since it has always been a question how the huge amounts of inflectional data of some languages are stored, the NNP might be a relevant mechanism which might be part of the human language faculty.

Taking a closer look at the definition in (3), one realizes that nearness can also be seen as a special version of Rizzi's minimality (Rizzi (1990), but also Fanselow (1991)). In both cases the definitions limit the potential relations between two terminal nodes with in a tree such that two nodes can only establish a relation if there is no intervening element of the same kind between them. It seems that minimality, which has been attested for syntactic as well as phonological processes, also plays an essential role in morphology.

3. Empirical Evidence

Having provided the theoretical background, I will now turn to some empirical evidence. The first part of this section is concerned with the question of how this analysis might be backed up by empirical data and what the argument encoding patterns of languages that make use of case borrowing look like. The second part deals with a small part of Latin noun declension exemplifying the practical use of a theory like case borrowing. After that I will try to provide a coherent analysis of the Diyari argument encoding system. Diyari, a Pama-Nyungan language, has a three-way system of non-oblique cases. Depending on the inflection classes, these three cases show different instantiations of syncretism that cannot be deduced with common approaches.

3.1. Preliminary thoughts on finding empirical evidence

The major question if one wants to find evidence for case borrowing is how an argument encoding pattern with gaps and case borrowing can be distinguished from one without. Whatever case hierarchy one assumes to explain borrowing domains, it is quite likely that cases that are close enough to exchange markers, also share feature values in an analysis that uses the concept of decomposition. For example, there is the well-known fact that nearly all neuter nouns in Indo-European languages have identical forms for nominative and accusative, but whether this is a result of case borrowing (8) or an underspecified (7) vocabulary item can hardly be proved.

(6) Latin noun declension

SG	fatum	(fate)	
Nom	fat-um		(7) (–oblique, +neuter) ⇔ /-um/
Acc	fat-um		(8) (Acc, +neuter) ⇔ /-um/

Paradigms like (6) cannot be seen as good evidence for or against a concept like case borrowing, since common theories also provide good theoretical methods to capture the phenomenon. Neither can a paradigm like (9) be seen as an improvement.

(9) Croatian noun declension

	masc	fem				
			(10)	(+masc, +nom, +sg)	⇔	/-i/
Nom	- i	- e		(–oblique, –neuter, +sg)	⇔	/-e/
Acc	- e	- e	(11)	(+masc, +nom, +sg)	⇔	/-i/
				(–neuter, +acc, +sg)	⇔	/-e/

Again, both theories can coherently analyse the given data. The former analysis (10) makes use of the concepts of a marker order and the Subset Principle. [1] The latter (11) assumes that the /-e/ in the nominative feminine is borrowed from accusative for want of a specific nominative form.

[1]For definition see: Halle and Marantz (1993), Halle and Marantz (1994) and Harley and Noyer (1999)

3.2. The Latin noun declension

The following paradigm in (12), however, looks different.

(12) Latin (Baerman, Brown, Corbett (2005))

	Class 1 bellum (war) neuter	Class 2 servus (slave) masculine	Class 3 vulgus (people) neuter
Nominative	-um	-us	-us
Accusative	-um	-um	-us
Genitive	-i	-i	-i
Dative	-o	-o	-o
Ablative	-o	-o	-o

The part of these paradigms on which I want to focus are the non-oblique cases. Besides these, all cells are assigned their phonological form only depending on case. These cells do not pose a problem for any morphological theory. But the nominative/accusative syncretisms in class I and III are not easy to handle. Within the first class ('bellum'), it seems as if the /-um/, which could be analysed as a prototypically accusative marker, has expanded to the nominative. The pattern of the third class ('vulgus')[2] is vice versa: /-us/ which is often called a nominative marker has expanded to accusative. In these cases it seems really intuitive that one phonological form represents one marker. Nevertheless, in common morphological theories this is difficult to model.

The Distributed Morphology approach can only declare one elsewhere-marker for the non-oblique cases, since the marker order is (intrinsically or extrinsically) determined. Ergo, at least one of the markers must be analysed as a coincidence of two different vocabulary items, which accidentally bear the same phonological form. Elaborate approaches in Distributed Morphology would probably have used the concept of impoverishment (Bonet (1991), Noyer (1992, 1998), Halle and Marantz (1993, 1994), Bobaljik (2002), Frampton (2002)) to enable their analyses to treat each syncretism as one vocabulary item. But in my opinion this does not entirely capture the phenomenon. This paradigm is not generated by an exceptional mechanism that manipulates

[2]One has to remark that Class 3 is a rather marginal class containing only five nouns, which are all neuter

or deletes features in a specific context, since this theory would entail making some assumptions that do not seem plausible. Either one would have to assume more than one impoverishment rule, which does not, in my opinion, reflect that this paradigm shows mirror images of the same phenomenon, or one would have to assume that it is one of the servus-forms that is impoverished, and I think that this would ignore the fact that this class can be seen as the prototypical one. Moreover, both ways of forcing this paradigm into the theoretical approach need more steps than following theory.

If one assumes the case hierarchy which Wiese(2003) has motivated for Latin and the major thesis of section 1, one can analyse the paradigms in (12) without any difficulties. It seems that the assigned marker predominantly depends on case. Throughout the whole paradigm, there are only two cells that cannot be assigned a marker, if one only refers to case. All one has to ensure is that these two cells can stay empty. After vocabulary insertion, these cells obtain their forms from their nearest neighbours within the hierarchy. In (13) one can see that a feature decomposition might not be very descriptive for a complete analysis of Latin argument encoding but for present purposes it seems appropriate.

Before presenting the explicit analysis, I need to introduce some technical details. As with many other common morphological theories, I make use of the concept of decomposition. The concept of decomposition of morphological categories goes back to Jakobson(1962), (but also: Bierwisch(1967)) who decomposed case into smaller units. By means of decomposition, it is possible to derive occurences of syncretism, because one can postulate abstract features that allow natural classes to be referred to. For the analysis of the Latin paradigms, I decided to decompose case and inflection class features into more primitive features:

(13) Decomposition

Case:		Inflection Class:	
Nom	[–obl, +subj]	Class 1 (bellum):	–x, +y
Acc	[–obl, +obj]	Class 2 (servus):	+x, +y
Gen	[+obl, +attr]	Class 3 (vulgus):	+x, –y
Dat	[+obl, +obj]		
Abl	[+obl, –obj]		

Having decomposed classes and cases into smaller feature sets, I can now propose four vocabulary items that can explain the marker distribution of the paradigms:

(14) Vocabulary Items

(1)[–obl, +subj, +x] ⇔ /-us/
(2)[–obl, +obj, +y] ⇔ /-um/
(3)[+obl, +subj] ⇔ /-i/
(4)[+obl] ⇔ /-o/

After vocabulary insertion has applied, two cells remain without an exponent:

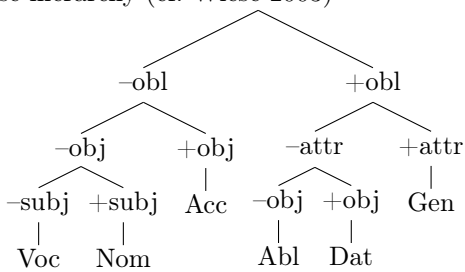
(15) Empty cells after vocabulary insertion
- Nominative class I (bellum)
- Accusative class III (vulgus)

(16) Latin paradigm with gaps

		Class 1 bellum –x, +y	Class 2 servus +x, +y	Class 3 vulgus +x, –y
Nominative	–obl, +subj		-us	-us
Accusative	–obl, +obj	-um	-um	
Genitive	+obl, +attr	-i	-i	-i
Dative	+obl, +obj	-o	-o	-o
Ablative	+obl, –obj	-o	-o	-o

These gaps within the paradigm will now be filled by the process of intraparadigmatic case borrowing. I adopt the following hierarchy for the Latin cases.

(17) Latin case hierarchy (cf. Wiese 2003)



The two gaps can now be filled by borrowing the form of their nearest neighbours:

- Nominative class I obtains its form by borrowing it from the accusative of its class [3]
- Accusative class III obtains its form by borrowing it from the nominative of its class

This example shows how the Case Borrowing approach can be backed up by empirical evidence. Compared to other morphological theories the present analysis manages to describe the patterns with fewer steps. In the following part, I will present a complete analysis of the argument encoding system of Diyari, an Australian language of the Pama-Nyungan family. Furthermore I will compare the analysis proposed here to a Distributed Morphology analysis of the same system to argue for the necessity of the operations I introduced above.

3.3. Dixari declension

3.3.1. Analysis

Diyari (Dieri) is a Australian language of the Pama-Nyungan family. Diyari has seven cases, of which four are oblique (dative, allative, locative, ablative). Like other languages of the Pama-Nyungan family Diyari has a split sytem for structural cases: nouns in singular and male proper names show an ergative alignment (which means that, S and P arguments are equally marked) and pronouns of 1st and 2nd person plural accusative alignment (S and A arguments have the same marker). All other categories have a three-way system, where all argument types (S, A, P) are distinguished. For further discussion of the case system see Austin(1981) and Bierkandt(2006) I will for the present analysis adopt the transcription, the analysis as an three-way case system and the

[3]Since class I is characterised by inanimate items, I assume that there is no vocative, or that the vocative is not assigned a form as well and therefore cannot lend it. Thus, the nominative borrows its form from the only other structural case: the accusative.

simplification of the class system in Bierkandt(2006). After sorting out several redundant inflection classes, one can end up with the following paradigm for the structural cases (18)

(18) Diyari structural cases (Bierkandt (2006))

	Class 1 Nouns SG	Class 2 Nouns nSG	Class 3 Names Male	Class 4 Names Female
Erg	-li	-li	-li	-ndu
Nom	-∅	-∅	-na	-ni
Acc	-∅	-na	-na	-na

	Class 5 Pronoun 1,2,3(F)	Class 6 Pronoun 3(nF)	Class 7 Pronoun 1,2 nSG	Class 8 Pronoun 3 nSG
Erg	-ndu	-li	-∅	-li
Nom	-ni	-∅	-∅	-∅
Acc	-na	-na	-na	-na

It is noticeable that these paradigms only consist of a few markers and their distribution is restricted. /-li/, for example, is confined to the ergative case, /-na/ is nearly almost found in the accusative and /-∅/ is the predominant marker for nominative. Nevertheless, there are some markers that really complicate a straightforward analysis. Attributed to the different alignment systems within this language there are some cells, where a specific marker shifts into another row. Since these shifts occur somehow entwined, (which means, that /-∅/ once shifts to accusative, whereas /-na/ also shifts to absolutive once) a Distributed Morphology approach cannot analyse them without great theoretical (and sometimes not really plausible) effort.

Assuming a theory with case borrowing, an analysis of these paradigms becomes much easier. The only thing one has to ensure is that the cells, where the problematic forms will be found later on, must stay empty. In what follows, I will present a method of how to derive every syncretism from one form.

(19) Vocabulary Items

(1) /ndu/ ⇔ [Erg, (4 , 5)]
(2) /ni/ ⇔ [Abs, (4 , 5)]

(3) /na/ ⇔ [Acc, (¬1)]
(4) /li/ ⇔ [Erg, (¬7)]
(5) /∅/ ⇔ [Abs, (¬3)]

I decided not to complicate the analysis by introducing abstract features. Looking at the proposed vocabulary items, one can see that probably the classes IV and V form a natural class. Differences between these two arise only in oblique contexts. Moreover one can observe that the negations of the VIs (3), (4) and (5) exactly rule out those classes which show ergative or accusative alignment. This problem could be solved by making the alignment information part of the distinctive feature structure of the inflection classes. One could assume binary features like ±ErgAl (ergative alignment) and ±AccAl (accusative alignment) to which the rules in (3), (4) and (5) could refer. In this manner one could reformulate rule (4), for example, as (20). However, for the sake of simplicity, I refrain from doing so here.

(20) /li/ ⇔ [Erg, –AccAl]

After the insertion has taken place, one ends up with the paradigm:

(21) Diyari paradigm with gaps

	Class 1 Nouns SG	Class 2 Nouns nSG	Class 3 Names Male	Class 4 Names Female
Erg	-li	-li	-li	-ndu
Nom	-∅	-∅		-ni
Acc		-na	-na	-na

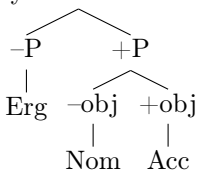
	Class 5 Pronoun 1,2,3(F)	Class 6 Pronoun 3(nF)	Class 7 Pronoun 1,2 nSG	Class 8 Pronoun 3 nSG
Erg	-ndu	-li		-li
Nom	-ni	-∅	-∅	-∅
Acc	-na	-na	-na	-na

The cells yet to be filled can be found in all classes that do not show a three-way alignment:

(i) Accusative Class 1
(ii) Nominative Class 3
(iii) Ergative Class 7

The Case Hierarchy one has to assume to get the expected results is the following:

(22) Case Hierarchy of Diyari for non-oblique cases[4]



This hierarchy ensures the right directions for case borrowing. Absolutive and accusative can mutually assign their form, whenever one of both is in need and ergative always obtains its form from the nearer absolutive. Thus the empty cells in (21) can now finally receive their correct forms:

- Accusative Class I obtains its form from the Absolutive
- Absolutive Class III obtains its form from the Accusative
- Ergative Class VII obtains its form from the Absolutive

Compared to an analysis that makes use of approaches like Distributed Morphology or Paradigm Function Morphology without gaps and case borrowing this one can explain the data with fewer insertion rules (vocabulary items). Furthermore it does not need to assume rules of referral or impoverishment rules, which treat systematic exceptions just like accidental syncretism.

3.4. Further evidence

The two previous sections have shown, how Case Borrowing can be backed up with empirical evidence. Using these concepts, one could

[4]In absence of a suitable feature that is to distinguish the ergative from the nominative and the accusative, I decided to label it ±P, as ergative does not occur as a patient role, whereas accusative and nominative (in unaccusative intransitives) do. It has been argued (e.g. Woolford (2006)) that it is its obliqueness that distinguishes the ergative from other structural cases, but in the case of Diyari, ergative bears much greater resemblance to the other structural cases.

analyse the peculiar syncretism pattern in Latin and the split system of the Pama-Nyungan language Diyari. One could probably find many more syncretism patterns that demonstrate the advantages of the theory I proposed. Another argument that supports the thesis that especially case borrowing is an intuitive process can be brought forward when looking at a well-known phenomenon in the Latin case system. The existance of the vocative case in Latin is rather marginal. Only one inflection class, namely the male nouns ending on /-us/ in the nominative, possess a distinct phonological marker (/-e/) for the vocative singular. In all other cases the vocative and the nominative from are identical.

(23) Latin vocative

	Case	/o/-decl (m)	/a/-decl (f)	cons-decl	...
SG	Nominative	serv -us	femin -a	mercator -∅	...
	Vocative	serv - e	femin -a	mercator -∅	...
PL	Nominative	serv -i	femin -ae	mercator -es	...
	Vocative	serv -i	femin -ae	mercator -es	...

This pattern can easily be analysed by most morphological theories. The Distributed Morphology approach, for example, makes use of the concept of underspecification to analyse these data. Intuitively, there is no nominative marker, but a marker that fits in both cases, nominative and vocative. Traditional Latin grammarians hold a different view on this phenomenon. The traditional explanation for the dominant nominative-vocative syncretism has been that the vocative inherits the ending of the nominative. This perspective corresponds to the concept of this paper. No declension class but rather the masculine /-us/-class is assigned a specific vocative marker. And since the vocative's nearest neighbour is the nominative, nearly all inflection classes show this syncretism. Of course, this is not a perfectly valid argument for the existence of the mechanisms I proposed, but it suggests that this concept comes close to a speaker's intuitions.

3.5. Problems and work to be done

The previous section on empirical data hopefully showed some clear arguments for a concept like case borrowing. In this section I will mainly

dwell on some problems that this approach entails. One of the central arguments was the possibility of smoothly deriving such syncretism patterns as the Latin case. The whole concept, however, faces problems when the paradigm is slightly different. Baerman et al. present a paradigm from the Altaic language Bonan:

Bonan noun declension (Baerman et al. 2005)

	noun	pronoun
Gen	-ne	-ne
Acc	-ne	-de
Dat	-de	-de

It is clear that the present approach cannot come up with a plausible explanation for these paradigms. A system based on a case hierarchy would fail because one could not explain why the accusative is sometimes (in case of proper nouns) closer to the genitive and sometimes (in case of pronouns) closer to the dative. The only possible explanation for these phenomena is that case borrowing in Bonan does not apply on the basis of a case hierarchy but of the animacy hierarchy (Silverstein 1972). One would have to assume that the dative of proper nouns is borrowed from the dative form of a pronoun and the genitive of a pronoun is borrowed from a proper noun genitive form. Whether this explanation can derive the rest of the Bonan inflection system and whether it entails critical problems or not would need to be examined. Another thing that is not yet clear is whether the whole concept I proposed can successfully be applied to verbal inflection as well. If this approach is on the right track, one might assume that verbal inflection can also make use of case borrowing. This, however, is not easy to examine, because it is not clear what the relevant hierarchies look like and whether they are cross-linguistically attested.

4. Conclusion

In the above, I have presented a mechanism that can be combined with most current morphological theories, as it does not refer to any specific concepts of a certain theory. There are only a few relevant assumptions that one has to make, such as the assumption that there need not be an elsewhere marker, or the existence of case hierarchies. A central

advantage that this concept entails is that it makes it possible to derive special syncretism patterns which probably have been problematic before.

More generally, this approach is a preliminary attempt to derive a less controversial concept of directional rules by making the rules predictive and, therefore, less stipulated. Case Borrowing is an automatic mechanism that does not need to be adapted to specific contexts.

In the course of this approach I made use of several concepts, which at least to some extent have already been accepted in scientific literature. The essential concepts I used in order to create this mechanism are the Nearest Neighbour Principle and typologically well-known case hierarchies.

5. References

Anderson, S. R. (1992): A-Morphous Morphology. Cambridge (Cambridge Studies in Linguistics 62)

Baerman,Matthew, Dunstan Brown and Greville Corbett (2005): The Syntax- Morphology Interface. A Study of Syncretism. Cambridge University Press, Cambridge.

Bierkandt, Lennart (2006) - Kasusmorphologie des Diyari - Eine Ansatz im Rahmen der Distribuierten Morphologie; In: Müller, Trommer, eds., Subanalysis of Argument Encoding in Distributed Morphology. Linguistische Arbeitsberichte 84, Universität Leipzig.

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

Bejar, Susana (2003): Phi-Syntax: A theory of agreement, Doctoral dissertation, University of Toronto.

Blake, Barry (2003): Case. Cambridge Textbooks in Linguistics, Cambridge University Press.

Bobaljik, Jonathan (2002): Syncretism without Paradigms: Remarks on Williams 1981, 1994. In: G. Booij and J. van Marle, eds., Yearbook of Morphology 2001. Kluwer, Dordrecht, pp. 53-85.

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

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

Fanselow, Gisbert (1991): Minimale Syntax. Rijksuniversität Groningen, 1991, Groninger Arbeiten zur germanistischen Linguistik 32.

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

Halle, Morris and Alec Marantz (1993): Distributed Morphology and the Pieces of Inflection. In: Hale and Keyser, eds., The View from Building 20. MIT Press, Cambridge, Mass.

Halle, Morris and Alec Marantz (1994): Some Key Features of Distributed Morphology. In: Carnie, Harley and Bures, eds., Papers on Phonology and Morphology. Vol. 21 of MIT Working Papers in Linguistics.

Harley, Heidi and Rolf Noyer (2003): Distributed Morphology. In: Cheng and Sybesma, eds., The Second GLOT International State-of-the-Article Book. Mouton de Gruyter, Berlin.

Jakobson, Roman (1962): Beitrag zur allgemeinen Kasuslehre. Gesamtbedeutungen der russischen Kasus. In: Selected Writings. Vol. 2, Mouton, The Hague and Paris, pp. 23–71.

Müller, Gereon (2004): On Decomposing Inflection Class Features: Syncretism in Russian Noun Inflection. In: Müller, Gunkel and Zifonun, eds., Explorations in Nominal Inflection. Mouton de Gruyter, Berlin.

Müller, Gereon (2006): Notes on Paradigm Economy. In: Müller, Trommer, eds., Subanalysis of Argument Encoding in Distributed Morphology. Linguistische Arbeitsberichte 84, Universität Leipzig.

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 and P. Farrell, eds., Morphology and its Relation to Phonology and Syntax.

Rizzi, Luigi (1990): Relativized Minimality. Cambridge, Mass.: MIT Press.

Silverstein, Michael (1976): Hierarchy of Features and Ergativity. in R.M.W. Dixon, ed., Grammatical Categories in Australian Languages. Canberra: Australian Institute of Aboriginal Studies. 112–172.

Sternefeld, Wolfgang (1997): Comparing Reference Sets. In: C. Wilder,

H.M. Gärtner and M. Bierwisch, eds, The Role of Economy Principles in Linguistic Theory. AkademieVerlag, Berlin, pp. 81–114.

Stump, Gregory (2001): Inflectional Morphology. Cambridge University Press, Cambridge.

Wiese, Bernd (2003): Zur lateinischen Nominalflexion: Die Form-Funktions-Beziehung. Ms., IDS Mannheim.

Wiese, Bernd (2004): Categories and Paradigms. On Underspecification in Russian Declension. In: Müller,Gunkel, Zifonun, (eds.) Explorations in Nominal Inflection. Mouton de Gruyter, Berlin.

Wiese, Bernd (2006): Zwischen Morphem und Paradigma: Zur polnischen Substantivflexion. Vortragsmanuskript bei der 28. Jahrestagung der Deutschen Gesellschaft für Sprachwissenschaft, Universität Bielefeld.

A Radically Non-Morphemic Approach to Bidirectional Syncretisms

Gereon Müller*

Abstract

This paper addresses the question of how certain kinds of overlapping syncretisms in inflectional paradigms can be accounted for that Baerman et al. (2005) refer to as *convergent/divergent bidirectional syncretisms* (based on earlier work by Stump (2001)). Bidirectional syncretism strongly resists accounts in terms of standard rules of exponence (or similar devices) that correlate inflection markers with (often underspecified) morpho-syntactic specifications (such rules are used in many morphological theories; e.g., Anderson (1992), Halle & Marantz (1993), Aronoff (1994), Wunderlich (1996), and Stump (2001)). The reason is that it is difficult to capture overlapping distributions by natural classes. In view of this, rules of referral have been proposed to derive bidirectional syncretism (Stump (2001), Baerman et al. (2005)). In contrast, I would like to pursue the hypothesis that systematic instances of overlapping syncretism ultimately motivate a new approach to inflectional morphology – one that fully dispenses with the assumption that morphological exponents are paired with morpho-syntactic feature specifications (and that therefore qualifies as radically non-morphemic): First, rules of exponence are replaced with feature co-occurrence restrictions (FCRs; Gazdar et al. (1985)). For phonologically determined natural classes of exponents, FCRs state incompatibilites with morpho-syntactic feature specifications. Second, marker competition is resolved by a principle of Sonority-driven Marker Selection (SMS). SMS takes over the role of the Specificity (Blocking, Elsewhere, Panini) Principle of standard analyses.

Empirically, the main focus is on Bonan declension; the analysis is subsequently extended to Gujarati conjugation and Latin *o*-declension, with further remarks on bidirectional syncretism in other inflectional paradigms.

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1. A Problem

Baerman et al. (2005, 136-144) discuss the following inflectional paradigm from Bonan (Altaic; Mongolian).[1]

(1) *Bonan declension*

	noun ('foliage')	pronoun ('he')
NOM	labčon-Ø	ndžan-Ø
GEN	labčon-ne	ndžan-ne
ACC	labčon-ne	ndžan-de
DAT	labčon-de	ndžan-de
ABL	labčon-se	ndžan-se
INS	labčon-Gale	ndžan-Gale

The exponents for nominative, ablative, and instrumental contexts are identical for nouns and pronouns; they correspond to what one would assume to be an ordinary state of affairs in a typical agglutinative system. However, the exponents for genitive, accusative, and dative contexts with nouns and pronouns show an overlapping syncretical distribution that raises severe problems for standard accounts of syncretism that rely on correlating inflectional exponents with underspecified feature specifications, in one way or another.[2] The reason is that it is

[1]The data are taken from Todaeva (1997); also see Baerman (2005, 815). Todaeva (1963, 1966, 1997) is mainly concerned with one of the two main dialects, viz., Gansu Bonan. The other dialect, Qinghai Bonan, is described in Wu (2003). The declension markers of Qinghai Bonan are not fully identical to those of Gansu Bonan in (1), with *da* instead of *de*, *sa* instead of *se*, and G*(w)ala* instead of G*ale* (*ne* is the same in both varieties). However, these minor differences can be ignored in what follows (as they do not affect the analysis to be presented in section 2 below): Whereas the *form* may differ minimally in some cases, the *distribution* of the relevant markers is the same in Gansu Bonan and Qinghai Bonan. In particular, the pattern of bidirectional syncretism (see below) is identical; see Wu (2003, 335-336).

[2]The concept of underspecification as a means to account for syncretism is employed in most recent theories of inflectional morphology. In what follows, I briefly consider Distributed Morphology, Minimalist Morphology, and Paradigm Function Morphology. In Distributed Morphology (see, e.g., Halle & Marantz (1993), Halle (1997), Noyer (1992)), functional heads in syntax provide contexts for insertion of vocabulary items; and whereas the former are characterized by fully specified morpho-syntactic features (ignoring impoverishment), the vocabulary items can be (and often are) underspecified with respect to these features; a Subset Principle ensures that a vocabulary item can only be inserted if its features are compatible with

hard to see how the distribution of the markers *ne* and *de* can be captured by referring to natural classes. Thus, a standard account of the case syncretisms with *ne* (genitive/accusative with nouns) and *de* (accusative/dative with pronouns) in (1) in terms of underspecification would have to rely on the assumption that at least one of the two relevant distributions in (1) can be described as a natural class; the remaining distribution could then be slightly more general, including an additional cell that is blocked in the course of marker competition. For instance, the three contexts GEN.NOUN, ACC.NOUN, and GEN.PRON would have to emerge as a natural class that is captured by some appropriate feature specification accompanying the exponent *ne*, and one could then assume *de* to be a more general marker for ACC and DAT contexts (e.g., encoded by a feature specifiction like [–subj,+obj], assuming that this specification fully characterizes the natural class of the two cases at hand), which is blocked by the more specific marker *ne* whenever the latter marker fits. The problem with such an approach is that is highly unclear whether a property can be found that, say, GEN.NOUN, ACC.NOUN, and GEN.PRON contexts have in common, and that separates these contexts from all the other ones in the paradigm. – Of course, the same problem arises if the distribution of *ne* is assumed

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those in the functional morpheme in syntax. Similarly, underspecification is considered to be one of the central assumptions of Minimalist Morphology (see Wunderlich (1996, 2004)). Even though Minimalist Morphology differs from Distributed Morphology in being an "incremental" approach, where the inflection marker contributes features to the whole word that would otherwise not be present (see Stump (2001) for the terminology), Wunderlich manages to integrate underspecification of inflection markers into the system, and in doing so invokes a Compatibility requirement that has effects which are similar to those of the Subset Principle. Finally, in Paradigm Function Morphology (see Stump (2001)), inflection markers are added to stems by morphological realization rules, which take the abstract form $\mathbf{RR}_{n,\tau,C}(<\mathbf{X},\sigma>) = <\mathbf{Y'},\sigma>$. Here, τ is the set of morpho-syntactic features associated with the inflection marker (the inflection marker emerges as the difference between the stem X and the inflected word Y′); τ can be underspecified. In contrast, σ is the set of morpho-syntactic features that the fully inflected word form bears (the analogue to the insertion contexts provided by functional morphemes in Distributed Morphology). Importantly, a constraint on rule/argument coherence ensures that σ is an *extension* of τ; this is comparable to the subset and compatibility requirements of Distributed Morphology and Minimalist Morphology, respectively. – Thus, in all these approaches, inflectional exponents are paired with (possibly underspecified) feature specifications, independently of whether or not the overall theory qualifies as "lexical" (Distributed Morphology, Minimalist Morphology) or "inferential" (Paradigm Function Morphology) in Stump's (2001) sense.

to be more general (covering all GEN and ACC contexts), and the distribution of *de* is restricted to DAT.NOUN, DAT.PRON, and ACC.PRON contexts.[3] The underlying reason for these problems is that the natural classes in question here would have to span instances of two distinct grammatical categories, viz., a certain instance of case and a certain instance of part of speech/categorial label, and all this under the exclusion of other instances of the respective grammatical categories.[4]

In view of this situation, various steps can be taken. One obvious possibility would be to assume that the distribution of *ne* and *de* in (1) reflects accidental homonymy rather than systematic syncretism. However, such an approach does not seem empirically motivated – the pattern is evidently systematic: Taken separately, both the GEN.NOUN/PRON distribution, and the GEN/ACC.NOUN distribution of *ne*, would qualify as perfectly regular syncretisms that any morphological theory wants to derive in a systematic manner. (Similarly for the separate DAT.NOUN/PRON and ACC/DAT.PRON syncretisms with *de*.) Another option would be to assume different rule orderings for nouns and pronouns. This option is also quite unattractive for obvious reasons (among them the fact that rule ordering plays no role anymore in in most current morphological theories); see Baerman et al. (2005, 138) for discussion.

Finally, the solution that Baerman et al. (2005) themselves offer for overlapping domains of syncretism in Bonan declension relies on two directional rules of referral; such rules state that (in the simplest case) some form for a given morpho-syntactic context is taken over from the form determined by standard rules of exponence (correlating

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[3]Based on remarks by Jonathan Bobaljik, Baerman et al. (2005) develop (and subsequently abandon) a version of such an approach (that must have this type of entry for both markers since it dispenses with the idea of resolving marker competition by some notion of specificity). In doing so, they invoke an abstract feature [X] that is supposed to stand for GEN and ACCUSATIVE.NOUN, and an abstract feature [Y] that encodes DAT and ACC.PRON contexts; *ne* can then be specified as [X], and *de* as [Y]. However, there is no independent justification for these features [X] and [Y], so the syncretism is stipulated rather than derived.

[4]Accordingly, there seem to be very few analyses where a case for a natural class involving instances of separate grammatical categories has convincingly been made. Wiese's (1999) approach to determiner inflection in German may belong to this group. Here, an instance of the grammatical category gender – FEM – and an instance of the grammatical category number - PL – are treated as a natural class, which is encoded by the feature [–standard].

exponents and feature specifications) for some other morpho-syntactic context. The two rules of referral can be formulated as in (2) (minimally deviating from the notation in Baerman et al. (2005)). Since these exponent take-overs seem to go in two directions (from GEN to ACC, and from DAT to ACC), Baerman et al. (2005) call this syncretism *bidirectional*.

(2) a. The exponent for ACC.NOUN contexts is the exponent determined by the rules of exponence for GEN contexts.
b. The exponent for ACC.PRON contexts is the exponent determined by the rules of exponence for DAT contexts.

The rules of exponence that underlie the system are given in (4).[5]

(3) a. NOM = STEM + /Ø/
b. GEN = STEM + /ne/
c. DAT = STEM + /de/
d. ABL = STEM + /se/
e. INS = STEM + /Gale/

Note that there is no rule of exponence for accusative contexts; therefore, the system would actually create paradigmatic gaps, if not for the effect of rules of referral.[6]

Such an analysis in terms of rules of referral succeeds in deriving the paradigm in (1). However, the rules in (2) stipulate what arguably should be derived (but see subsection 3.2 below), and the resulting

[5]Here and henceforth, I render exponents (outside paradigms) in the / / notation.

[6]Such a state of affairs would not be possible in theories that always postulate a radically underspecified elsewhere marker for each paradigm; compare, e.g., Stump's (2001) Identity Function Default rule. However, the question of whether rules of exponence should initially also provide some marker for all ACC contexts in Bonan declension is orthogonal to our main concerns here as long as it is ensured that rules of referral also override the outcome of rules of exponence; see, e.g., Stump (2001) for such an approach. – That said, it is interesting to note that the approach to bidirectional syncretism developed in Weisser (2007) presupposes that the absence of a marker introduced by rules of exponence is the defining characteristic of all instances of bidirectional syncretism. On this view, the presence of a paradigmatic gap induces a search in immediately adjacent cells (defined by a concept of feature minimality). This ultimately leads to the same effect as a rule of referral: A form is borrowed from some other paradigm cell.

number of rules overall is the same as the number that results from treating the overlapping syncretisms via separate rules of exponence (i.e., two rules for /ne/, and two rules for /de/).

Given (a) the systematicity of syncretism in (1), (b) the failure of classic analyses in terms of natural classes and underspecification, and (c) potential problems of explanatory adeaquacy for alternative analyses (in terms of rule ordering or rules of referral), I would like to conclude that the Bonan data suggest that a radically new approach to inflectional paradigms might be worth pursuing – one that gives systematic accounts of instances of syncretism without invoking the idea that syncretism is to be captured by underspecification of morphological exponents with respect to morpho-syntactic features. More specifically, I will develop an analysis that is truly non-morphemic, in the sense that it abandons the standard assumption that exponents are correlated with morpho-syntactic feature specifications in one way or the other.

2. A Solution

Most current approaches to inflectional morphology correlate inflectional exponents with feature specifications. Inferential theories like those developed in Anderson (1992), Aronoff (1994), Stump (2001), and Corbett & Fraser (1993) or Baerman et al. (2005) differ from lexical theories (like Distributed Morphology or Minimalist Morphology) in that inflection markers are not assumed to have morpheme status, or to exist as separate objects; rather, inflection markers are introduced by rules of exponence. However, even here inflectional exponents are clearly correlated with morpho-syntactic feature specifications. I would therefore like to contend that many inferential approaches are not as radically non-morphemic as is sometimes made out. Accordingly, the gist of an inferential analysis can often be transferred to a lexical analysis without major changes (and vice versa), with most of the important differences being confined to suprasegmental exponents – e.g., umlaut –, or the technical means to override the effects of basic rules of exponence (in inferential approaches) or marker entries (in lexical approaches) – e.g., rules of referral vs. impoverishment rules (which can produce similar effects, but are not necessarily equivalent).

Suppose now that the assumption is abandoned that there is a correlation between an inflectional exponent and a specification of morpho-

syntactic features that captures the distribution of the exponent (more precisely, the *potential* distribution, given that an exponent may be blocked in a context in which it would fit in principle, by a more specific marker). For concreteness, assume that each language has a given inventory of exponents for each of its inflectional domains, but there is no feature specification directly associated with the exponents. Thus, in Bonan there is an initial set of possible exponents for nominal and pronominal declension, as in (4).

(4) *Inventory of declension markers in Bonan*
{/Ø/, /ne/, /se/, /de/, /Gale/}

The question then is how these markers can be assigned to the twelve paradigm cells in (1) if there are no rules that correlate them with feature specifications characterizing the cells (possibly via underspecification). I would like to suggest that the distribution of exponents of an initial inventory over the cells of a paradigm is brought about by a system composed of two main ingredients: First, there are (negative) *feature co-occurrence restrictions* (FCRs, see Gazdar et al. (1985)) that block the use of (phonologically defined) natural classes of exponents in certain morpho-syntactic environments (which are also captured by natural classes – natural classes of cases, in the case at hand). And second, there is a general principle that selects, for each cell, the most sonorous exponent among those that are not blocked by a feature co-occurrence restriction. I call this principle *Sonority-driven Marker Selection* (SMS); see (5). Thus, FCRs take over the role of rules of exponence or lexical entries (or vocabulary items), and SMS replaces the Specificity (Blocking, Elsewhere, Panini) Principle as a means to resolve a competition of markers. Evidently, if the idea is given up that exponents pair phonological form and morpho-syntactic features, with only the form remaining, a selection principle for cases of marker competition can only be sensitive to aspects of form, not to aspects of function.[7]

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[7]Müller (2002) is a predecessor of the present approach. This paper contains an analysis along these lines for determiner, adjective, and noun inflection in German. The analysis derives all instances of syncretism, including ones that at first sight seem to illustrate a discontinuous pattern (e.g., the the marker /er/ shows up in NOM.MASC.SG, DAT/GEN.FEM.SG, and GEN.PL contexts, and the marker /en/ occurs in ACC.MASC.SG and DAT.PL environments). This approach is couched in the framework of Optimality Theory, where radically non-morphemic analyses of inflection

(5) *Sonority-driven Marker Selection* (SMS):
An exponent α is selected for a fully specified morpho-syntactic context Γ iff (a)-(c) hold:

a. α is part of the inventory that belongs to Γ's domain.
b. α is not blocked in Γ by a FCR.
c. There is no other marker β such that (i)-(iii) hold:
   (i) β satisfies (5-a).
   (ii) β satisfies (5-b).
   (iii) β is more sonorous than α.

(5) presupposes that the markers of the inventory in (4) can be ordered according to decreasing sonority. Abstracting away from the identical vowel, this is straightforward for /ne/, /se/, and /de/: Nasals are more sonorous than fricatives, and fricatives are more sonorous than stops. Assuming that "more sonorous" is really to be understood as "less consonantal", the remaining two markers can also naturally be integrated into the sonority scale: The marker /Gale/ emerges as most consonantal – hence, at the bottom of the scale –, and the null marker /Ø/ (equivalently, absence of marking) is least consonantal – hence, at the top of the scale. The complete ordering of the elements of the inventory in (4) according to decreasing sonority is given in (6).

(6) *Sonority scale*
/Ø/ > /ne/ > /se/ > /de/ > /Gale/

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are independently motivated by conceptual considerations if one takes seriously the assumption that "the functional lexicon is slave to the syntax" (see Legendre et al. (1998)). (A side remark: The reason is that if syntactic constraint rankings are responsible for determining whether or not a language has, say, case markers, it would be strange if inflectional exponents existed independently, with associated feature specifications. This way, the situation could arise that a language's morphology has independently provided a rich system of case markers with morpho-syntactic specifications which can never be used because syntactic constraints block case markers in general; alternatively, we might end up with the situation that syntactic constraints require case markers in a language but the morphological component has simply failed to provide them. These kinds of problems (which arguably arise in approaches like Aissen (1999, 2003)) disappear in a radically non-morphemic approach where (potential) inflectional exponents never carry morpho-syntactic feature specifications to begin with.) However, the analysis in Müller (2002) has been shown not to depend on specific optimality-theoretic assumptions; see Müller (2003), where a version of the approach is laid out that takes the same general form as the one developed below.

Turning next to the FCRs, it must first be clarified how natural classes of cases can be described. I assume that syntactic cases result from a cross-classification of more primitive, decomposed case features. By combining aspects of the proposals in Bierwisch (1967) (for German), Wiese (2003b) (on Latin), and Wiese (2003a) (on Russian and Lithuanian), the four primitive binary case features [±subj(ect)], [±obj(ect)], [±obl(ique)], and [±adv(erbial)] can be postulated for Bonan. A cross-classification of these features inter alia yields the six complete case specifications in (7), which correspond to Bonan's six cases.[8]

(7) *Decomposition of cases*

	subj	obj	obl	adv
NOM	+	−	−	−
GEN	+	+	−	−
ACC	−	+	−	−
DAT	−	+	+	−
ABL	−	+	−	+
INS	−	+	+	+

Relevant consequences of (7) for natural classes of cases are these: First,

[8]Four binary case features yield 16 possible cases. A more parsimonious approach to Bonan might make do with three binary case features, yielding 8 potential cases of which 6 are used in the language. However, I will not attempt to develop such a more parsimonious approach here, for the following two reasons. First, an approach that relies on only three primitive case features would require additional assumptions to make it possible to group all non-nominative cases into a natural class, as it will be shown to be required for Bonan. (Note incidentally that the same problem arises with weak declensions in languages like Icelandic and German – weak feminine and weak masculine declensions, respectively –, where genitive, accusative, and dative must form a natural class excluding nominative that can be referred to by morphological rules.) This problem may in principle be solved, though, by assuming that complements of natural classes also qualify as natural classes (see Zwicky (1970)). Second, the exact nature of the primitive case features active in a language can only be determined by close inspection of the syntax, and the relevant information does not seem available in the case of Bonan at this point. Future research in this area may reveal that an approach in terms of three rather than four primitive case features is warranted – or it may suggest that even more primitive case features should be postulated. Given that the classes of cases that are presupposed by the analysis to be developed in the main text are simple and coherent, I take the issue of properly setting up an underlying system of abstract case features to be ultimately independent of the main task, which is to account for the bidirectional syncretism in Bonan declension.

all non-nominative cases form a natural class since they all prototypically show up in object positions (i.e., VP-internally); this class is referred to by the primitive case feature [+obj]. Second, accusative and dative form a natural class (excluding nominative, genitive, ablative, and instrumental) that is defined by the features [–subj,–adv] (nominative and genitive are [+subj], the latter because it shows up with highly prominent arguments/possessors in the NP domain; ablative and instrumental are [+adv] – note that the feature [+obj] is thus not necessary to refer to accusative and dative alone). Third, dative and instrumental form a natural class defined by [+obj,+obl]; the assumption here is that genitive (a structural case NP-internally) and ablative do not inherently qualify as oblique.[9] And fourth, ablative and instrumental form a natural class because these are the adverbial cases ([+adv]).

Finally, since the FCRs correlate case environments with natural classes of exponents that are phonologically defined, something needs to be said about these classes, and the phonological features that encode them. Three classes will be relevant. First, there is the class of exponents that do not have any phonological realization: /Ø/. The second class is composed of exponents that are [–continuant]: /ne/, /de/ (alternatively, the feature [–strident] could be used). These two are straightforward, but it turns out that a bit more must be said about the third class, which contains /ne/ and /se/ but not /de/. Nasals and fricatives do not form a natural class excluding stops in standard feature systems (e.g., the one in Chomsky & Halle (1968)). However, note that nasals and fricatives occupy adjacent positions on the sonority scale, and in this sense they qualify as a natural class. As shown by de Lacy (2002, 97-99), a sonority scale can be decomposed into a series of binary scales. Furthermore, de Lacy notes that assuming (as he does) that there is a

[9]The fact that the ablative is used in comparative constructions (see, e.g., Wu (2003, 333)) may arguably be viewed as an argument for its structural, non-oblique nature in Bonan. Still, if one does not want to classify the ablative as prototypically non-oblique, alternatives are readily available. For instance, in Jakobson's (1962) system, dative and instrumental also form a natural class (characterized by the features [+marginal,–quantified]). Similarly, and even closer to the system adopted in the main text, Franks (1995, 51) derives a natural class of dative and instrumental (in Russian) by invoking the features [+obl,+phrasal]; an ablative would then qualify as [–phrasal], on a par with the locative in Russian. The feature [±phrasal] (which Franks takes to stand for "assigned in the phrasal domain of a category") might then either replace or accompany the feature [±obl] in the present analysis.

direct correspondence of scales and features, each binary scale can be encoded by a feature with value "–" to the left of >, and value "+" to the right of it. Thus, focussing on the case at hand, the sonority scale in (6) can be broken down into four binary scales, as in (8). For each binary scale, items to the left of an ordering symbol > are assigned value "–" of the respective sonority feature, and items to the right of > are assigned value "+" (de Lacy calls these features [$\pm f_a$], [$\pm f_b$], etc., but I will call them here [$\pm cons_a$], [$\pm cons_b$], – this is not to be confused with the non-indexed standard feature [±consonantal] that distinguishes proper consonants from vowels, glides, glottal stops, etc.).

(8) *Binary sonority scales*

a.	/Ø/ > /ne/, /se/, /de/, /Gale/	[$-cons_a$] > [$+cons_a$]
b.	/Ø/, /ne/ > /se/, /de/, /Gale/	[$-cons_b$] > [$+cons_b$]
c.	/Ø/, /ne/, /se/ > /de/, /Gale/	[$-cons_c$] > [$+cons_c$]
d.	/Ø/, /ne/, /se/, /de/ > /Gale/	[$-cons_d$] > [$+cons_d$]

Consequently, nasals and fricatives (plus, irrelevantly so for our present concerns, the null exponent /Ø/ – alternatively, absence of exponence) form a natural class excluding stops; this class is defined by the feature [$-cons_c$].[10]

With these assumptions about natural classes of exponents and natural classes of cases in place, consider the following four FCRs for nominal and pronominal declension in Bonan.

(9) *Feature co-occurrence restrictions* (FCRs)

a.	FCR 1: [+obj] ⊃ ¬[Ø]	*/Ø/
b.	FCR 2: [–subj,–adv],[+pron] ⊃ ¬[$-cons_c$]	*/Ø/, */ne/, */se/
c.	FCR 3: [+obj,+obl] ⊃ ¬[$-cons_c$]	*/Ø/, */ne/, */se/
d.	FCR 4: [+adv] ⊃ ¬[–continuant]	*/ne/, */de/

[10]Two remarks. First, de Lacy ultimately abandons the account just sketched in favour of his "xo-theory", according to which sonority is a multivalued feature; interestingly, one of his reasons for doing so is that he does not see evidence for a feature like [$-cons_c$] encoding a natural class. Second, as before, it should be kept in mind that alternative ways of defining the required natural class are readily available. Again, Zwicky's (1970) assumption that complements of natural classes also qualify as natural classes is an obvious candidate (the natural class at hand would then be definable as ¬[–sonorant,–continuant]).

FCR 1 in (9-a) blocks /Ø/ in the non-nominative ([+obj]) cases; see (10).[11]

(10) *Effects of FCR 1*

		[–pron]	[+pron]
NOM:	[+subj,–obj,–obl,–adv]		
GEN:	[+subj,+obj,–obl,–adv]	*/Ø/	
ACC:	[–subj,+obj,–obl,–adv]		
DAT:	[–subj,+obj,+obl,–adv]		
INS:	[–subj,+obj,+obl,+adv]		
ABL:	[–subj,+obj,–obl,+adv]		

FCR 2 in (9-b) states that pronominal [–subj,–adv] (i.e., accusative and dative) contexts are incompatible with a more sonorous (or less consonantal, i.e., [–cons$_c$]-marked) exponent of the inventory (i.e., /ne/ and /se/, and vacuously also /Ø/); cf. (11).

(11) *Effects of FCR 2*

		[–pron]	[+pron]
NOM:	[+subj,–obj,–obl,–adv]		
GEN:	[+subj,+obj,–obl,–adv]		
ACC:	[–subj,+obj,–obl,–adv]		*/Ø/, */ne/, */se/
DAT:	[–subj,+obj,+obl,–adv]		
INS:	[–subj,+obj,+obl,+adv]		
ABL:	[–subj,+obj,–obl,+adv]		

According to FCR 3 in (9-c), the same class of exponents (i.e., the less consonantal ones, which are marked [–cons$_c$]: /Ø/, /ne/, /se/), is blocked in [+obj,+obl] (i.e., dative and instrumental) contexts.

[11] In order to show the effects of the FCRs more clearly, the table rows for dative, instrumental, and ablative are rearranged in (10)–(13).

(12) *Effects of FCR 3*

		[–pron]	[+pron]
NOM:	[+subj,–obj,–obl,–adv]		
GEN:	[+subj,+obj,–obl,–adv]		
ACC:	[–subj,+obj,–obl,–adv]		
DAT:	[–subj,+obj,+obl,–adv]	*/Ø/,	
INS:	[–sunetwork/bj,+obj,+obl,+adv]	*/ne/, */se/	
ABL:	[–subj,+obj,–obl,+adv]		

Finally, it follows from FCR 4 in (9-d) that exponents that are [–continuant] (i.e., /ne/ and /de/) are incompatible with [+adv] (i.e., ablative and instrumental) environments; this is shown in (13).

(13) *Effects of FCR 4*

		[–pron]	[+pron]
NOM:	[+subj,–obj,–obl,–adv]		
GEN:	[+subj,+obj,–obl,–adv]		
ACC:	[–subj,+obj,–obl,–adv]		
DAT:	[–subj,+obj,+obl,–adv]		
INS:	[–subj,+obj,+obl,+adv]	*/ne/,	
ABL:	[–subj,+obj,–obl,+adv]	*/de/	

Note that the instrumental marker /Gale/ is not blocked by any FCR: It is not [–continuant] (given that /l/ is [+continuant]); and it is not [–son$_c$] either.[12]

Given (i) the inventory of possible exponents for nominal and prominal declension in Bonan in (4), (ii) the principle of Sonority-driven Marker Selection (SMS) in (5), and the four FCRs in (9), the paradigm in (1) is derived. Four each paradigm cell (more precisely, each fully specified morpho-syntactic context), SMS selects the most sonorous marker out of the set of those markers of the basic inventory which are not blocked in this cell by a FCR. Thus, in nominative environments, where no exponent is excluded by a FCR, the least consonantal exponent /Ø/ is chosen (alternatively, no exponent is chosen). In genitive contexts, /Ø/ is blocked, so the next-sonorous marker /ne/ is

[12]However, even if a segment of /Gale/ would fall under the first FCR, one might plausibly argue that the marker as a whole does not because it remains outside the scope of this segment-based system.

used. In accusative contexts, /ne/ is blocked for pronouns but not for nouns, so it is chosen in the latter context and abandoned in the former. Since /se/ is also blocked in accusative contexts for pronouns, the less sonorous marker /de/ must be used. The exponent /de/ is also the most sonorous marker that can be used in dative contexts (where less consonantal /Ø/, /ne/, and /se/ are blocked throughout, with nouns and pronouns); this accounts for the the bidirectional syncretism that characterizes the system. In ablative environments, only /se/ can be used since all other markers (except for /Gale/) are excluded. And finally, /Gale/ is chosen in instrumental contexts where FCR 3 and FCR 4 interact to block all other, more sonorous, exponents. All this is shown schematically in (14) (where markers blocked by a FCR are struck through, and markers chosen by SMS have boxes around them).

(14) *Deriving the paradigm*

	[–pron]	[+pron]
NOM	$\boxed{\text{Ø}}$ > ne > se > de > Gale	$\boxed{\text{Ø}}$ > ne > se > de > Gale
GEN	~~Ø~~ > $\boxed{\text{ne}}$ > se > de > Gale	~~Ø~~ > $\boxed{\text{ne}}$ > se > de > Gale
ACC	~~Ø~~ > $\boxed{\text{ne}}$ > se > de > Gale	~~Ø~~ > ~~ne~~ > ~~se~~ > $\boxed{\text{de}}$ > Gale
DAT	~~Ø~~ > ~~ne~~ > ~~se~~ > $\boxed{\text{de}}$ > Gale	~~Ø~~ > ~~ne~~ > ~~se~~ > $\boxed{\text{de}}$ > Gale
ABL	~~Ø~~ > ~~ne~~ > $\boxed{\text{se}}$ > ~~de~~ > Gale	~~Ø~~ > ~~ne~~ > $\boxed{\text{se}}$ > ~~de~~ > Gale
INS	~~Ø~~ > ~~ne~~ > ~~se~~ > ~~de~~ > $\boxed{\text{Gale}}$	~~Ø~~ > ~~ne~~ > ~~se~~ > ~~de~~ > $\boxed{\text{Gale}}$

3. Discussion and Outlook

3.1. The SMS/FCR-Based Approach to Bidirectionality

To sum up so far, I have shown that the declension system of Bonan, including particularly its overlapping syncretism domains in the genitive, accusative, and dative, can straightforwardly be accounted for in a radically non-morphemic approach where exponents are not associated with any morpho-syntactic feature specification. In the present approach, the task of correlating form and function is mainly accomplished by four feature co-occurrence restrictions (FCRs). However, the FCRs talk about natural classes of exponents rather than about exponents as such, and the classes are phonologically defined, not in terms of morpho-syntactic features. Furthermore, the FCRs do not state what specification an exponent can have; rather, they state what specifications it is incompatible with. In addition, marker competition is re-

solved by Sonority-driven Marker Selection (SMS) rather than by some notion of Specificity Principle. The resulting analysis requires four simple rules (viz., the partly overlapping FCRs), plus one principle resolving the competition, to correctly account for the distribution of five exponents. I take this to be an optimal state of affairs.

At this point, the central remaining question is whether this result can be generalized, i.e., whether a SMS/FCR-based approach to inflectional morphology may prove tenable for other inflectional systems – both those instantiating "standard" patterns of syncretism, and those instantiating patterns of bidirectional syncretism that have proven difficult to account for in well-established approaches based on underspecification and specificity. As for the former, the issue can of course be decided only if many more inflectional systems are considered in detail from the present perspective. However, all instances of syncretism in the system of German declension (which does not instantiate bidirectionality, but nevertheless involves discontinuous occurrences of markers in a paradigm that pose insurmountable problems for a unified treatment of all markers in standard approaches) can be derived systematically in the approach in Müller (2002) (see footnote 7). This fact may arguably be taken to hold some promise; and I do not foresee any major problems with less complicated systems of inflection either.

As for other instances of bidirectional syncretism as they are discussed in Stump (2001) and Baerman et al. (2005), I think that the question must be addressed on a case-by-case basis. The present approach to bidirectional syncretism differs from the approaches given in Stump (2001) and Baerman et al. (2005) in that it does not assume that there is anything inherently "bidirectional" going on in the paradigms that should be reflected in a synchronic analysis. However, closer inspection reveals that things are not so clear in the approaches just mentioned either. To see this, let me briefly digress, and pursue the question as to what extent Stump's and Baerman, Brown, & Corbett's analyses reflect bidirectionality.

3.2. Bidirectional Syncretism and Rules of Referral

Stump (2001, 219) develops an intricate and, in my view, elegant analysis of bidirectional syncretism that centers around a *Bidirectional Referral Principle*. This meta-principle ties the existence of one rule of

referral to the existence of another, complementary rule of referral. It is given in (15).

(15) *Bidirectional Referral Principle*
The existence of a rule of referral '$RR_{n,\tau,\mathbf{C}}(<X,\sigma>) =_{def} <Y,\sigma>$, *where* $Nar_n(<X,\sigma/\rho>) = <Y,\sigma/\rho>$' with referral domain D entails the existence of a second rule of referral '$RR_{n,\tau/\rho,\mathbf{D-C}}(<X,\sigma>) =_{def} <Y,\sigma>$, *where* $Nar_n(<X,\sigma/\tau>) = <Y,\sigma/\tau>$' with referral domain D.

Here, RR stands for a realization rule that is a rule of referral which states that the exponent for some fully specified morpho-syntactic context σ is going to be the one determined independently (by some other RR) for a minimally different fully specified morpho-syntactic context in which σ is changed by ρ; n designates the number of the block in which the rule applies (this becomes relevant when more than one inflection marker is added to the stem, and it mimicks morpheme positions in other approaches; see Anderson (1992)); τ encodes a (possibly underspecified) well-formed set of morpho-syntactic features that the rule realizes by its application; C is the domain in which the rule is applicable (e.g., nouns, or certain kinds of nouns); X stands for the wordform before the application of the rule, and Y stands for the form yielded by the application of the rule (simplifying a bit, Y differs from X in that it has the exponent introduced by the rule added to X); and Nar_n designates the most specific rule that is applicable in block n.

So far, this is the canonical approach to inflectional morphology in Stump (2001). However, one important additional stipulation must be made, viz., that every rule of referral $\mathrm{RR}_{n,\tau,C}$ has a *referral domain* D associated with it, in addition to the domain in which it can apply (C). C must be a subset of D. Two possibilities arise: C may be a proper subset of D, or it may be identical to D. If there is a proper subset relation (i.e., referral domain (D) and domain of application (C) are not identical in a rule), the Bidirectional Referral Principle implies the existence of an inverse rule in which the domain of application is changed from C to the complement of C in D (the relevant items are set in boldface in (15)). On the other hand, the referral domain D may be identical to the domain of application C (i.e., C may not be a proper subset); in that case, (15) does not have any further consequences because the inverse rule triggered by (15) must apply to an empty set of expressions.

Stump illustrates the Bidirectional Referral Principle with data from Rumanian verb inflection: In all verb inflection classes except conjuga-

tion 1, 1.SG and 3.PL exponents are identical in indicative paradigms. Sometimes, 3.PL is considered the dependent part (based on evidence from conjugation 1, where the same ending (-*u*) shows up *only* in 1.SG contexts); but with the verb *a fi* ('to be'), 1.SG. is assumed to be the dependent part (because the stem *sínt* for both 1.SG and 3.PL occurs throughout in the plural). Stump argues that there is a rule of referral as in (16-a), which has only the verb *a fi* as its application domain, and which has associated with it a domain of referral V (i.e., the set of all verbs). The Bidirectional Referral Principle then predicts that there must also be the inverse rule of referral in (16-b), with V-*a fi* as the application domain. Whereas (16-a) assigns the 3.PL exponent to 1.SG contexts, (16-b) assigns the 1.SG exponent to 3.PL contexts. (Both rules are slightly simplified here.)

(16) a. $\mathrm{RR}_{0/1,\{\mathrm{agr}(su):\{\mathrm{per:1,num:}sg\}\},a\ fi}(<\mathrm{X},\sigma>) =_{def} <\mathrm{Y},\sigma>$, where
$\mathrm{Nar}_n(<\mathrm{X},\sigma/\{\mathrm{AGR(su)}:\{\mathrm{PER:3,NUM:pl}\}\}>) =$
$<\mathrm{Y},\sigma/\{\mathrm{agr(su)}:\{\mathrm{per:3,num:pl}\}\}>$ Referral domain: V

b. $\mathrm{RR}_{0/1,\{\mathrm{agr}(su):\{\mathrm{per:3,num:}pl\}\},V-a\ fi}(<\mathrm{X},\sigma>) =_{def} <\mathrm{Y},\sigma>$, where
$\mathrm{Nar}_n(<\mathrm{X},\sigma/\{\mathrm{AGR(su)}:\{\mathrm{PER:1,NUM:sg}\}\}>) =$
$<\mathrm{Y},\sigma/\{\mathrm{AGR(su)}:\{\mathrm{PER:1,NUM:sg}\}\}>$ Referral domain: V

Turning next to the Bonan paradigm in (1), one might hope that the same kind of analysis can be given. However, this is not the case. Thus, suppose that there is a rule of referral like (17-a) with the set of nouns as the application domain (= C) and a more comprehensive referral domain comprising nouns and pronouns (= D), that states that the exponent for ACC contexts is the exponent determined by the most specific rule applicable in GEN contexts (see (2-a)). The Bidirectional Referral Principle would then predict the existence of the inverse rule in (17-b) with the complement of the set of nouns in D (i.e., only the set of pronouns) as the domain of application, and the choice of the exponent for GEN determined by the exponent selected for ACC contexts. But this is not what we want to derive: It is not the GEN exponent that is introduced by referral in the case of pronouns in Bonan, but the ACC exponent, and the referral does not go to ACC, but to DAT (see (2-b)).

(17) a. $\mathrm{RR}_{1,\{\mathrm{acc}\},\mathrm{N}}(<\mathrm{X},\sigma>) =_{def} <\mathrm{Y},\sigma>$, where
$\mathrm{Nar}_n(<\mathrm{X},\sigma/\{\mathrm{gen}\}>) =$
$<\mathrm{Y},\sigma/\{\mathrm{gen}\}>$ Referral domain: N∪Pron

b. $\mathrm{RR}_{1,\{\mathrm{gen}\},\mathrm{N}\cup\mathrm{Pron}-\mathrm{N}}(<\mathrm{X},\sigma>) =_{def} <\mathrm{Y},\sigma>$, where $\mathrm{Nar}_n(<\mathrm{X},\sigma/\{\mathrm{acc}\}>) = <\mathrm{Y},\sigma/\{\mathrm{acc}\}>$ Referral domain: $\mathrm{N}\cup\mathrm{Pron}$

In view of this different behaviour of two kinds of bidirectional syncretisms, Baerman et al. (2005) propose to distinguish between *divergent* bidirectional syncretism (as in Rumanian conjugation), and *convergent* bidirectional syncretism (as in Bonan declension). Only the former type lends itself to an analysis in terms of the Bidirectional Referral Principle. We may thus conclude that an account of convergent bidirectional syncretism in Stump's (2001) approach will most likely involve referral, but the two relevant rules must be stipulated separately (more or less as in (2)). Consequently, the concept of bidirectionality is not built into the analysis of a bidirectional syncretism in this case.[13]

This latter consequence holds more generally in Baerman et al.'s (2005) approach. To the extent that formal analyses of instances of (either kind of) bidirectional syncretism are provided, these analyses rely on rules of referral that are not intrinsically related. Thus, it seems fair to conclude that bidirectionality as a concept of grammatical theory is in fact not incorporated into their analysis at all. More generally, this may be taken to indicate that there is nothing a priori wrong with an analysis of bidirectional syncretism that does not reflect bidirectionality in the analysis itself. This leads me back to the present approach.[14]

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[13]Strictly speaking, there is nothing in the *structure* of the paradigm in (1) that makes the bidirectional syncretism in Bonan convergent (Lennart Bierkandt, p.c.). If the paradigm is rotated by 90 degrees, it looks exactly like all the paradigms instantiating divergent bidirectional syncretism in Baerman et al. (2005). That the syncretism cannot be accounted for by invoking the Bidirectional Referral Principle is solely due to the fact that in (15), τ would have to encode part of speech (N vs. Pron) (rather than case) as the (possibly underspecified) feature set characterising an exponent, and C would have to encode case (rather than, e.g., N) as the application domain.

[14]Note, however, that even if bidirectionality is not reflected in the synchronic analysis, the present approach is perfectly compatible with the possibility that patterns of bidirectional syncretism may have arisen historically as a result of some referral-like process.

3.3. Further Cases of Bidirectional Syncretism

On this basis, I would like to return to the original question of whether the present approach can be applied to other instances of bidirectional syncretism (of either the convergent or the divergent type). I will go through two further relevant paradigms, and consider what the SMS/FCR-approach might have to say about them.

3.3.1. Gujarati Conjugation

Consider first another convergent bidirectional syncretism, viz., future tense verb inflection in Gujarati (see Baerman et al. (2005, 70) and literature cited there). The paradigm is given in (18).

(18) *Gujarati conjugation, future tense*

	I	II
1.SG	-iš	-iš
2.SG	-iš	-še
3.SG	-še	-še
1.PL	-š(i)ũ	-š(i)ũ
2.PL	-šo	-šo
3.PL	-še	-še

Note that I and II are not inflection classes in the traditional sense; rather, they represent two freely alternating strategies of realizing 2.SG (I and II are otherwise identical): 2.SG exponents may be taken over from 1.SG contexts (I) or from 3.SG contexts (II). Here is a sketch of what may be said about this paradigm in a SMS/FCR-based approach. The consonantal part of the markers is invariant, so it does not play a role for SMS, and I will ignore it in what follows. However, the four vowel parts differ. General considerations lead one to postulate that /e/ and /o/ are more sonorous than /ũ/ and /i/ (most sonorous /a/ and least sonorous /ə/ are not employed as markers in these paradigms); suppose furthermore that /e/ outranks /o/, and /ũ/ outranks /i/ on the sonority scale (minor differentiations of this type will presumably have to be assumed to be highly language-specific); see (19).

(19) *Sonority scale for vowel exponents in Gujarati verb inflection*
/e/ > /o/ > /ũ/ > /i/

Next, consider the following three FCRs:[15]

(20) a. FCR 5: [–1,–3],[+pl] ⊃ ¬[–back] */e/, */i/
b. FCR 6: [+1,–3] ⊃ ¬[–high] */e/, */o/
c. FCR 7: [+1,–3],[–pl] ⊃ ¬[–cons$_c$] */e/, */o/, */ũ/

Given SMS, these FCRs derive the paradigm of future verb inflection in Gujarati, except for 2.SG forms in option I. Here, two possibilities arise. The first one is that the optionality of choosing pattern I or pattern II is derived by assuming that the feature [+1] is only optionally present in FCR 7: If it is, /-še/ is used in 2.SG contexts; if it is not (i.e., if only [–3] remains), all the more sonorous markers are blocked both in 1.SG *and* 2.SG contexts, and /-iš/ is chosen instead. Alternatively, it could be assumed that since I and II represent different inflectional patterns, they instantiate two separate inflection classes, with all verb stems freely alternating between the two classes. On this view, there could be an additional FCR 8 that blocks */e/, */o/, and */ũ/ in 2.SG contexts. FCR 7 might then perhaps be slightly restricted in its application; cf. (21) (where FCR 7′ would replace FCR 7).

(21) a. FCR 7′: [+1,–3],[–pl] ⊃ ¬[+high,+back] */ũ/
b. FCR 8: [–3],[–pl],[I] ⊃ ¬[–cons$_c$] */e/, */o/, */ũ/

Under both approaches, the picture in (22) arises; note that neither of the analyses employs more rules than markers.

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[15] A few remarks are due on the features employed by these FCRs. Since 1. and 2. person may systematically be syncretic in the world's languages (see Cysouw (2001), Baerman et al. (2005)), there is good reason to assume that these two persons form a natural class; I follow Trommer (2006a,b) in assuming that this class can be referred to by the feature [–3] (where [+3] stands for 3. person); see also Nevins (2007). The difference between 1. and 2. person can then be captured by a feature [±1]. (In order to account for 1./3. person syncretisms – as, e.g., in SG.PAST contexts in the Germanic languages – and to define 1.INCL properly, reference to a third feature [±2] is probably unavoidable, but I will abstract from that in the present context.) Furthermore, the feature [–cons$_c$] in FCR 7 is derived in the same way as before, by decomposing the sonority scale into a set of binary scales which are then translated into"–"- and "+"-valued features. (Since the relevant natural class covers the highest three items of the scale in (19), we end up with the same index for [–cons] as in the case of Bonan; however, this is purely accidental – the two constraints are not identical since they cover different parts of the sonority hierarchy, and they are generated on the basis of two different basic segment inventories in two separate languages.)

(22) *Deriving the paradigm*

	I	II
1.SG	~~šẽ~~ > ~~šo~~ > ~~šũ~~ > $\boxed{\text{iš}}$	~~šẽ~~ > ~~šo~~ > ~~šũ~~ > $\boxed{\text{iš}}$
2.SG	~~šẽ~~ > ~~šo~~ > ~~šũ~~ > $\boxed{\text{iš}}$	$\boxed{\text{šẽ}}$ > šo > šũ > iš
3.SG	$\boxed{\text{šẽ}}$ > šo > šũ > iš	$\boxed{\text{šẽ}}$ > šo > šũ > iš
1.PL	~~šẽ~~ > ~~šo~~ > $\boxed{\text{šũ}}$ > iš	~~šẽ~~ > ~~šo~~ > $\boxed{\text{šũ}}$ > iš
2.PL	~~šẽ~~ > $\boxed{\text{šo}}$ > šũ > ~~iš~~	~~šẽ~~ > $\boxed{\text{šo}}$ > šũ > ~~iš~~
3.PL	$\boxed{\text{šẽ}}$ > šo > šũ > iš	$\boxed{\text{šẽ}}$ > šo > šũ > iš

3.3.2. Latin Declension

Consider next the divergent bidirectional syncretism in the singular of Latin *o*-declensions that figures prominently in Baerman et al. (2005, 134-136 & 139-142) (also see Xu (2007)). The paradigm is shown in (23).

(23) *Latin o-declension, singular*

	NEUT$_a$	MASC	NEUT$_b$
	bell- ('war')	serv- ('slave')	vulg- ('crowd')
NOM	-um	-us	-us
ACC	-um	-um	-us
GEN	-ī	-ī	-ī
DAT	-ō	-ō	-ō
ABL	-ō	-ō	-ō

Assuming the masculine noun stems that take /us/ in the nominative and /um/ in the accusative to be basic, the regular neuter inflection (NEUT$_a$) in these environments can be described in terms of a take-over of the accusative marker for nominative contexts. However, for the few neuter noun stems that instantiate the third pattern (NEUT$_b$), the take-over then goes in the opposite direction, such that the nominative marker is also used for accusative contexts. On this view, there is a bidirectional syncretism in (23).[16]

[16]This syncretism can be derived by invoking the Bidirectional Referral Principle if we assume that the application domain (C) of one rule of referral is the set of

A proper account of this bidirectional syncretism will ultimately have to be embedded in an analysis of the whole system of Latin declension, which is beyond the scope of the present paper. In addition, I take it to be far from clear that the pattern associated with NEUT$_b$ is to be viewed as fully systematic, and to be treated on a par with other syncretisms; and even if full systematicity is assumed, one might still make a case that this kind of syncretism with virtually all neuters in Indo-European languages should be accounted in some different way that reflects its probable functional origin (essentially, the absence of a need for differential object marking; see Comrie (1978)).[17] Still, abstracting away from these caveats, it is at least worth noting that the pattern in (23) can be derived in a SMS/FCR-based analysis without much ado.

First, closer scrutiny of the complete system of declension in Latin reveals that there is good reason to assume that seemingly primitive exponents are to be broken up into sequences of smaller exponents with segmental (and even suprasegmental) status; such a subanalysis has been argued for in detail by Wiese (2003b). In line with this, I assume that markers like *um* and *us* are composed of two exponents – a first vowel exponent /-u/, and a second consonant exponent /-m/. Accordingly, there are also two slots in genitive, dative, and ablative contexts, with the first posistion occupied by a vowel marker, and the

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regular neuter noun stems, with the whole set of neuter noun stems as the referral domain (D). This justifies labelling the syncretism as "divergent".

[17]The only exception seems to be the case of animate neuters in Russian, which exhibit different forms for nominative and accusative in the plural; see Corbett & Fraser (1993) and Krifka (2003), among others. Note incidentally that Russian also exhibits a bidirectional syncretism that looks very much like the one in Bonan: With (regular) masculines in the singular, and with all kinds of nouns in the plural, the accusative takes the form of the nominative with stems that are [–animate], and it takes the form of the genitive with stems that are [+animate]. This looks a lot like an instance of functionally motivated differential object marking, and it is not clear to me whether an attempt should be made to account for it by regular rules of exponence, or whether it should be treated by some separate mechanism (like, e.g., rules of referral, or feature-changing impoverishment). See Corbett & Fraser (1993) and Müller (2004) for versions of the latter option; Wunderlich (2004) for the former approach; and Baerman et al. (2005, 145-150) for a critique of Wunderlich (2004) that inter alia argues that his analysis depends on more than mere rules of exponence (viz., feature deletions brought about by optimality-theoretic competitions). I will leave this matter undecided; but the Russian case should in principle be amenable to the same kind of analysis as its Bonan counterpart under present assumptions.

second one occupied by /Ø/ (equivalently, remaining empty). Since bidirectional syncretism only shows up with the second exponent, the main focus can be on FCRs affecting the distribution of /Ø/, /m/, and /s/ for present purposes.

As far as the FCRs are concerned that govern the distribution of these subanalyzed markers, we must ensure that they hold only for certain slots in a sequence of inflectional exponence. Note that this consequence is completely analogous to the comparable situation with standard morphological approaches that correlate exponents with feature specifications, and one may technically implement this in more or less any of the ways that have been proposed in standard approaches. Thus, one may assume that FCRs bear block indices (in analogy to rule blocks, as in Anderson (1992), Stump (2001)). Another possibility would be to assume FCRs to restrict insertion of maximally sonorous markers into specific functional heads; these could be encoded as features in the part to the left of ⊃ in the respective FCR's statement (in analogy to insertion contexts in Distributed Morphology, as in Halle & Marantz (1993)).

For the sake of concreteness, suppose that there is a set of FCRs for block I whose interaction with SMS ensures the occurrence of /oː/ in dative and ablative contexts (possibly because no FCR_I is active here); of /u/ in nominative and accusative contexts (perhaps because a FCR_I blocks /o/ in nominative and accusative contexts); and of /iː/ in genitive contexts (where /oː/ and /u/ may be blocked by a second FCR_I). Next, by assumption, the inventory of markers available for block II is the set {/Ø/, /m/, /s/} (as long as we restrict attention to *o*-declension noun stems, that is), with SMS favouring /Ø/ over /m/, and /m/ over /s/. The three FCRs for block II in (24) then account for the distribution of these three exponents. Here, [–cons_b] encodes the natural class formed by the two exponents (out of the three exponents of the inventory for block II) that are less consonantal than the third one. The specification [+subj,–obj,–obl] identifies the nominative, as above; suppose that [–obl] covers accusative and nominative (but not genitive, unlike what is the case in Bonan).[18] Furthermore, we must

[18]More generally, the genitive has properties of both oblique and non-oblique cases across languages, so it does not come as a surprise if there is some variation in this domain. Note furthermore that beyond these considerations, the issue of how the cases are fully characterized by primitive case features in Latin does not have to be decided here.

be able to refer to (i) the exceptional neuter declension as an inflection class, and (ii) a natural class of inflection classes composed of the masculine declension and the exceptional neuter declension. I adopt the view that natural classes of inflection classes can be formed by decomposing standard inflection class features into primitive binary features (see Halle (1992, 38), Oltra Massuet (1999, 11), Stump (2001, 34), and Alexiadou & Müller (2005, sect. 2.1.2), among others). The masculine and exceptional neuter declensions can then be assumed to share an abstract inflection class feature [+α] that separates them from other declensions (including the regular neuter declension); neuter itself can be defined as [–masc,–fem] (although nothing depends on this in the present context).

(24)
a. FCR_{II} 9: [–obl] $\supset \neg$[Ø] */Ø/
b. FCR_{II} 10: [–masc,–fem,+α] $\supset \neg$[+sonorant] */m/
c. FCR_{II} 11: [+subj,–obj,–obl],[+α] $\supset \neg$[–cons_b] */Ø/, */m/

(25) shows how the (partial) paradigm in (23) can be derived by SMS on this basis. The divergent bidirectional syncretism is accounted for, and in a simple way: The analysis does not rely on more rules than there are markers.

(25) *Deriving the paradigm*

	[–masc,–fem,–α]	[+masc,–fem,+α]	[–masc,–fem,+α]
NOM	~~/Ø/~~ > $\boxed{\text{/m/}}$ > /s/	~~/Ø/~~ > ~~/m/~~ > $\boxed{\text{/s/}}$	~~/Ø/~~ > ~~/m/~~ > $\boxed{\text{/s/}}$
ACC	~~/Ø/~~ > $\boxed{\text{/m/}}$ > /s/	~~/Ø/~~ > $\boxed{\text{/m/}}$ > /s/	~~/Ø/~~ > /~~m/~~ > /s/
GEN	$\boxed{\text{/Ø/}}$ > /m/ > /s/	$\boxed{\text{/Ø/}}$ > /m/ > /s/	$\boxed{\text{/Ø/}}$ > ~~/m/~~ > /s/
DAT	$\boxed{\text{/Ø/}}$ > /m/ > /s/	$\boxed{\text{/Ø/}}$ > /m/ > /s/	$\boxed{\text{/Ø/}}$ > ~~/m/~~ > /s/
ABL	$\boxed{\text{/Ø/}}$ > /m/ > /s/	$\boxed{\text{/Ø/}}$ > /m/ > /s/	$\boxed{\text{/Ø/}}$ > ~~/m/~~ > /s/

3.4. Concluding Remarks

On the basis of the analysis of convergent bidirectional syncretism in Bonan noun inflection, and of the sketches of analyses of convergent bidirectional syncretism in Gujarati verb inflection and divergent bidirectional syncretism in Latin noun inflection, I think one can venture the hypothesis that an SMS/FCR-based approach to bidirectional syncretism in inflectional morphology is an appropriate means to account for bidirectional syncretism more generally. Other cases of bidirectional

syncretism that have been reported in the literature do not appear to pose a new obstacle for the present approach, and lend themselves to the same kind of analysis. For instance, this holds for the convergent bidirectional syncretism in Lak declension (see Baerman et al. (2005, 50)), for the divergent bidirectional syncretism in Rumanian conjugation (see Stump (2001, 213-222)), and for the divergent bidirectional syncretism in Classical Arabic declension (see Baerman et al. (2005, 142-143)). As a matter of fact, there is at least one case of a putatively divergent bidirectional syncretism that raises problems for an approach in terms of bidirectional referral but would seem to lend itself to an analysis in terms of FCRs, viz., noun declension in Diyari (see Baerman et al. (2005, 143-144), with data taken from Austin's (1981) grammar). The following paradigm is taken from Bierkandt (2006, 51) (it is slightly more comprehensive than the version in Baerman et al. (2005)).

(26) *Diyari declension*

	NOUN.SG	NOUN.NON-SG	NAME.MALE	NAME.FEM
ERG	-li	-li	-li	-ndu
NOM	-Ø	-Ø	-ṉa	-ni
ACC	-Ø	-ṉa	-ṉa	-ṉa
DAT	-ja	-ɳi	-ɳi	-ṉa-ŋka
ALL	-ja	-ŋu	-ŋu	-ṉa-ŋu
LOC	-ṉi	-ŋu	-ŋu	-ṉa-ŋu
ABL	-ndu	-ŋu-ndu	-ŋu-ndu	-ṉa- ndu

	PRON.1/2.SG, 3FEM	PRON.3.SG, NON-FEM	PRON.1/2. NON-SG	PRON.3. NON-SG
ERG	-ndu	-li	-Ø	-li
NOM	-ni	-Ø	-Ø	-Ø
ACC	-ṉa	-ṉa	-ṉa	-ṉa
DAT	-ɳi	-ɳi	-ɳi	-ɳi
ALL	-ŋu	-ŋu	-ŋu	-ŋu
LOC	-ŋu	-ŋu	-ŋu	-ŋu
ABL	-ŋ-ndu	-ŋ-ndu	-ŋ-ndu	-ŋ-ndu

Baerman et al. (2005, 144) observe that the Diyari paradigm involves overlapping syncretism domains. On their view, /-ṉa/ is an accusative form that one inflection class (viz., male personal names) also uses in nominative (absolutive) contexts; and /-Ø/ is a nominative (absolutive)

form that is also used in the accusative by singular nouns. Notwithstanding the problem posed by the slightly more general distribution of /-Ø/ (which Baerman et al. (2005) tackle in a footnote), it seems clear that /-n̪a/ has inherently a much wider distribution than just the accusative in the female name declension: Exactly the same exponent shows up as the first part of a composite marker in dative, allative, and locative contexts with female names (with two different exponents able to follow it). It is therefore unclear why an occurrence of /-n̪a/ in the nominative in one declension should be treated differently (viz., as an instance of a bidirectional syncretism) from an occurrence of /-n̪a/ in other object cases in another declension. Consequently, there is no pattern of bidirectionality left in the data: There are three types of occurrences of /-n̪a/ that must be captured by three distinct rules (or lexical entries) in standard underspecification-based approaches (as they are in the Distributed Morphology analysis advanced in Bierkandt (2006, 58), with /-Ø/ as the elsewhere marker). An approach in terms of directional rules of referral will minimally have to postulate two separate rules of referral to cover the distribution of /-n̪a/, with no bidirectionality involved (since spreading goes from a single source – accusative – to two different domains – nominative, oblique). In contrast, it seems that the present analysis might have a chance of deriving all occurrences of /-n̪a/ systematically, via various FCRs that block this marker in many paradigm domains, each of which corresponds to a natural class. But again, for reasons of space of coherence, I will have to leave it at that for now (the declension system of Diyari is fairly complex, and would certainly require a separate paper).

To conclude, in this paper I have developed a radically non-morphemic approach to syncretism (bidirectional and other) that relies on sonority-driven marker selection (SMS) and feature co-occurrence restrictions (FCRs), and that does not correlate exponents directly with a morpho-syntactic specification, like virtually all existing theories do. At this point, I would like to contend that the present approach is currently the only one that can derive bidirectional syncretism in the same way that it derives standard instances of syncretism. It may therefore be well worth pursuing, even though it clearly requires a radical rethinking of many traditional concepts and analyses in morphological theory (most specifically, the assumption that inflection markers are

accompanied by morpho-syntactic specifications); and it goes without saying that it raises many new questions.[19]

References

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

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

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.

Anderson, Stephen (1992): *A-Morphous Morphology*. Cambridge University Press, Cambridge.

Aronoff, Mark (1994): *Morphology by Itself*. MIT Press, Cambridge, Mass.

Austin, Peter (1981): *A Grammar of Diyari, South Australia*. Cambridge University Press, Cambridge.

Baerman, Matthew (2005): Directionality and (Un)Natural Classes in Syncretism, *Language* 80, 807–824.

Baerman, Matthew, Dunstan Brown & Greville Corbett (2005): *The Syntax-Morphology Interface. A Study of Syncretism*. Cambridge University Press, Cambridge.

Bierkandt, Lennart (2006): Kasusmorphologie des Diyari. Ein Ansatz im Rahmen der Distribuierten Morphologie. In: G. Müller & J. Trommer, eds., *Subanalysis of Argument Encoding in Distributed Morphology*. Vol. 84 of *Linguistische Arbeitsberichte*, Universität Leipzig, pp. 43–62.

[19]To name just an obvious one: How does acquisition of inflectional systems take place under the present perspective?

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.

Chomsky, Noam & Morris Halle (1968): *The Sound Pattern of English*. MIT Press, Cambridge, Mass.

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

Corbett, Greville & Norman Fraser (1993): Network Morphology: A DATR Account of Russian Nominal Inflection, *Journal of Linguistics* 29, 113–142.

Cysouw, Michael (2001): The Paradigmatic Structure of Person Marking. PhD thesis, Katholieke Universiteit Nijmegen. Revised version published 2003: Oxford University Press.

de Lacy, Paul (2002): The Formal Expression of Markedness. PhD thesis, University of Massachusetts, Amherst.

Franks, Steven (1995): *Parameters of Slavic Morphosyntax*. Oxford University Press, New York and Oxford.

Gazdar, Gerald, Ewan Klein, Geoffrey Pullum & Ivan Sag (1985): *Generalized Phrase Structure Grammar*. Blackwell, Oxford.

Halle, Morris (1992): The Latvian Declension. In: G. Booij & J. van Marle, eds., *Yearbook of Morphology 1991*. Kluwer, Dordrecht, pp. 33–47.

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.

Jakobson, Roman (1962): Morfologičeskije Nabljudenija. In: *Selected Writings*. Vol. 2, Mouton, The Hague and Paris, pp. 154–181.

Krifka, Manfred (2003): Case Syncretism in German Feminines: Typological, Functional, and Structural Aspects. Ms., ZAS Berlin.

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.

Müller, Gereon (2002): Remarks on Nominal Inflection in German. In: I. Kaufmann & B. Stiebels, eds., *More than Words: A Festschrift for Dieter Wunderlich*. Akademie Verlag, Berlin, pp. 113–145.

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.

Nevins, Andrew (2007): The Representation of Third Person and Its Consequences for Person-Case Effects, *Natural Language and Linguistic Theory* 25, 273–313.

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

Oltra Massuet, Isabel (1999): On the Notion of Theme Vowel: A New Approach to Catalan Verbal Morphology. Master of science thesis, MIT, Cambridge, Mass.

Stump, Gregory (2001): *Inflectional Morphology*. Cambridge University Press, Cambridge.

Todaeva, Buljaš X. (1963): Einige Besonderheiten der Paoan-Sprache, *Acta Orientalia Academiae Scientarium Hungaricae* 16.

Todaeva, Buljaš X. (1966): *Baoan′skij jazyk*. Nauka, Moskva. pp. 22-28.

Todaeva, Buljaš X. (1997): Baoan′skij jazyk. In: *Jazyki mira: mongol′skie jazyki, tunguso-man′čžurskie jazyki, japonskij jazyk, korejskij jazyk*. Indrik, Mosvka, pp. 29–26.

Trommer, Jochen (2006a): Plural Insertion is Constructed Plural. In: G. Müller & J. Trommer, eds., *Subanalysis of Argument Encoding*

in Distributed Morphology. Vol. 84 of *Linguistische Arbeitsberichte*, Universität Leipzig, pp. 197–228.

Trommer, Jochen (2006b): Third-Person Marking in Menominee. Ms., Universität Leipzig.

Weisser, Philipp (2007): Case Borrowing. Ms., Universität Leipzig.

Wiese, Bernd (1999): Unterspezifizierte Paradigmen. Form und Funktion in der pronominalen Deklination, *Linguistik Online* 4. (www.linguistik-online.de/3_99).

Wiese, Bernd (2003a): Russian Noun Morphology and Underspecified Paradigms. Ms., IDS Mannheim.

Wiese, Bernd (2003b): Zur lateinischen Nominalflexion: Die Form-Funktions-Beziehung. Ms., IDS Mannheim. www.ids-mannheim.de/gra/personal/wiese.html.

Wu, Hugjiltu (2003): Bonan. In: J. Janhunen, ed., *The Mongolic Languages*. Routledge, New York & London, pp. 325–345.

Wunderlich, Dieter (1996): Minimalist Morphology: The Role of Paradigms. In: G. Booij & J. van Marle, eds., *Yearbook of Morphology 1995*. Kluwer, Dordrecht, pp. 93–114.

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.

Xu, Zheng (2007): An Optimality-Theoretic Account of Full and Partial Identity of Forms. In: T. Scheffler, J. Tauberer, A. Eilam & L. Mayol, eds., *Proceedings of Penn Linguistics Colloquium*. Vol. 13.1, University of Pennsylvania, pp. 421–434.

Zwicky, Arnold (1970): Class Complements in Phonology, *Linguistic Inquiry* 1, 262–264.

Reanalysing Hindi Split-Ergativity as a morphological phenomenon

Stefan Keine *

Abstract
This paper develops an analysis of Hindi split ergativity in morphological terms, employing the framework of Distributed Morphology. Syntactically, the case features assigned to a DP do not differ in perfective and non-perfective clauses. It is merely the phonological realisation of these features that is subject to variations, giving rise to different case markers on the surface. Furthermore, the proposal crucially involves '-ko' (dative) case in the derivation of the distributional pattern of '-ne' (ergative).

1. Introduction

Deriving alignment patterns with only one homogeneous algorithm is one major goal within the study of syntax (Bittner & Hale 1996, Bobaljik 1993, Chomsky 1993, Lee 2006, Murasugi 1992, Woolford 2001 and others). Since case assignment is widely seen to be a syntactic phenomenon, all these analyses derive alignment patterns by means of syntactic mechanisms. Questions arise how to treat departures from such "pure" alignments patterns. Some languages at first glance seem to switch between different case patterns if certain conditions are fulfilled. Hindi-Urdu is generally assumed to exhibit such a system. In the context of non-perfective aspect the case markers attached are different from the context of perfective aspect, therefore exhibiting a system of *split ergativity* (Das 2006, Mahajan 1990, Pandharipande & Kachru 1977, Ura 2006).

Generally speaking, all previous accounts of the case system of Hindi are syntactic in nature, i.e. they propose special syntactic mechanisms

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that "overwrite" the general strategies of case assignment. While this is in principle feasible, it strikingly complicates the syntactic component of the grammar. For any given language exhibiting properties of split ergativity new constraints have to be introduced. This is especially obvious for optimality theoretic approaches such as Lee (2006), that stipulate new and otherwise unmotivated constraints in order to account for the empirical evidence in Hindi.

In this paper, I argue that Hindi split ergativity is best understood to be a morphological phenomenon, with morphology being realizational in nature, such as Distributed Morphology (Halle & Marantz 1993, 1994) or Paradigm Function Morphology (Stump 2001). Interestingly enough, only the distribution of the case markers can be considered split ergative. As for syntactic criteria, Hindi displays an accusative system (Kachru & Pandharipande 1977). If the distribution of the case markers is accounted for in syntactic terms, this raises the question why no such system can be observed in the area of binding, verbal agreement, raising, relativization and other diagnostics (for a detailed discussion see Kachru & Pandharipande 1977). If, on the other hand, the syntactic system of Hindi is treated to be uniform throughout all conditions, the observation that only markers but no syntactic properties change falls into place.

Theoretically speaking, the main claim proposed here is that, apart from the empirical gains of this analysis, all morphological devices resorted to, such as feature decomposition or impoverishment rules, have been motivated independently. Hence, modern morphological theories are fully capable of deriving the empirical facts of Hindi and no additional stipulative principles are necessary.

Three case markers are subject to the analysis: *-ne*, *-ko* and the zero marker. Both *-ne* and *-ko* alternate with the null marker in principled ways. The main claim is that these patterns of alternations can be captured by means of impoverishment rules: In the standard case, the non-null markers are chosen. But in certain contexts features are deleted, so that the set of attachable case markers is minimized, only allowing for the zero marker to be attached. The contextual features of these impoverishment rules capture the principles underlying the alternations between non-null and null markers, therefore giving rise to split ergativity.

This paper is structured as follows: Section 2 describes the empirical phenomena that are to be explained. In section 3 some previous accounts are reviewed, describing the general approach as well as point-

ing out some problems. Section 4 develops a formal theory of how Hindi split-ergativity can be accounted for in morphological terms. Finally, section 5 illustrates some theoretical implications and situates the approach in a wider context, namely predictions about the behavior of identically and distinctly marked DPs with respect to other areas, i.e. binding, agreement and scopal ambiguity. Section 6 draws a conclusion. As an appendix, section 7 demonstrates a translation of the system worked out in section 4 into Paradigm Function Morphology.

2. Empirical Evidence

This section gives an overview over the distributional patterns of three case markers – -*ne*, -*ko* and -∅. I mainly draw from Mohanan (1994)'s description. As will become clear, -*ne* and -*ko* are confined to subjects and objects respectively, and both alternate with the zero marker.

Hindi-Urdu distinguishes several case markers. In Mohanan (1994: 66)'s analysis there are eight:

(1) **Hindi case markers**

feature	*marking*
NOM	∅
ERG	-ne
ACC	-ko
DAT	-ko
INST	-se
GEN	-kaa
LOC_1	-mē
LOC_2	-par

The present analysis will only be concerned with the distribution of the first three case markers -∅, -*ne* and -*ko*. Interestingly enough, Mohanan treats -*ko* as being ambiguous between a dative and an accusative marker. The motivation of her doing so lies in the different behavior of the *ko*-marked noun in transitive and ditransitive clauses as will be outlined below.

2.1. -ne

The marker *-ne*, traditionally called ergative, only shows up on subjects of perfective clauses, in all other aspects the use of the ergative is systematically ruled out:

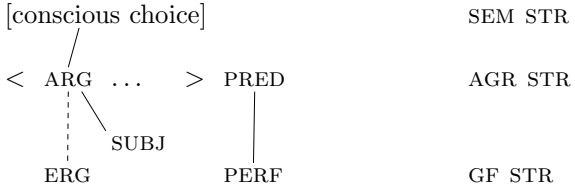
(2) a. raam-ne ravii-ko piiṭaa
Ram-ERG Ravi-ACC beat.PERF
'Ram beat Ravi.'
b. raam ravii-ko piiṭaa hai
Ram.NOM Ravi-ACC beat.IMPERF be.PR
'Ram beats Ravi.' (Mohanan 1994: 70)

In perfective clauses the distribution of the ergative is further restricted since it can only be attached to subjects that have *conscious control* over the action denoted by the verb. In all other cases, the subject is zero (nominative) marked, cf. (3).

(3) a. raam-ko acaanak šer dik^{h}aa. vah/
Ram-DAT suddenly lion.NOM appear-PERF he.NOM
*us-ne cillaayaa
he-ERG scream-PERF
'Ram suddenly saw a lion. He screamed.'
b. us-ne/ *vah jaan buuj^{h}kar cillaayaa
he-ERG he.NOM deliberately shout-PERF
'He shouted deliberately.' (ibid.: 72)

Although the condition for the use of the ergative is termed differently in the literature (e.g. *conscious choice* by Mohanan 1994, *volitionality* by Lee 2003, "agent in the completion of the action" by Das 2006: 42, and *conscious awareness* by Montaut 2004), the main insight behind these conditions seems to be the same. Furthermore, since most of the analyses I am aware of lack an articulate semantic theory, the differences between those labels cannot be expatiated. Therefore, I assume the distribution of the ergative in the perfect to be semantically motivated, although the details remain to be worked out. The underlying system is illustrated by Mohanan (1984: 77) as follows (where solid lines indicate conditions and the dashed line the implication):

(4) ERG association:



It turns out that nearly no transitive verb allows for a zero marked subject in perfect clauses, i.e. the distribution of the marker *-ne* is largely governed by the factors transitivity and perfective aspect (Das 2006). To my knowledge, there are only two exceptions to the generalisation that all transitive verb require *ne*-marked subjects in the perfective aspect: *bhuulna* 'forget' and *laanaa* 'bring'. A few verbs show optionality (e.g. *samajhnaa* 'understand'):

(5) a. raam šiišaa laayaa
Ram.NOM mirror.NOM bring.PERF
b. *raam-ne šiišaa laayaa
Ram-ERG mirror.NOM bring.PERF
'Ram brought the mirror.' (ibid.: 72)

Montaut (2004) argues that it is an idiosyncratic property of 'bring' that this verb does not license ergative marked subject, which has to be coded lexically. Butt & King (2004: 186) agree with this view in considering *bring* "truly exceptional". Following their intuition, I will regard the behavior of these verbs as idiosyncratic. Generally speaking, all transitive verbs in the perfect must have subjects in the ergative. The factor *volitionality* only plays a role with intransitive verbs (see also Butt & King 2004).

2.2. -ko

The accusative/dative marker *-ko* never shows up on subjects but only on objects. With transitive verbs its appearance alternates with zero marking. As for ditransitives, however, the indirect object is obligatorily *ko*-marked and the direct object usually has to be zero marked, cf. (6).

(6) ilaa-ne mãã-ko yah haar / *is
Ila-ERG mother-DAT this.NOM necklace.NOM this.NONNOM
haar-ko diyaa
necklace-ACC give.PERF
'Ila gave this necklace to mother.' (ibid.: 85)

As is the case with the ergative, the occurence of *-ko* is not optional but conditioned by semantic factors: it is attached "when it refers to a human being or a specific inanimate entity" (Montaut 2004: 170). The dependence on humanness is exemplified in (7), the specificity effects in (8)

(7) a. ilaa-ne ek bacce-ko / *baccaa uṭ^{h}aayaa
Ila-ERG one child-ACC child.NOM lift/carry.PERF
'Ila lifted a child.'
b. ilaa-ne ek haar / *haar-ko uṭ^{h}aayaa
Ila-ERG one necklace.NOM necklace-ACC lift-PERF
'Ila lifted a necklace.' (ibid.: 79)

(8) a. nadya=ne gaṛi cɑla-yi
Nadya.F.SG=ERG car.F.SG.NOM drive-PERF.F.SG
hɛ
be.PRES.3SG
'Nadya has driven a car.'
b. nadya=ne gaṛi=ko cɑla–ya
Nadya.F.SG=ERG car.F.SG=ACC drive–PERF.M.SG
hɛ
be.PRES.3SG
'Nadya has driven the car.' (Butt & King 2004: 161)

A subclass of verbs, which Montaut (2004) calls "basic", only permit zero marked objects, regardless of the humanness and specificity features of their objects. Examples for verbs belonging to that class of verbs are *banaa* 'make', *paḍ^h* 'read', *gaa* 'sing', and *pii* 'drink'. One example is provided by (9).

(9) ilaa-ne yah k^{h}at / *is k^{h}at-ko
Ila-ERG this.NOM letter.NOM this.NONNOM letter-ACC
lik^{h}aa
write.PERF
'Ila wrote this letter.' (Mohanan 1994: 81)

Note that out of three logically possible classes of verbs only two exist: Class I in principle allows for zero marked and *ko*-marked objects as well. Objects of verbs belonging to class II, on the other hand, can only be zero marked. But no transitive verb only allows for *ko*-marked objects.

Interestingly enough, in ditransitive clauses the direct object cannot be marked with *-ko* even if it is human, and thus should have to be *ko*-marked in any case:

(10) ilaa-ne mãã̃-ko baccaa / *bacce-ko diyaa
Ila-ERG mother-DAT child.NOM child-ACC give-PERF
'Ila gave a/the child to the mother.'

As mentioned above, the empirical generalisation is that in ditransitives only the indirect object can be (and in fact has to be) *ko*-marked.

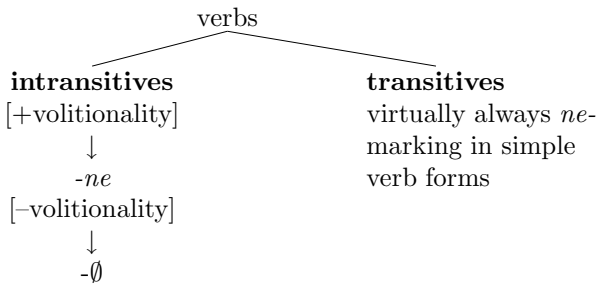
Accusative/dative marking is in no way connected to the appearance of the ergative marker, so *-ko* occurs throughout all tenses and aspects.

2.3. Summary

The distributional patterns of *-ne*, *-ko* and the zero marker can schematically be represented as below.

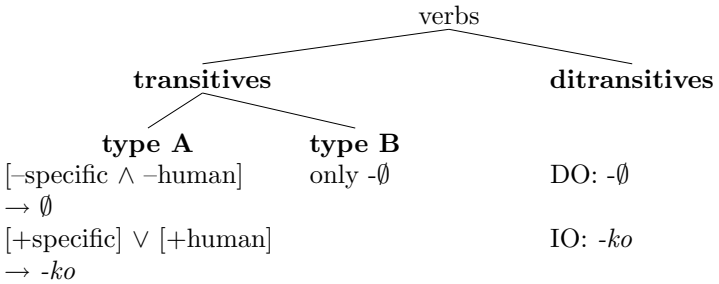
(11) *-ne:*

- only on subjects of perfective clauses



(12) *-ko:*

- only on objects[1]



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3. Previous Analyses

In this section some previous theoretical accounts are reviewed. They all have in common that they treat split ergativity as a syntactic phenomenon, a claim contrary to the main proposal of this paper. I will briefly outline several optimality-theoretic accounts and one minimalist account.

3.1. Optimality-Theoretic Approaches

3.1.1. Woolford (2001)

In order to derive different alignment patterns Woolford (2001), a paper that is mainly concerned with deriving different alignment patterns, also includes an approach to the distribution of the ergative in Hindi. The relevant constraints are the following:

[1]This is a simplification since there are instances of *ko*-marked subjects. I will abstract away from them, merely noting that some extra mechanism is needed for *quirky case*.

(13) *Constraints*

a. FAITH-LEX:
'Realize a case feature specified on V in the input.'

b. FAITH-LEX$_{perf}$:
'Realize a case feature specified on perfective V in the input.'

c. *ERG:
'Avoid ergative case.'

(14) *Ranking in Hindi*
FAITH-LEX$_{perf}$ ≫ *ERG ≫ FAITH-LEX

These constraints yield the result that in non-perfective clauses the faithfulness constraints FAITH-LEX is outranked by the markedness constraint *ERG so that the ergative cannot be realized. In perfective clauses, however, a special faithfulness contraints overrides the general ban on ergatives. Woolford treats the ergative as lexical and therefore inherent case, present in the input. Hence, if it does not occur in the output a violation of a faithfulness constraint arises.

3.1.2. Stiebels (2000, 2002)

The reasoning behind Stiebels' account works in the opposite direction of Woolford's: Instead of generating nominative subjects as the default and ensuring ergative marking in perfective contexts, here ergative marking is the standard case, that is overriden in non-perfectives by means of the high-ranked constraint *[+lower role]/[–perf]*:

(15) *[+lower role]/[–perf]* ([+lr]/[–perf]):
'Avoid ergative marking in non-perfective contexts.'

The feature *[+lower role]* marks that in the sentence there is a lower Θ-role than the one which this feature is assigned to. Hence *[+lower role]* marks subjects in transitives. One problem with this approach is obvious: It cannot account for *ne*-marked subjects in intransitive clauses. A possible way out would be to assume that unergatives are hidden transitives (cf. Bittner & Hale 1996).

3.1.3. Lee (2003, 2006)

Lee's account resembles that of Woolford in treating nominative marking as the standard case and instantiating ergative marking only in perfective clauses. This is accomplished by the following contraints:

(16) a. *ERG
'Avoid ergative marker.'
b. ERG_{perf}
The highest argument role in a perfective clause must be in the ergative.'

3.1.4. Problems

Several problems arise with these optimality-theoretic approaches: Firstly, it is not obvious how the semantic impact of ergative vs. nominative marking can be implemented, since they primarily focus on the distribution of case features, abstracting away from semantic implication.[2]

Secondly, the constraints employed are a restatement of the facts. The ranking $\text{ERG}_{\text{perf}} \gg$ *ERG states that ergative marking is not allowed except for perfective clauses. But this is just an empirical generalization. So these accounts fall somewhat short of deriving empirical patterns from more general principles.

3.2. A minimalist analysis – Anand & Nevins (2006)

The main focus of Anand & Nevins' analysis lies in accounting for scopal differences between zero marked and *ne*-marked subjects, but they also offer an account of how to capture the relevant distributional properties of the markers under consideration within the Minimalist Program. Their proposal for scope ambiguity is discussed in section 5.3 below.

Ignoring the dative marker *-ko*, Anand & Nevins propose four distinct case features: the ergative (marked by *-ne*, a lexical case assigned

[2]Lee's account should be noted as an exception to this criticism.

by perfective v[3]), the nominative (the zero marker assigned by T), the accusative (-∅, assigned by v) and the objective (-*ko*, a lexical case assigned by a separate projection EncP on direct objects). Hence, -∅ (as well a probably -*ko*, although nothing is said about it) is assumed to be ambiguous.

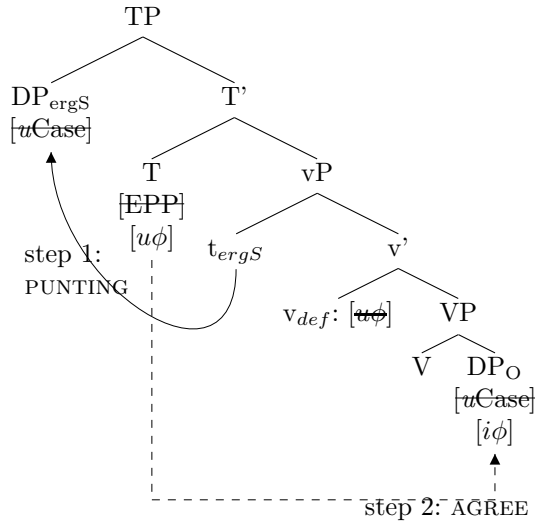
Two derivations are described by Anand & Nevins: ERG-NOM and ERG-OBJCTV. Firstly, they propose that perfective v and passive v are *one and the same head* since they take the identical form:

(17) a. aadmii-ne rotii khayii thii
man-ERG bread-NOM eat-PERF be-PAST
'The man had eaten the bread.'
b. rotii khaayii gayii
bread-NOM eat.PERF go-PERF
'The bread was eaten.' (Anand & Nevins 2006: 16)

Consequently, since passive v cannot assign the accusative, v in passives cannot. But since both subject and object require their case feature to be valued the derivation will crash unless one of the two arguments has its case features valued by some other method. As one way out, the subject (base generated in Specv) receives ergative case from perfective v and is therefore rendered inactive. With the subject being inactive, T assigns its nominative feature to the object which is then realized by zero marking. To account for the fact that the verb only agrees with the highest zero marked argument, hence the object, T has to establish an agree relation with the object which should be barred since the subject intervenes, blocking agreement with the object due to *Relativized Minimality* (Rizzi 1990) or some equivalent notion. The solution to this problem is that the subject has to move to SpecT in order to satisfy T's EPP requirement. At this stage of the derivation the subject no longer intervenes and the object values T's ϕ-features.

[3]That case marking with the ergative is actually due to perfective v is not explicit in the relevant paper, but was pointed out to me by Andrew Nevins (p.c.).

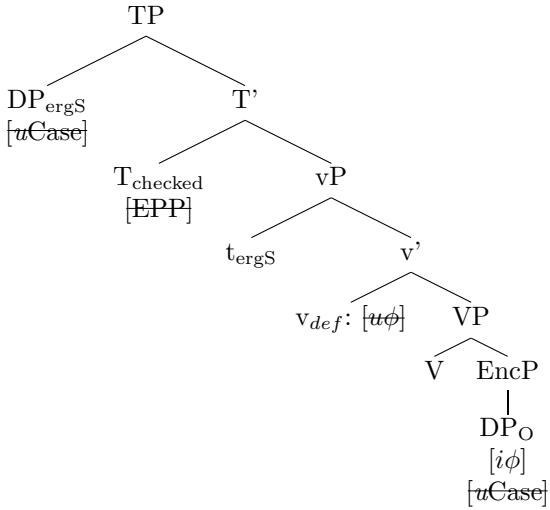
(18) *Derivation of* ERG-ACC *structures*



In order to only allow T-object agreement it is crucial that movement of the subject to SpecT has to apply *before* T probes for ϕ-features.

Sentences with ergative marked subjects and objective marked objects (i.e. *-ne* and *-ko*, respectively) are derived in the following way. Again v, being perfective/passive, cannot assign the accusative but assigns the ergative to its specifier. In contrast to ERG-ACC patterns the object is not case marked by T but by an additional projection – EncP:

(19) *Derivation of* ERG-OBJCTV *structures*



Since in this derivation the case features of the subject as well as the object are valued lexically, i.e. by v or Enc, it is crucial that T does not assign a case feature for it would not be checked, leading to a crash of the derivation. To achieve this, Anand & Nevins assume that in such cases a special head $T_{checked}$ can be selected, that bears no uninterpretable features and thus does not require agreement. Morphologically, this is instantiated by default agreement.

This analysis, however, faces several problems. Firstly, the identity of passive and perfective v, meant to account for the fact that perfective v cannot assign accusative case, is difficult to maintain as soon as the ergative is encountered: While perfective v can assign the ergative (and does so in most cases), passive v can never. Both heads behave alike with respect to the accusative but differently with respect to the ergative. While this in principle might be the case there is no reason for why the identical behavior breaks down for the ergative. Thus a certain distinction between both v's has to be introduced nevertheless.

Furthermore, the specific orderings of operations appears to be purely stipulative: For ERG-ACC derivations to yield the correct sentences, i.e. agreement with the object instead of the subject, movement of the subject has to apply *before* T probes for ϕ-features. On the other hand, if the subject of a clause is zero marked, the verb agrees with it, independently of the aspect. Now if movement to SpecT renders the

subject incapable of valuing T's ϕ-features, EPP-driven movement has to apply *after* ϕ-feature valuation in the case of zero marked subjects, exactly the opposite order. Since for *ne*-marked subjects T never shows agreement with the subject, but T always agrees with zero marked subjects, it must not only be the case that both rule orderings are in principle possible but that one of both is systematically excluded, depending on the case that is assigned to the subject. While this approach is feasible, such shifts in the order of operations do not follow from any property of the grammar in Anand & Nevins' system and hence turn out to be stipulations.

Another problem concerns Spec-head relations. In the derivation of ERG-ACC structures the subject was moved to SpecT because if it stayed in Specv it would block agreement between T and the object. In SpecT, the subject is no longer c-commanded by the probe T and hence no longer intervenes between T and the object. But in ERG-ACC structures it is not only the case that T *can* agree with the object but furthermore that T *cannot* agree with the subject, so the element in SpecT must be invisible to T probing for a goal. This seems reasonable if agreement is constrained to goals c-commanded by the probe. But now consider ergative assignment: If the ergative on the subject stems from v, an agreement relation between a head and its specifier has to be possible, since the subject originated in Specv, thus never occupying a position within the c-command domain of v. The dilemma looks as follows: If one allows Spec-head agreement, verb agreement with a *ne*-marked subject is incorrectly predicted to be grammatical. If, on the other hand, agreement is restricted to the c-command domain of a head, v cannot assign its ergative feature to the subject, yielding crash for all derivations with *ne*-marked subjects. It would be possible to constrain agreement to a head's c-command domain for ϕ-features but to its m-command domain for case features, though there does not appear a principled reason for doing so.

A related point concerns ergative marking of the subject in Specv by v. It is unclear why this case feature cannot be assigned to the object in the complement position of V and hence within the c-command domain of v, if it is not embedded within an EncP and therefore still lacking case, as in the derivation of ERG-ACC structures above. In this case the subject could get its case feature valued by T. The result of such a derivation would be NOM-ERG structures but *ne*-marked objects are ungrammatical without exceptions. To salvage this derivation a feasible way out would be to link ergative assignment to Θ-roles, i.e. the

ergative can only be assigned to the element receiving the external Θ-role. Again, such an assumption works but again it would introduce an asymmetry between the ergative and another case feature: as depicted above, the nominative can be assigned to the complement of V by T, not depending on Θ-assignment.

The distribution of EncP appears to be problematic, as well. Since EncP assigns objective case, realized as *-ko*, it has to be present if and only if the object is specific or human. Humanness will be a feature of the noun rather than Enc, hence Enc has to have an uninterpretable feature [±human]. Verbs that allow for both zero and *ko*-marked objects should have either the feature [*u*Enc] or [*u*DP]. But then a verb could select a human DP, eliding the EncP. In this case the subject is zero marked since EncP, that is responsible for *ko*-marking, is not present within the structure created, undermining the generalization that for human objects, -ko is obligatory. The intuition seems to be that whenever Enc can be inserted it has to be. But it is unclear how this can be accomplished.

4. Analysis

This section sets forth the theoretical implementation of the main claim of this paper, i.e. that Hindi split ergativity is properly analysable as a morphological phenomenon. The system outlined below makes several claims: First, Hindi has active alignment – subjects on the one hand and objects on the other are marked homogeneously. This accounts for the fact that *-ne* is only attached to DPs that are interpreted as volitional actors and, furthermore, that *-ko* is confined to objects. Second, the marker *-ko* is a lexical case marker attached to objects in all of its occurences. Two cases can be assigned to the object of a transitive verb: absolutive, marked by the null marker, and accusative, normally realized by *-ko*. Third, the subject is always marked by the ergative, which is standardly realized by *-ne*. Fourth, subjects and objects can be marked with the zero marker if impoverishment rules by means of feature deletion render insertion of the standard markers impossible. The context of these impoverishment rules is exactly the triggering condition for split ergativity.

Put more concrete, the impoverishment rule for objects only affects accusatives, yielding zero marking instead of *ko*-marking if the object is not human and non-specific. Absolutive case can, independently

of impoverishment rules, only marked by the zero marker, hence no marker alternation arises for this case. Subjects receive the ergative, which is standardly realized by *-ne*. In non-perfective sentences, however, a second impoverishment rule applies, rendering *ne*-insertion impossible. As a consequence, only the zero marker can be attached, confining the appearance of *-ne* to perfectives alone. The system is then slightly extended for datives in ditransitives, marked by *-ko*, in order to account for the fact that they never alternate with -∅. Both the accusative in transitives and the dative in ditransitives are lexical cases, distinguished by some feature. The context of the impoverishment rule for accusatives is enriched so that it only applies to transitive clauses. This yields the observation that indirect objects are marked with *-ko* independently of specificity or humanness.

I agree with Bittner & Hale (1996), Bobaljik (1993), Chomsky (1993) and Davison (2004) among many others in analysing the ergative as a structural case. Furthermore, I assume perfect clauses to be the standard form and non-perfect clauses to be derived through *impoverishment rules* (within the framework of Distributed Morphology) or *rules of referral* (as in Paradigm-Function Morphology). For this kind of rules to be useful, morphology must be seen as *realizational* in nature. Hence, inflectional markers *never* add information to a given stem, but can only be attached if the set of features characterized by that inflectional marker is a *subset* of the set of features of the stem. It is further assumed that these markers can be *underspecified*. Consequently, they compete with each other for being attached to a stem. In such cases, the most specific of all applicable markers is chosen, where specificity is determined on the basis of cardinality of sets: Out of all competing markers, the one with the highest number of features is attached to the stem. Since feature deleting operations can erase syntactically relevant information they must apply post-syntactically. For these operations to influence the attachment of inflectional markers (as is their very purpose), these markers have to be inserted after those rules have applied. Thus, inflectional markers are inserted post-syntactically. This is termed *late insertion* in Distributed Morphology.[4]

[4]More mechanisms have been proposed, such as *fusion*, *merger* and *fission* (Halle & Marantz 1993, Noyer 1992), but the present analysis only relies on impoverishment rules.

4.1. Active Alignment in Hindi

Hindi has an active alignment pattern with Θ_{ext} being *ne*-marked and Θ_{int} being zero-marked. The general structure of active alignment is demonstrated in (20):

(20) *Active alignment*

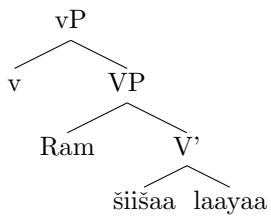
ERGATIVE	ABSOLUTIVE
DP_{ext}-V_{intr}	DP_{int}-V_{intr}
DP_{ext}-V_{tr}	DP_{int}-V_{tr}
-ne	-∅

With this assumption, the subject marking of sentences in the perfect can largely be explained: In standard transitive sentences the subject must receive Θ_{ext}, since Θ_{int} is assigned to the object. Therefore, in these cases *-ne* is always attached to the subject. The above mentioned case of the verb 'bring', which only allows for zero-marked subjects can be accounted for by the lexical idiosyncrasy that this particular verb subcategorises for a direct and an indirect object but no subject, thus departing from the *Uniformity of Theta Assignment Hypothesis* (Baker 1988, Adger 2003):

(21) UNIFORMITY OF THETA ASSIGNMENT HYPOTHESIS (UTAH)
Identical thematic relationships between predicates and their arguments are represented syntactically by identical structural relationships when items are Merged.

The structure of (5) can thus be schematized as in (22):

(22)



As for intransitive verbs, the so-called subject can receive either Θ-role. If UTAH holds true, it is a natural prediction that with certain verbs only one Θ-position should be available. For those verbs whose semantics license assignment of either Θ-role and thus external merge within VP or vP respectively the two options should result in different inter-

pretations. These predictions are borne out. Obligatorily unaccusative verbs such as 'fall' only license zero-marked subjects, which falls into place straightforwardly since unaccusatives by definition only assign an internal Θ-role:

(23) a. raam giraa
Ram.NOM fall.PERF
b. *raam-ne giraa
Ram-ERG fall.PERF
'Ram fell hard.' (Mohanan 1994: 71)

On the other hand, unergative verbs, which assigns only an external Θ-role, only allow for *ne*-marked subjects:

(24) a. raam-ne nahaayaa
Ram-ERG bathe.PERF
b. *raam nahaayaa
Ram.NOM bathe.PERF
'Ram bathed.' (ibid.: 71)

If verbs permit assigment of Θ_{int} as well as Θ_{ext} a semantic contrast is attested as exemplified by (3), repeated here.

(3) a. raam-ko acaanak šer dik^{h}aa. vah/
Ram-DAT suddenly lion.NOM appear-PERF he.NOM
*us-ne cillaayaa
he-ERG scream-PERF
'Ram suddenly saw a lion. He screamed.'
b. us-ne/ *vah jaan buuj^{h}kar cillaayaa
he-ERG he.NOM deliberately shout-PERF
'He shouted deliberately.'

As noted above, a semantic analysis of these contrasts remains to be worked out, but the intuition behind those patterns is that, at least in Hindi, Θ_{ext} is associated with volitional interpretation: In (3-b) Ram screamed intentionally and thus in some sense was the semantic causer of this event. In (3-a) Ram's screaming was not caused by Ram himself but rather by the appearance of the lion. If a verb does not allow for these two kinds of readings due to its semantics, the optionality of the ergative marker breaks down. One cannot fall purposefully (cf. (23)) and bathing must be an intentional activity ((24)). Note that this claim is supported by independent arguments that v° has a semantic impact,

i.e. it yields a causative interpretation. It also immediately follows that the ergative codes "prototypical agent properties" (Lee 2006: 93). This is because Θ_{ext} *is* the agentive role.

The proposal that Hindi has active argument encoding therefore leads to the following system: On the semantic side, Θ_{ext} receives a volitional interpretation. On the syntactic side it is homogenuously associated with the case feature ERGATIVE, as will be demonstrated below. The appropriate marker for this feature environment is *-ne*. As a consequence, *ne*-marking and volitional interpretation are connected to each other, which derives this empirical generalization.

(25) Θ_{ext} → *semantic interpretation:* +volitional
Θ_{ext} → *case feature:* [ERG] → *-ne*

4.2. The status of -ko

Viewing Hindi as being actively aligned immediately raises one problem concerning the marker *-ko*. In many analyses (e.g. Butt & King 2004, Mohanan 1994) *-ko* is treated as being ambiguous between an accusative and a dative marker. Given the empirical evidence, this seems reasonable at first glance: It can mark the direct object of a transitive verb (cf. (2)) as well as the indirect object of a ditransitive verb ((6)).

(2) a. raam-ne ravii-ko piiṭaa
Ram-ERG Ravi-ACC beat.PERF
'Ram beat Ravi.'

b. raam ravii-ko piiṭaa hai
Ram.NOM Ravi-ACC beat.IMPERF be.PR
'Ram beats Ravi.' (Mohanan 1994: 70)

(6) ilaa-ne mãã-ko yah haar / *is
Ila-ERG mother-DAT this.NOM necklace.NOM this.NONNOM
haar-ko diyaa
necklace-ACC give.PERF
'Ila gave this necklace to mother.' (ibid.: 85)

If Hindi in fact shows active alignment, this poses the question why *-ko* never occurs on any subject.[5] The system behind active alignment consists in the uniform marking of Θ_{int} and Θ_{ext}. (2) seems to demonstrate that Θ_{int} is marked with *-ko* for objects, but on subjects Θ_{int} is zero-marked ((3-a)). The problem boils down to the observation that only two instances of case can be involved in active marking, but in Hindi three markers (*-ne*, *-ko* and -∅) appear. Therefore, I will argue that only *-ne* and -∅ are structural case markers and *-ko* constitutes a lexical marker in all instances.

The main difference between lexical and structural case is that the former but not the latter has to be coded explicitly on the assigning head, e.g. V° (see Marantz 1991 among many others). The reasoning behind this distinction is based on the different distributions of these cases: Structural case is the default, so one would lose a generalisation if it had to be annotated on every single verb. Thus, it is introduced by general rules (e.g. Marantz 1991) or by functional heads (e.g. Bobaljik 1993, Chomsky 1993, Chomsky 2001). In contrast, lexical case is exceptional in the sense that it only occurs if a verb is specifically marked for it. Thus, it constitutes a retreat from the general case.

Several phenomena are accounted for if *-ko* is treated as a lexical case marker:

First, (9) shows that the appearance of *-ko* is dependent on the verb.

(9) ilaa-ne yah k^{h}at / *is k^{h}at-ko
Ila-ERG this.NOM letter.NOM this.NONNOM letter-ACC
lik^{h}aa
write.PERF
'Ila wrote this letter.' (Mohanan 1994: 81)

While for all verbs objects can be zero-marked, some verbs arbitrarily do not allow for *ko*-marked objects. These verbs behave exceptionally, which has to be annotated lexically. Therefore, *-ko* but not zero marking shows properties of lexically governed case, since it does not conform to rules in some instances. This fact constitutes an argument in favor of *-ko* being a lexical case marker and -∅ a structural case marker.

[5]In fact, *-ko* can appear on subjects in the context of *quirky case marking*. Some special mechanism is necessary to account for this phenomenon. I will not try to implement such cases.

Second, in ditransitive structures the direct object can never be *ko*-marked[6], even if the semantic conditions are met (cf. (6)). If *-ko* was an accusative marker it would be mysterious why it can appear on direct objects of transitive verbs but not on direct objects of ditransitive verbs.

Third, a theory that analyses *-ko* as a lexical case marker predicts it to be maintained in passive structures. This prediction is borne out for ditransitives as well as for transitives:

(26) anil-ko haar b^{h}ejaa gayaa
Anil-DAT necklace.NOM send.PERF go.PERF
'Anil was sent a/the necklace.' (Mohanan 1994: 93)

(27) anil-ko (raam-se) uṭ^{h}aayaa jaaegaa
Anil-ACC Ram-INSTR carry.PERF go.FUT
'Anil will be carried (by Ram).'[7] (ibid: 94)

However, this behavior of *-ko* is found only in some dialects of Hindi. While in ditransitives *-ko* is maintained troughout all variants, a contrast is observed for passivization of transitive structures. Some dialects only allow for the preservation of *-ko* in passives, in others only zero marked subjects are grammatical. This constitutes a challenge for any theory treating *-ko* as one and the same marker in all of its appearances. I consider (27) to provide evidence for the claim that *-ko* marks a lexical case, noting the complications with (26). Nevertheless, something will have to be said about such cases. In section 4.5 I provide the theoretical means to at least formulate this contrast.

In order to capture these otherwise surprising properties of *-ko* I will treat it as a lexical marker throughout all of its occurences. Thus,

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[6]Admittedly, this turns out to be wrong at least for some dialects. Consider (i):

(i) hɛm is bɛ ko uskī mã̄ ko sɔ̃ dẽ
we this child.OBL DOBJ he.POSS.F.OBL mother IOBJ handover give.PL.OPT
(Kachru 2006: 197)

Kachru states that double *ko*-marking is possible if both objects are human, a claim that is in conflict with (10). I do not know of any account or convincing empirical generalization about double *ko*-marking and hence will ignore these cases here, adhering to the standard claim that *-ko* can only be attached to the indirect object.

[7]The glosses follow Mohanan. Within the present analysis, of course, both appearances of *-ko* are considered two instances of the very same marker.

in the present analysis *-ko* is not ambiguous between a dative and an accusative marker.

4.3. The zero marker

If the distribution of *-ko* and the zero marker is conditioned by morphological impoverishment rules, i.e. one marker being underlying, the other being introduced by the application of a rule, the question arises wether *-ko* or -∅ is underlying. Two arguments favor *-ko*: Firstly, if *-ko* was introduced by a rule, this rule would have to include a disjunction. It would have to apply if the element is either human or specific, since it marks objects that are human *or* specific (yielding the disjunction [+human] ∨ [+specific][8]). In the contrary scenario, however, a conjunction is sufficient, i.e. the zero marker is attached if the noun is not human and unspecific ([–human] ∧ [–specific]), clearly a conceptually simpler rule. Secondly, the complexity of the grammar is considerably reduced if morphological rules can only yield the conditions for attaching phonetically less marked elements. Consider a very restrictive iconicity principle, stating that the internal structure of an affix correlates with its external, i.e. phonetic, structure. This means that a zero marker must *always* be constituted of fewer grammatical features than a non-null marker. If in addition a principle similar to the *Inclusiveness Principle*[9] (Chomsky 2005) in syntax is also active in morphology (cf. Trommer 2003), perhaps in every domain of the grammar,[10] this derives the restriction that morphological rules can only exchange zero markers for non-zero markers and never the other way around. While possibly too strong, this conclusion constrains the capacity of the grammar in

[8]See the empirical patterns illustrated in section 2.3

[9]The inclusiveness principle states that syntactic operations do not add information not present within the elements involved into this operation, such as indices, traces etc. Deletion, however, must inevitably still be possible, for in the framework of Minimalism all syntactic operations are driven by the need to get rid of uninterpretable features.

[10]The *Compositionality Principle* active in semantics can well be seen as another instantiation of this principle. As for phonology, *containment* (McCarthy & Prince 1995) appears to be a principle quite similar in nature.

a straightforward and natural way. If *-ko* is analysed as the underlying marker, the grammar is considerably more restrictive.

If *-ko* is treated as underlying and the zero marker as being attached if an impoverishment has applied and rendered the insertion of *-ko* impossible, the marker specification of -∅ must be a proper subset of that of *-ko*. Consequently, I will argue that the zero marker is the default marker. Note that the zero marker can appear on both subjects and objects, whereas *-ne* or *-ko* can only be attached on either the subject or the object. Furthermore, -∅ can in principle appear on the object of *all* verbs, its usage being restricted by the factors [±human] and [±specific]. *-ko*, on the other hand, is only available on the objects of a subclass of verbs, cf. (9). Those verbs rule out *-ko*-marking on their objects regardless of specificity. No transitive verbs, however, allow only for *ko*-marked objects, despite of the factors [±human] and [±specific]. Hence the zero marker has a larger distribution than both *-ne* and *-ko*. It therefore seems straightforward to treat this marker as the default, being maximally underspecified.

4.4. The system

The case features relevant to this analysis are Ergative, Absolutive and Accusative. These three cases are assigned by three different heads respectively:

(28) *Case assignment* (cf. Bobaljik 1993, Chomsky 1993, among others)
Ergative: by T°
Absolutive:[11] by v°
Accusative: by V°

In order to define natural classes of cases, I will resort to *decomposition* (Bierwisch 1967, following the Jakobsonian tradition). This means that case features are not viewed as primitive grammatical entities but as being constituted by smaller features. The motivation behind our doing so is the same as in phonology: Regarding sounds as made up

[11] This marker is generally called *nominative*, though this would suggest assignment by T. To avoid confusion I will use the term absolutive instead. This matter, however, is purely terminological. The glosses in the examples will be kept unchanged, referring to nominative in place of absolutive.

by smaller features allows one to define *natural classes*. Consider a rule that applies to all voiceless sounds. Instead of merely listing all relevant sounds, decomposition allows us to refer to one relevant feature, i.e. [–voiced]. Within morphology, the reasoning is similar: If e.g. two cases are marked by the same affix (i.e. they behave identical in this respect), both are decomposed to smaller features of which they share at least one.

Secondly, with decomposed features *impoverishment* (see below) does not yield an all-or-nothing option. If, for example, [ERGATIVE] was a primitive feature impoverishment could only delete this entire feature, yielding an element that is non-specified for case. If, on the other hand, [ERGATIVE] consists of two features, say $[+\alpha, -\beta]$, impoverishment could only delete $[+\alpha]$, leaving [-β] intact. The resulting element $[-\beta]$ would neither be fully specified for case no radically underspecified. This allows us to predict that this element shares distribution with the ergative elements in certain aspects (i.e. whenever the feature $[-\beta]$ is relevant) while behaving differently in other aspects (when $[+\alpha]$ is relevant).

Decomposition of these cases yields the following features:

(29) *Case decomposition*[12]
ABSOLUTIVE: [–oblique, –subject]
ACCUATIVE: [+oblique, . . .]

The inflectional markers are decomposed into:

(30) *Decomposition of inflectional markers*
(/-ko/, [+obl, . . .])
(/-∅/, [ ])

A second devise employed here are *impoverishment rules*. The job of impoverishment rules is to delete features in certain contexts, thus influencing marker competition. Since all markers (viewed as a set of features) that constitute a subset of the features of a given syntactic head compete for insertion into this position. The marker with the most features gets inserted. By deleting features of the syntactic head, impoverishment rules diminish the set of markers that are a subset of

[12]Of course, as for the accusative, more features are necessary to distinguish it from the other lexical cases (cf. (1)), but they are irrelevant since these cases are abstracted away from in this analysis.

this head and hence make the set of markers that compete for insertion smaller. Now it might be the case that due to impoverishment is excluded from competition and therefore another marker wins whenever the impoverishment rule applies. So if markers behave differently depending on the presence of other features this connection can be expressed be impoverishment.

There is one impoverishment rule that influences the insertability of the marker *-ko*:

(31) *Impoverishment rules for accusatives*
[+oblique] → ∅ / [–specific, –human]

The functioning of the system is illustrated by means of the following examples:

(7) a. ilaa-ne ek bacce-ko uṭ^{h}aayaa
Ila-ERG one child[+obl, . . .] lift/carry.PERF[ACC]

b. ilaa-ne ek haar-∅ uṭ^{h}aayaa
Ila-ERG one necklace[~~+obl~~, . . .] lift-PERF[ACC]

(9) ilaa-ne yah k^{h}at lik^{h}aa
Ila-ERG this.NOM letter[–obl,–subj] write.PERF[ABS]

Since the object of 'lift' can in principle be marked with *-ko*, it has to assign the accusative to its complement. Therefore, in both (7-a) and (7-b) the object receives the abstract syntactic feature bundle [+oblique, . . .]. The difference arises due to whether the impoverishment rule (31) has applied or not. Only in (7-b) the context for deletion of [+oblique] is given, since only here the object is [–specific] as well as [–human]. Thus, in (7-a) but not in (7-b) is the feature set of *-ko* a subset of the feature set of the head. Therefore, in (7-b) only the zero marker fullfills the condition for being inserted. The same argumentation applies to (8).

(8) a. nadya=ne gaṛi cɑla-yi
Nadya.F.SG=ERG car.F.SG.NOM drive-PERF.F.SG
hɛ
be.PRES.3SG
'Nadya has driven a car.'

b. nadya=ne gaṛi=ko cɑla–ya
Nadya.F.SG=ERG car.F.SG=ACC drive–PERF.M.SG
hɛ
be.PRES.3SG
'Nadya has driven the car.' (Butt & King 2004: 161)

The object of 'write' in (9), however, can never bear the *ko*-marker, hence it can be concluded that this verb never provides the correct features for *ko*-insertion but assigns the absolutive case. Out of the two markers in (30), only -∅ stands in a subset relation to the absolutive. Thus, no other marker than the zero marker can be attached to the object of 'write', as desired. The impoverishment rule (31) does not apply to this class of verbs.

That the crucial condition for the application of (31) is humanness rather than animacy can be demonstrated by the following contrast:

(32) a. ravii (ek) gaay k^{h}ariidnaa caahtaa hai
Ravi.NOM one cow.NOM buy.NONFIN wish.IMPERF be.PR
'Ravi wished to buy a cow (with no particular cow in mind)'.

b. ravii ek gaay-ko k^{h}ariidnaa caahtaa hai
Ravi.NOM one cow-ACC buy.NONFIN wish.IMPERF be.PR
'Ravi wished to buy a (particular) cow.'

c. ravii gaay-ko k^{h}ariidnaa caahtaa hai
Ravi.NOM cow-ACC buy.NONFIN wish.IMPERF be.PR
'Ravi wishes to buy a particular cow.'

d. ravii us gaay-ko k^{h}ariidnaa caahtaa hai
Ravi.NOM that cow-ACC buy.NONFIN wish.IMPERF be.PR
'Ravi wishes to buy that cow.' (Mohanan 1994: 80)

The object is homogeneously non-human but animate. If the relevant contextual features of the impoverishment rule was [±animate] instead of [±human], we would expect *ko*-marked objects in all four sentences, contrary to fact. Furthermore, (32) shows that it is specificity rather than definiteness that is relevant for the distribution of -*ko*. While only the object in (32-d) is definite, the objects in all examples except (32-a) are interpreted specifically. Since the objects in (32-b), (32-c) as well as (32-d) bear the marker -*ko*, specificity is the feature that is relevant to distinguish these cases. So since only in (32-a) the object bears the feature [–human,–specific], (31) applies only here, yielding zero marking.

This analysis of *-ko* as a single marker has several advantages: First, it can be treated uniformly throughout its appearances. No distinction between a dative marker *-ko* in ditransitives and an accusative marker-*ko* in transitives has to be drawn. Second, the semantic impact of the appearance vs. non-appearance of *-ko* can be captured indirectly, i.e. by means of an impoverishment rule that only applies if certain semantic conditions are met. As a consequence, there is no need to retreat from the widely held position that case is a semantically uninterpretable feature. Third, the dependence on the verb is accounted for via different case features on some verbs. Fourth, under this account the proposal that Hindi is actively aligned can be maintained. *-ko* can never occur on subjects because lexical case is never involved in active alignment, which only generalises over the distribution of structural case, in the case of Hindi *-ne* and -∅. Fifth, the fact that in ditransitives only one *ko*-marked object can appear is given a principled explanation since only one argument receives lexical case (the other is valued with the structural case absolutive) and is hence capable of bearing the marker *-ko*.

Consider as a contrast the analysis in Mohanan (1994: 85f.). She stipulates two properties of Hindi case marking: Firstly, "the language disfavours identical case marking on more than one nominal"; secondly, the indirect object is given priority over the direct object. Note first that it is unclear how these principles can be derived. Second, it does not appear to capture the correct empirical patterns in the first place. It is not clear what "disfavours" means in particular. Furthermore, this generalisation fails to apply to ditransitives since, as Mohanan herself argues, *-ko* is not one and the same marker but ambiguous between a dative and an accusative marker. Thus, the indirect object is dative marked, receiving the marker *-ko*$_1$ and the direct object in contrast bears the accusative, with *-ko*$_2$ being attached. Hence, her generalisation allows for double *ko*-marking. This analysis would work if both appearances of *-ko* were instantiation of the same case so that *-ko* on one object excluded *-ko* on the other one. This, however, is argued against by Mohanan. In addition to overgenerating, Mohanan's analysis also undergenerates, since it does not allow for perfectly grammatical instances of zero-marked subjects and objects, as in (33):

(33) nadya-∅ gaṛi-∅ cɑla-ti hɛ
Nadya.F.SG.NOM car.F.SG.NOM drive-IMPF.F.SG be.PRES.3SG
'Nadya drives a car.' (Butt & King 2004: 161)

As will be outlined outlined in section 5.2 Mohanan argues that zero-marked objects are *not* allomorphs of accusative marking but bear the very same case marker as zero-marked subjects, which shuld in turn rule out zero marked subjects and objects within the same clause.

4.5. Transitives vs. ditransitives

As matters stand now, all *ko*-marked DPs are expected to behave alike, but in fact they do not: The impoverishment rule in (31) applies to lexically case marked DPs in transitive and ditransitive clauses alike, allowing both to alternate with -∅. This, however, is empirically wrong. In transitive clauses *-ko* is exchanged or the zero marker in the context of [–human,–specific]. The indirect object of ditransitives, on the other hand, always has to be marked with *-ko*, regardless of humanness and specificity. To capture this difference, (31) has to be modified in order to only apply to the lexical case assignes by transitive verbs. Any analysis must be capable of somehow expressing this difference by introducing a distinction between lexical cases in transitives and ditransitives. But with such a distinction the advantage of a homogenuous treatment of all instances of *-ko* seems to be lost. In order to resolve this tension, the present system can be slightly modified as follows. The easiest way is to just postulate two different abstract cases, that I will call ACCUSATIVE and DATIVE. Dative refers to the case assigned to the indirect object of ditransitives. Accusative is the lexical case that transitive verbs assign to their objects, i.e. the case that is compatible with *ko*-marking. There has to exist at least one feature [$\pm\alpha$] which has different values for each case. Consider the following schematic feature decomposition:

(34) *Case decomposition*
ACCUSATIVE: [+oblique, $+\alpha$]
DATIVE: [+oblique, $-\alpha$]

The impoverishment rule (31) now can be enriched in the following way:

(35) *Impoverishment rule for accusatives*
[+oblique] → ∅ / [–specific –human, $+\alpha$]

In this way only *-ko* in transitives is affected. In order to capture the fact that both cases bear the same marker, *-ko*'s feature specification is left unchanged:

(36) *marker decomposition*
(/-ko/, [+oblique])

The present dilemma looks as follows: Both cases behave differently with respect to case reduction (accusative undergoing reduction, while datives never do). On the other hand, however, both bear by the same marker (*-ko*). Hence they share behavior in one respect while showing different properties in other respects. This tension can be resolved by realizational theories of morphology with the means of underspecification and impoverishment, as employed here. In such theories there naturally arises a distinction between case as an abstract grammatical feature (*abstract case*) and the surface case marker actually attached to the stem (*m-case*). So e.g. in (9) the abstract case assigned to the object is [–obl,–subj] (absolutive) and the m-case marker is -∅.

(9) ilaa-ne yah k^{h}at lik^{h}aa
Ila-ERG this.NOM letter[–obl,–subj] write.PERF[ABS]

Now since accusatives and datives are constituted by different features but the very same marker is attached to both, they are an instance of two abstract cases that correspond to one m-case, i.e. the difference between the two only shows up on the level of abstract case, never on the level of m-case.

Because of underspecification a single m-case marker can match several abstract cases, thus constituting a one-to-many-relation. Impoverishment rules, on the other hand, modify the syntactically assigned features and thus allow for several markers for one and the same abstract case in different contexts. Conflating these two yields a many-to-many relation between abstract and m-case. Deriving a mismatch between abstract and surface features is exactly the reason behind introducing this distinction into grammar theory (cf. Zaenen, Maling & Thráinsson 1985 for Icelandic and Bobaljik & Wurmbrand 2006 for a general overview). Therefore, it would appear to be an unexplained phenomenon if it turned out that in spite of this relation the number of abstract and m-cases is the same. This would not follow from anything and would have to be stipulated externally. If it was the case that the number of abstract and m-cases was identical then the distinction

between both levels would appear doubtful since to a certain extent it would be redundant. Insofar the scenario depicted above turns out to be a natural one in the context of realizational morphology.

A similar state of affairs can be observed in German. Only in passivization structures with *bekommen* ('get') can the dative object be reduced to a nominative and constitute the subject of the clause. As for transitives, no such structure can be formed:

(37) a. Maria schenkt ihm ein Buch.
Maria.NOM give as a present he.DAT a book.ACC
'Maria gives him a book.'

b. Er bekommt ein Buch geschenkt.
he.NOM get a book.ACC give as a present
'He is given a book.'

(38) a. Maria hilft ihm.
Maria.NOM help he.DAT
'Maria helps him.'

b. *Er bekommt geholfen.
he.NOM get helped
'He is helped.'

Hence, datives in ditransitives and datives in transitives behave differently on the level of abstract case (i.e. with respect to case reduction in passives) but both bear one and the same marker in active voice (i.e. both are marked by *'ihm'* in the example above). The general reasoning about Hindi thus also applies to German.

Let us summarize the different object cases briefly: The analysis distinguish between absolutive, accusative and dative. Their properties are listed below:

(39) **Overview over cases assigned to objects**

case	*abstract case features*	*assigned by*	*m-case markers*
ABS	[–obl,–sub]	v°	always -∅
ACC	[+obl,+α]	transitive V°	-∅ or -*ko*
DAT	[+obl,−α]	ditransitive V°	always -*ko*

4.6. The distribution of the ergative

Against this background only some extensions are necessary to account for the distribution of the ergative. First, the case decomposition in (29) can be extended to include the ergative[13]:

(40) *Case decomposition*

ERGATIVE:	[–oblique, +subject]
ABSOLUTIVE:	[–oblique, –subject]
ACCUSATIVE:	[+oblique, $+\alpha$]
DATIVE:	[+oblique, $-\alpha$]

The marker decomposition of the full system is displayed in (41).[14]

(41) *Marker decomposition*
(/-ne/, [–oblique, +subject])
(/-ko/, [+obl, . . .])
(/-∅/, [ ])

Again, one impoverishment rule suffices to capture the distributional patterns of the marker *-ne*:

(42) *Impoverishment rule for ergatives*[15]
[+subject] → ∅ / [–PERFECT]

---

[13]This decomposition of the ergative is somewhat reminiscent of Lee (2006)'s constraint ERG_{perf}, which states that the highest argument role in a perfective clause must be in the ergative (cf. also Kiparsky 1999, Wunderlich 2000). The similiarity is due to the fact that [+subject] indicates the highest argument in a clause.

[14]This approach also captures the insights of the following default principles of Butt & King (2004: 185):

(i) a. Wellformedness principle: KP: (↑CASE)
b. Default: ((↑SUBJ CASE)=NOM)
c. Default: ((↑OBJ CASE)=NOM)

Both Butt & King's analysis and the one presented here treat zero marking (i.e. the nominative) as the default marking, which is instantiated if no more specific principle or marker can be attached.

[15]Two possibilities for formulating this rule are discussed by Woolford (2007): Firstly, a faithfulness constraint outranking a general ban on ergatives states that perfective marking in the input must be preserved in the output in the perfective

The effect of this rule is that whenever a sentence stands in the non-perfective aspect, only the zero marker can be attached:

The algorithm functions as follows ((2)):

(2) a. raam-ne ravii-ko piiṭaa
Ram-[–obl,+subj] Ravi-ACC beat.PERF[ERG]

b. raam-∅ ravii-ko piiṭaa hai
Ram-[–obl,~~+subj~~] Ravi-ACC beat.IMPERF[ERG] be.PR

---

aspect. In the second version the ergative is prohibited in the imperfect, which outranks a general constraint forcing the ergative to appear. The first possibility thus enhances a constraint *demanding* ergative with a contextual feature, the second one enriches a constraint *prohibiting* ergative marking with a context specification. Clearly, the analysis pursued here is an example of the second type. Woolford, instead, favors the first alternative. While they are empirically indistinguishable for Hindi, Woolford bases her argument on Nepali, which exhibits the same aspectual split as Hindi but furthermore preserves ergative marking in the imperfect if the predicate is individual-level. To illustrate this, consider the two examples below:

(i) a. Raam=le (#aajaa) angreji jaan-da-cha
Ram=ERG today English know-IMPF-NONPAST.M.3.SG
'Ram knows English (#today).' (Individual-Level)

b. Raam (aajaa) angreji bol-da-cha
Ram today English speak-IMPF-NONPAST.M.3.SG
'Ram will speak English (today).' (Stage-Level)
(Woolford 2007: 6)

In (i-a) a property is ascribed to Ram, whereas in (i-b) an event is depicted. Ergative marking in the imperfect is possible in Individual-Level but not in Stage-Level predication. On the basis of these data Woolford argues that if one prohibits ergative marking in the non-perfect (cf. the second alternative above), (i-a) is inevitably ruled out. Further constraining does not help since it would only further reduce the contexts in which the ergative occurs. On the other hand, if the ergative is allowed for by faithfulness constraints, a second contraint to the one demanding ergative in perfectives can be made use of to account for (i).

But note that while this might be the case for optimality-theoretic approaches it does not extend to analyses employing impoverishment rules. If simply a second constraint allowing the ergative in Individual-Level predication is used there is no connection between these two contexts. This reduces to a disjunction stating that the ergative has to show up in the output in the context of *either* perfective aspect *or* Individual-Level predication. Under the point of view adopted here the alternative would be to formulate an impoverishment rule deleting the ergative in the context of imperfective aspect *and* Stage-Level predication. This would avoid a disjunction or, equivalently, only make use of one rule instead of two.

In (2-b) but not in (2-a) the context for applying (42) is provided. This rule renders *ne*-insertion impossible so that only the zero marker can be attached.

Within the set of perfective sentences the applicability of (42) depends on the base position of the 'subject', cf. (3):

(3) a. raam-ko acaanak šer dik^{h}aa.
Ram-DAT suddenly lion.NOM appear.PERF
[$_{vP}$ ∅ [$_{VP}$ vah-∅ cillaayaa]]
he[–obl,–subj] scream.PERF[ABS]

b. [$_{vP}$ us-ne jaan buuj^{h}kar cillaayaa]
he-[–obl,+subj] deliberately shout.PERF[ERG]

In (3-a) 'he' is base generated within the VP and receives Θ_{int} because here a non-volitional instance of screaming is depicted. Within the VP absolutive is assigned as the standard case, hence the case feature of the DP is valued with [–oblique, –subject]. Of the case markers in (41) only -∅ is attachable. (3-b) denotes a deliberate action. Consequently, 'he' is generated in SpecvP and case-marked with [–oblique, +subject]. Since the verb is perfective the context for deletion of [+subject] is not satisfied, and hence -*ne* remains attachable, outranking -∅ for specificity reasons. Hence, this contrast is not connected to an impoverishment rule but depends on the claim that Hindi has active argument encoding. (42) only handles the perfect-nonperfect distinction.

This analysis accords with that of Bittner & Hale (1996) (and others, see above), which states that the ergative is assigned by I°. Butt & King (2004) criticise Bittner & Hale's treatment with the objection that under this account it is unexplained why the ergative is obligatory in transitive clauses and optional in intransitive clauses. If Hindi has active alignment as argued above this critism is void. In transitive clauses Θ_{ext} is assigned to one argument, in intransitive clauses it may (unergative verbs) or may not (unaccusative verbs).

This rule seems to be non-local since the feature changed is present on the subject noun, while the context information is situated within T. Nevertheless, there are at least two ways out: (42) can either be seen as an *inner-syntactic* rule, applying *before* the abstract case feature is assigned to the subject by T. In this case the affected information and

the context would be present on the same head, yielding locality.[16] This solution, however, is incompatible with the main claim of this paper, i.e. that the distribution of structural case markers in Hindi can be fully accounted for by means of *post-syntactic* morphology.[17] I will thus neglect this nevertheless feasible approach and suggest a second solution: treating case (i.e. at least the case assigned by T) as uninterpretable tense on D (cf. Pesetsky & Torrego 2001, Williams 1994). In this case the contextual information as well as the information deleted by (42) is present on one and the same head ({D, [–oblique, +subject], *u*perfect, ...}) and hence (42) is a strictly local rule, adhering to the claim that morphology becomes active after finishing the syntactic derivation.

Note that this analysis conforms to the iconicity and inclusiveness principles mentioned for the case of *-ko*: a zero marker substitutes a non-null marker. Consider, on the contrary, Anderson (1992: 357)'s treatment of the ergative in Hindi:

(43) $\mathrm{NP}_i \rightarrow$ [+Ergative] (when properly governed by [$_V$+Perfect, i[X])

Here the ergative substitutes the zero marker if certain conditions are met. Apart from the iconicity principle, this treatment also violates the inclusiveness principle for a second reason: A distinction, i.e. a new marker, is introduced during the course of the derivation, hence new information is added. By contrast, under the analysis proposed here a distinction between markers is eliminated, adhering to the

[16] See Heck & Richards (2007) for another analysis involving intrasyntactic impoverishment for Southern Tiwa.

[17] This mechanism might turn out not to be incompatible if certain assumptions about cyclic TRANSFER of phases (e.g Chomsky 2005, 2006) are met: In such a system AGREE applies at the very moment the structure is transferred to PF and LF. In such a model, AGREE does not interact with structure building operations but applies after the whole phase is built up. A second option would be to assume, with Epstein & Seely (2002), that every operation, as characterized by their input and output, constitutes a domain in which information about input and output are present simultaneously. In this case, AGREE between T and the DP in its specifier would constitute a local connection of the features of T and the DP, hence the feautures relevant to (42). I will not pursue these ideas any further.

inclusiveness principle (also cf. Trommer 2003).[18]

Since the impoverishment rules relevant for the distribution of *-ko* , *-ne* and the null marker operate independently from each other, nothing prevents simultaneous application of both if the relevant features provide the appropriate context. Such an example can be seen in (33).

(33) nadya-∅ gaṛi-∅ cɑla-ti hɛ
Nadya.F.SG.NOM car.F.SG.NOM drive-IMPF.F.SG be.PRES.3SG
'Nadya drives a car.' (Butt & King 2004: 161)

As for *-ne*, as well as for *-ko*, the case marker in itself is semantically vacuous. Semantic effects merely arise since the relevant impoverishment rules are semantically conditioned.

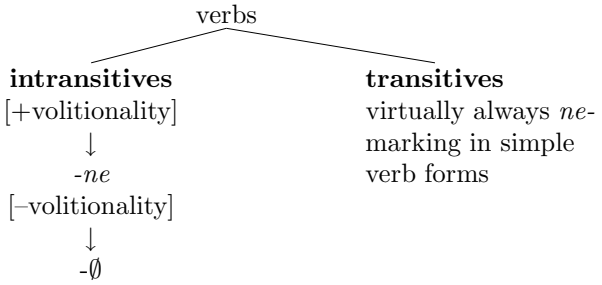
4.7. Summing up

In order to briefly set out the main claims argued for in this section, let us recapitulate the schematic outline of the empirical facts from section 2.3, repeated here, and line out how each point is accounted for within the present framework.

[18] Analyses resembling the one presented here in this respect are Woolford (2001)'s in assuming the constraints FAITH-LEX$_{perf}$ $\gg$ *ERG and Stiebels (2000, 2002)'s **[+lower role]/[-perf]* ('Avoid ergative marking in non-perfective contexts.'). In these analyses the case feature *perfective* is present within the input but possibly not realized in the output. But note that in these approaches nominative could in principle also be replaced by the ergative if the relevant constraint would be modified in a way to exclude nominative marking. This means there is no principled constraint on what can be exchanged for what. On the contrary, the analysis presented here is certainly more restrictive in only allowing a zero marker to be inserted instead of a non-null marker, adhering to inclusiveness.

(11) *-ne:*

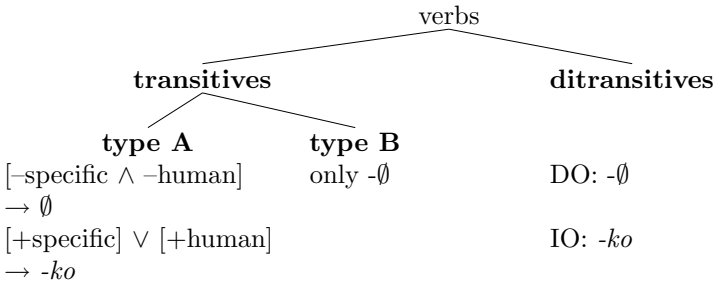
- only on subjects of perfective clauses



-ne can only be attached to subjects because due to active alignment subjects are one homogenuous class with respect to case assignment in Hindi, all receiving the ergative from T. As for the ergative, *-ne* and -∅ both fulfill the subset principle and hence both compete for insertion. All else being equal, *-ne* wins against -∅, but as soon as the impoverishment rule (42) applies, only -∅ can be inserted. (42) applies in the non-perfective aspect, so *-ne* can only appear in perfective clauses. The factor [±volitionality] also triggers *-ne* or zero marking which is subsumed indirectly. External arguments receive a volitional interpretation, internal do not. Since Hindi is assumed to exhibit active alignment, Θ_{ext} and Θ_{int} are distinctly case marked – ergative and absolutive, respectively. The connection between markers and semantics thus arises because internal and external Θ-roles receive specific markers and specific interpretations. The fact that subjects of intransitives alternate between zero and *ne*-marking whereas transitive subjects are almost always marked by *-ne* in the perfect is again captured by active alignment. Only Θ_{ext} can be marked with the ergative. Transitives on the one hand always assign an external Θ-role, intransitives on the other hand can alternate between assigning Θ_{ext} or Θ_{int}.

(12) *-ko:*

- only on objects



That *-ko* can only appear on objects is due to the fact that the dative and the accusative are lexical cases that can only be assigned to the complement of V. In the case of ditransitives the indirect object is marked with the dative, realized by *-ko* and the direct object receives the absolutive, expressed by the zero marker. In the case of transitive verbs, two verb classes have to be distinguished: Class B assigns the absolutive case to its object which inevitably results in zero marking. Class A assignes the absolutive to its object, which hence can be marked with *-ko*. The impoverishment rule (31) renders *ko*-insertion impossible in the context of [–specific,–human] which in turn derives the apparent semantic impact of the case markers, that is derived indirectly in the present system. That *ko*-zero alternation is possible only in transitive clauses is ensured by enriching the context of the relevant impoverishment rule so as to yield (35).

5. Theoretical implications

The present system predicts *ne*-marked subjects in the perfect and zero-marked subjects in nonperfect clauses to behave alike with respect to syntax, since both bear the same abstract case feature [–oblique, +subject] before impoverishment and occupy the same structural position. The distinction imposed by the impoverishment rule only arises *post*-syntactically. The analysis thus makes the following prediction: Subjects bearing *-ne* and unmarked subjects should exhibit similar behavior with respect to syntactic tests, but as for post-syntactic operations, they should show different properties. The goal of this section is to test these predictions. In section 5.1 classical tests for subjecthood, i.e.

binding of anaphors and control, are applied. Section 5.2 considers an argument from Mohanan (1994) in favor of treating *identically marked* DPs as bearing the *identical case features* and a solution of how the advantages of her analysis can be captured within the present system. Finally, section 5.3 presents an argument from Anand & Nevins (2006) who, making use of quantifier scope ambiguities, argue that zero and *ne*-marked subjects are not to be analysed alike.

5.1. Tests for subjecthood

The tests for subjecthood adopted by Anand & Nevins are binding and control. Following Ura (2001), they propose that these properties are inherited by virtue of being in SpecTP. Since zero-marked and *ko*-marked subjects of transitive clauses are assumed to get their case feature valued by T in the present analysis, the view that occupying SpecT is the trigger for passing these tests is consistent with the analysis here. Whether the subjects of unaccusative verbs behave alike or not depends on whether or not one assumes T in Hindi to bear an EPP-feature. If it does the highest DP has to move to SpecTP, predicting that internal DPs of intransitive clauses exhibit the same properties as external arguments. This problem is independent from the treatment suggested here. Anand & Nevins assume that SpecTP has to be occupied by a DP.

The classical tests for subjecthood all show that subjects marked with *-ne* and unmarked ones behave alike:

(44) *Binding of 'apna' (subject-oriented anaphor)*

a. Salmaa Raam-se Mohan-ko apnii kitaab
Salma-NOM Raam-INST Mohan-DAT self's book-NOM
bhijvaayegii
send-CAUSE-FUT
'Salma$_i$ will get Raam$_j$ to send Mohan$_k$ self's$_{i/*j/*k}$ book.'

b. Salmaa-ne Raam-se Mohan-ko apnii kitaab
Salma-ERG Raam-INSTR Mohan-DAT self's book-NOM
bhijvaayii
send-CAUSE-PERF
'Salma$_i$ will get Raam$_j$ to send Mohan$_k$ self's$_{i/*j/*k}$ book.'

(45) *Obviation with the pronominal 'uskii'*

a. Salmaa Raam-se Mohan-ko uskii kitaab
Salma-NOM Raam-INSTR Mohan-DAT self's book-NOM
bhijvaayegii
send-CAUSE-FUT
'Salma$_i$ will get Raam$_j$ to send Mohan$_k$ self's$_{*i/j/k}$ book.'

b. Salmaa-ne Raam-se Mohan-ko uskii kitaab
Salma-ERG Raam-INSTR Mohan-DAT self's book-NOM
bhijvaayii
send-CAUSE-PERF
'Salma$_i$ will get Raam$_j$ to send Mohan$_k$ self's$_{*i/j/k}$ book.'

(46) *Control into participal adjuncts*

a. Salmaa Raam-se Mohan-ko [PRO adres
Salma-NOM Raam-INST Mohan-DAT [PRO address
khoj kar] uski kitaab bhijvaayegii
search do self's book-NOM send-CAUSE-FUT
'PRO$_{i/*j/*k}$ having searched for the address, Salma$_i$ got Raam$_j$ to send Mohan$_k$ his$_{*i/j/k}$ book.'

b. Salmaa-ne Raam-se Mohan-ko [PRO adres khoj
Salma-ERG Raam-INST Mohan-DAT [PRO address search
kar] uski kitaab bhijvaayii
do self's book-NOM send-CAUSE-PERG
'PRO$_{i/*j/*k}$ having searched for the address, Salma$_i$ got Raam$_j$ to send Mohan$_k$ his$_{*i/j/k}$ book.'

The same phenomenon can be observed for Control structures (Pandharipande & Kachru 1977: 225):

(47) a. lərke ne caha [lərka jae]
boy ag. wanted boy go
'The boy wanted [the boy go].'

b. lərke ne jana caha
boy ag. to go wanted
'The boy wanted to go.'

c. lərka cahta hɛ [lərka jae]
boy wants boy go

d. lərka jana cahta hɛ
boy to go wants

As expected, no matter what marker the subject bears, it behaves alike with respect to innersyntactic properties, namely binding.

Whether this is to be attributed to identical case features or identical structural positions, as Anand & Nevins argue, remains to be seen. Both generalizations conform to the analysis suggested here.

5.2. Allomorphy of the accusative?

Independently of the marker they bear, subjects of transitives are assigned the same syntactic case feature (namely, [+subj,–obl]) and hence similiarities in grammatical properties are expected. Note that, however, the features of subjects and objects bearing the zero marker are different even if impoverishment rules have applied. To see this, recapitulate that the case marker assigned to the subject ([+subj,–obl]) becomes [–obl] if the impoverishment rule (42) has applied. Direct objects are either marked with the absolutive ([–subj,–obl]) or the accusative ([+obl,+α,...]), that is reduced to [+α,...] if the impoverishment rule (35) applies. As can be seen, zero marked DPs can bear the abstract case features [–obl], [+α,...] or [–subj,–obl], due to the fact that the zero marker has no grammatical features that would have to adhere to the subset principle and hence fits into every context. On the other hand, internal arguments of verbs assigning the accusative are valued with the same abstract case features ([+subj,+α,...]) *prior* to impoverishment (i.e. innersyntactic), no matter if -*ko* or -$\emptyset$ is attached.

Mohanan (1994) argues against treating the relation between -*ko* and -$\emptyset$ on objects as an instance of allomorphy. Furthermore, she notes that zero marked subjects and objects behave alike with respect to verb agreement and stem form selection. Therefore, she concludes that both must be marked with the same case feature syntactically and that the distribution of the case endings under consideration must be explained in syntactic terms. In the following, her arguments will be illustrated and a way of implementing these observations in the present analysis will be suggested. The line of reasoning will be that these properties can be expressed on the basis of the marker actually attached, and hence are determined post-syntactically.

1. *stem forms*

   Some nouns and pronouns have two stem forms, one a nominative form, the other the form for non-nominatives. Only the case marker that is actually attached is relevant for this distinction; consider (48):

(48) a. kaccaa **kelaa** sastaa hai
unripe.NOM banana.NOM inexpensive be.PR
'Unripe bananas are inexpensive.'

b. ravii-ne kaccaa **kelaa** kaaṭaa
Ravi-ERG unripe.NOM banana.NOM cut.PERF
'Ravi cut the / an unripe banana.'

c. ravii-ne kacce **kele**-ko kaaṭaa
Ravi-ERG unripe.NONNOM banana-ACC cut.PER
'Ravi cut the / *an unripe banana.'

d. kacce **kele**-mẽ kiiḍaa hai
unripe.NONNOM banana-LOC worm.NOM be.PR
'There is a worm in the unripe banana.'

e. raam kacce **kele**-se kyaa
Ram.NOM unripe.NONNOM banana-INSTR what
banaaegaa?
make.FUT
'What will Ram make with the unripe banana?'
(Mohanan 1994: 87f.)

Generally speaking, the nominative form appears whenever there is no marker attached. However, there is one exception, namely the locative. It is not overtly marked but nevertheless the non-nominative form is chosen:

(49) a. **kalkattaa** bahut duur hai
Calcutta.NOM very far be.PR
'Calcutta is very far away.'

b. raam **kalkatte** gayaa
Ram.NOM Calcutta.NONNOM go.PERF
'Ram went to Calcutta.' (Mohanan 1994: 88)

These observations also extend to modifier agreement. The modifier is not case marked by itself but shows stem form alternations nevertheless:

(50) a. **meraa** **g^{h}ar** gããw-mẽ hai
I.GEN.NOM house village-LOC be.PR
'My house is in a/the village.'

b. raam-ne **meraa** **g^{h}ar** k^{h}ariidaa
Ram-ERG I.GEN.NOM house buy.PERF

'Ram bought my house.'

c. raam **mere** **g^{h}ar** aayaa
Ram.NOM I.GEN.NONNOM house come.PERF
'Ram came to my house.' (ibid.: 89)

For this reason Mohanan argues that the alternation cannot be due to whether the noun is inflected or not but must be dependent on the actual syntactic case feature. Since zero marked subjects and objects behave alike (cf. (48-a) and (48-b)) she concludes that both must bear the same abstract case feature. Marked and unmarked objects ((48-b) vs. (48-c)), however, appear in different stem forms and therefore are best accounted for if the former is marked with accusative and the latter with nominative in the syntax.

This analysis is incompatible with the treatment of the case markers outlined here. The key proposal outlined here is that the distribution of the markers under consideration can be explained in terms of post-syntactic morphology. Thus, inner-syntactic shifts in feature valuation cannot be employed.

2. *verb agreement*

The verb agrees with the subject in gender, number and person if the subject is nominative; if it is not, it agrees with the object if the object is nominative (cf. (51-a), (51-c)); if neither the subject not the object is nominative the verb appears in the default form ((51-b)) (Mohanan 1994: 89). Zero-marked subjects and objects therefore can in principle trigger verb agreement but *ne-* or *ko-*marked arguments cannot, the same state of affairs as for stem form selection.

(51) a. ilaa-ne kelaa uṭ^{h}aayaa
Ila.FEM-ERG banana.MASC.NOM lift.PERF.MASC
'Ila picked up the/a banana.'

b. ilaa-ne roṭii-ko uṭ^{h}aayaa
Ila.FEM-ERG bread.FEM-ACC lift.PERF.MASC
'Ila picked up the bread.'

c. ilaa-ne roṭii uṭ^{h}aaii
Ila.FEM-ERG bread.FEM.NOM lift.PERF.FEM
'Ila picked up the/a bread.' (ibid.: 90)

3. *coordinative structures*

   In coordinations of two nominals only nominals with the same marker can be conjoined:

(52) a. raam-ne bacce-ko aur aske juute-ko
Ram-ERG child-ACC and pron.GEN shoes-ACC
uṭ^{h}aayaa
lift.PERF
'Ram picked up the child and its shoes.'

b. *raam-ne bacce-ko aur uskaa juutaa
Ram-ERG child-ACC and pron.GEN shoes.NOM
uṭ^{h}aayaa
lift.PERF

(ibid.: 90)

In light of this evidence, Mohanan (1994: 90) argues that "[m]odifier agreement, verb agreement, and coordination show that the distinction between inflected and uninflected objects must be treated as a distinction in syntactically relevant case features, not merely in morphological case marking". Therefore she concludes that the *ko*-zero-alternation on objects cannot be an instance of syncretism but must be seen as different case features assigned to the DP syntactically.

This conclusion, however, is not mandatory given contemporary assumptions about the architecure of the grammar. As argued in section 4.5 above, realizational theories of morphology are compatible with a distinction drawn between grammatical case ('abstract case') and surface case ('surface case'). The relation between the two is many-to-many.

Bobaljik (2007) argues that agreement is not an inner-syntactic operation but feeds on m-case. Hence, it is part of the post-syntactic morphology. Assuming that this claim is motivated independently Mohanan's observations concerning stem form agreement and verb agreement follow immediately. As for the stem form alternation, a rule is needed that states that whenever a case marker other than $-\emptyset_{absolutive}$ is attached the non-nominative form is chosen, where $-\emptyset_{locative}$ is distinct from $-\emptyset_{absolutive}$:

(53) *Stem form selection*
Select the nominative stem form whenever an element bears the marker $\emptyset_{absolutive}$.

This informal principle is not meant to fully explain the stem form distribution in Hindi but merely serves as an exemplification. It ensures that stem forms are correlated with inflectional markers. Since by assumption *Agree* applies post-syntactically and hence *after* impoverishment rules have applied. The result is that all modifiers within a DP agree with the head (or the noun) *after* impoverishment has taken place, yielding the effect that if the head bears the nominative stem form, all modifiers do. (53) makes no reference to the abstract case markers that provide the environment of marker insertion and hence accounts for the fact that the nominative stem form is chosen independently of the innersyntactic case marking of a DP.

As for verb agreement, no further assumptions are necessary. Only an absolutive m-case can trigger verbal agreement; if both the subject and the object are unmarked the verb agrees with the higher DP; if no DP fullfills this condition default agreement is instantiated on the verb. Consider the tentative version in (54):

(54) *Verbal agreement*[19]
The verb agrees with the highest nominal element bearing the marker $-\emptyset_{absolutive}$.

Again, abstract case marking is irrelevant for verb agreement. Since the verb can in principle agree with subjects and objects, this treatment appears natural.

The same argumentation applies to coordination: Only identically m-case marked NPs can be conjoined, deriving (52).

5.3. Quantifier Scope

Nevins & Anand (2006) propose that reconstruction in Hindi depends on whether the verb agrees with the subject or not. Firstly, they assume that quantifier raising (QR) alone is not sufficient for giving rise to scope ambiguity. The second condition that has to be met is that the item with higher surface scope has to reconstruct to a position lower than the raised object. Both operations have to apply, otherwise only the rigid reading is available. This is schematized in (55)

[19]This analysis for agreement in Hindi has also been put forward in Bobaljik (2007).

(55) $[\mathrm{Q_A} \ldots [\mathrm{Q_B} \ldots [t_\mathrm{A} \ldots t_\mathrm{B}] \ldots]]$

reconstruction

QR

The relevant distinction in Hindi can be seen in (56). In the perfective sentence (56-a) only the surface scope orders are available, but the non-perfective (56-b) turns out to be ambiguous.

(56) a. kisii shaayer-ne har ghazal likhii
some poet-ERG every song-NOM write.f-PERF
'Some poet wrote every song.' ($\exists > \forall$, $*\forall > \exists$)

b. koi shaayer har ghazal likhtaa hai
some poet-NOM every song-ACC writem-IMPF be-PRES
'Some poet writes every song.' ($\exists > \forall, \forall > \exists$)
(Anand & Nevins 2006: 5)

The idea pursued by Nevins & Anand is to attribute this distinction to verbal agreement rather than aspect, since zero-marked subjects of perfectives that hence trigger verb agreement also exhibit scopal ambiguity:

(57) koi aadmii har kitaab laayaa
some man-NOM every book-ACC bring-PERF
'Some man brought every book.' ($\exists > \forall, \forall > \exists$)
(ibid.: 12)

Since Anand & Nevins assume reconstruction of the subject to be a necessary condition for scopal ambiguity, they propose that reconstruction of the subject into its base position (Specv) is possible only if the verb agrees with it.

(58) *Agreement allows Reconstruction*
Reconstruction of an XP from a head H is possible iff H agrees with XP.

In (56-b) as well as (57) does the verb agree with the subject and hence allow reconstruction, giving rise to the non-surface scope order. In (56-a), however, since the verb does not show agreement, reconstruction of the subject is impossible and therefore no ambiguity arises.

This account as such is incompatible with the analysis proposed here because if agreement is seen as acting post-syntactically, applying only to the PF-branch, the agreement information is not present at LF and hence cannot play a role in determining semantic, i.e. scopal, prop-

erties. To compensate this possible problem, I will outline a possible implementation of (58)[20] that is consistent with the assumptions made here and makes the same predictions for the data under consideration. Aftre that I will call into question the main underlying assumptions pursued by Anand & Nevins, namely that ambiguity depends on reconstruction.

Of the Hindi case markers under consideration only two can be attached to subjects: -*ne* and -∅. The verb agrees with the subject if and only if the zero marker is attached. Now note that if verbal agreement and case markers are correlated, statements making reference to agreement features can be reformulated as statements about case markers. And since the case marker actually attached is determined by abstract case features and the contextual features of the impoverishment rules, m-case properties can be reanalysed as properties of abstract case, a gain within the present theory since in this case we are able to refer to LF properties by means of inner-syntactic features, overcoming the problem that m-case is only relevant for PF. To see this on the basis of an example, consider (56). In (a) the subject is syntactically marked with the features [+subj,–obl] (the specification for the ergative assigned by T). The impoverishment rule (42) does not apply. In (b) the subject is marked with [+subj,–obl] as well but (42) can apply since the sentence is not perfective. Now it is possible to state the following generalisation:

(59) Subjects marked with [+subj,–obl,+perfective] (i.e. valued by perfective T) and only those cannot reconstruct.[21]

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[20] I am grateful to Gereon Müller for pointing this out to me.

[21] One *subject* case marker that has been abstracted away from in the present analysis is the dative marker -*ko*. Since dative is a lexical case the relevant feature specification for abstract case cannot be [+subj,–obl,–perfective]. Hence, according to (59), reconstruction should be possible, predicting ambiguity. Anand & Nevins' analysis makes the opposite prediction: Since the verb does not agree with *ko*-marked subjects reconstruction should be barred. Interestingly, sentences with *ko*-marked subjects are ambiguous:

(i) kisii bacce-ko har kitaab milii
some child-DAT every book-NOM.F meet-PERF.F
'Some child received every book.' $(\exists > \forall, \forall > \exists)$
(Anand & Nevins 2006: 13)

If reconstruction is a necessary condition for scopal ambiguity we predict (56-a) to only exhibit the rigid reading, while (56-b) should be ambiguous. This prediction is correct. The difference lies in the fact that the features [+subj,–obl,
–perfective] are *inner*syntactic features that are relevant for PF (marker insertion) and LF (availability of reconstruction) as well. Now consider (57): Again, also the non-rigid reading is available. This is predicted since the subject of *'bring'* is not marked by T but by v[22], bearing the features [–subj,–obl]. According to (59) the subject is predicted to be able to reconstruct, allowing for ambiguity. This prediction is borne out.

Conceptually, the differences between both formulations are minor: Both focus on a valuation relation between T and a DP. While Anand & Nevins' account makes reference to the head T that has undergone agreement with a DP and hence got valued for ϕ-features, the analysis outlined here refers to the DP that has entered in a case valuation relation with T and therefor bears case features.

There are, however, some independent problems for Anand & Nevins' claim that in Hindi agreement is a necessary condition for reconstruction and reconstruction in turn a necessary condition for ambiguity. First, consider the following example:

(60) Sumita saare darvaaze kholnaa bhuul gayii
Sumita-NOM all doors-ACC open-INF forget go-PERF
'Sumita forgot to open all the doors.' (forget $> \forall, \forall >$ forget)
(Anand & Nevins 2006: 12)

In (60) the ambiguity lies between the matrix verb and the quantified object of the embedded clause. This ambiguity is unexpected. If the embedded object is not capable of moving into the matrix clause it is unclear why it can take scope over the matrix predicate. If it moves into the higher clause, however, based on (58) we would expect it to obligatorily take scope over the matrix verb since the embedded verb

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To account for this surprising property, Anand & Nevins assume that the structural relation between ERG and NOM is variable. Due to this structural ambiguity both readings can be treated as rigid and hence no reconstruction is necessary.

[22]See (22) in section 4.1 above.

does not agree with it (and the matrix verb agrees with the matrix subject) and hence reconstruction should be barred. Either way, based on (58) we would predict (60) to be unambiguous, contrary to fact. A possible solution pointed out to me by Andrew Nevins (p.c.) is that movement of the quantified DP into the matrix clause is optional. If it occurs, no reconstruction is possible, yielding scope over *forget*. If it does not move, only narrow scope is available. But note that this severely challenges the claim made by Anand & Nevins (p. 10): "[I]nverse scope requires two operations: reconstruction of the higher QP and raising of the lower QP [...]. *The failure of either operation to apply will yield scopal rigidity.*"[23] In (60), in contrast, reconstruction can never apply since agreement, the necessary condition, is not met but the non-rigid reading is available nevertheless.

Scrambling structures constitute another problem. If the linear order of subject and object DP is turned around and all else, especially verb agreement, is left identical, one would expect scopal ambiguity or rigidity to remain the same. This, however, is incorrect:

(61) a. *Subj – Obj – Verb*
[kisi laṛkii]-ne [har laṛke]-ko ḍã:ṭaa
some girl-SUBJ every boy-OBJ scolded
'Some girl scolded every boy' ($\exists > \forall$, $*\forall > \exists$)

b. *Obj – Subj – Verb*
[har laṛke]-ko [kisi laṛkii]-ne ḍã:ṭaa
every boy-OBJ some girl-SUBJ scolded
'Some girl scolded every boy' ($\exists > \forall, \forall > \exists$)
(Bhatt 2003)

Independently of how to analyse scrambling structures in Hindi, in both (61-a) and (61-b) does the verb agree with neither the subject nor the object since both are not zero marked. So in both cases reconstruction of either DP should be ruled out. But since Anand & Nevins treat reconstruction as a necessary condition for ambiguity, both sentences should only exhibit the rigid reading, contrary to fact. Even if QR is optional as in the analysis of (60), this might possibly explain the ambiguity of (61-b), but it would would leave the rigidity of (61-a) and (56) unaccounted for. So (61) poses another problem for the claim that

[23] My emphasis.

scopal ambiguity arises only of reconstruction is possible, which in turn is only possible if the verb agrees with certain DP. Hence it might be the case that verbal agreement is in fact irrelevant for computating scope in Hindi, as is expected if agreement is seen as a post-syntactic phenomenon only relevant for the PF branch.

6. Concluding remarks

The analysis presented here focuses on a morphological treatment of split-ergativity in Hindi-Urdu, rendering the syntactic mechanism secondary. The main proposal is that contemporary morphological theories are powerful enough to account for the case patterns in Hindi. After that it was shown how some seemingly problematic positions argued for in the literature can be integrated into the analysis smoothly.

Interestingly, the relevant impoverishment rules, repeated here, can be seen as being *functionally motivated*.

(35) *Impoverishment rule for accusatives*
[+oblique] → ∅ / [–specific, –human, +α]

(42) *Impoverishment rule for ergatives*
[+subject] → ∅ / [–PERFECT]

Both constitute a case of *differential object marking* (cf. Aissen 2003) or *differential subject marking* (Aissen 1999, Anand & Nevins 2006), respectively. Note that (35) substitutes for a zero marker for a non-null marker whenever the object is *'typical'* (nonhuman and non-specific) and *traceable* (the feature +α is assigned only by transitive verbs and hence to the only object, which in turn is traceable). Therefore, the context of the impoverishment rule is an array of the Animacy and Definiteness Scale:

(62) a. *Animacy Scale*
Human ≻ Animate ≻ Inanimate
b. *Definiteness Scale*
Personal Pronouns ≻ Proper name ≻ Definite DP ≻ Indefinite specific DP ≻ Non-specific DP

The system as outlined above captures the fact that zero marking on objects appears if the object is non-human on the animacy scale and non-specific on the definiteness scale, i.e. if the object is unmarked and

has the properties of a 'standard' object. Thus, the above impoverishment rules code Differential Object Marking (DOM) and hence are funtionally motivated.

The same reasoning arguably holds for Differential Subject Marking (DSM) as well. Kiparksy (1998) shows that in Finnish the relevant notion for DOM is aspect. If this is correct one might expect that aspect also plays a role for DSM, as predicted by the impoverishment rule (42). Woolford (2007) discusses another functional approach to case markers sensitive to aspect. In her view, such a construction can be used to code aspect without an additional aspect marker on the verb. In the case of Hindi, when the subject bears the marker *-ne* the hearer knows that the sentence is perfective. Therefore, information about aspect can be provided by other means than verbal morphology. Woolford terms this *Parasitic Marking*.

When put into a larger context, this approach lies within the research program of Anderson (1992) because it treats a seemingly syntactic phenomenon as morphological in nature.

If the assumption that split-ergativity in Hindi, i.e. departures from "purely" accusative, ergative or active alignment, is due to morphological principles operating after the syntactic derivation is on the right track, the more general question arises whether – in the best case – *all* instances of split-ergativity can be analysed along these lines. In this case argument encoding in all languages would be accusative, ergative, active or threefold and departures from such systems would emerge if due to morphology the connection between abstract case and m-case becomes "loose", thus giving rise to split-ergativity. This is a strong claim, though it would systematize the great variety of argument encoding patterns and thus seems worth pursuing.

7. Appendix – A translation into Paradigm Function Morphology

While all of the analysis presented above was formulated within Distributional Morphology (DM), nothing hinges on that particular framework. As has already been emphasized, the only necessary condition is that morphology operates realizationally. To demonstrate this claim, a brief translation of the main technical issues into Pradigm Function Morphology (PFM, Stump 2001) is provided in this appendix.

The main difference between DM and PFM is that PFM is *rule-*

based. Hence, morphemes do not have an independent status but are introduced through rules that attach phonological material to a stem if certain conditions are met. A largely equivalent version of the present analysis assumes the following rules:

(63) *Realizational Rules*

$\mathrm{RR}_{,\{\mathrm{ergative}\},\mathrm{N}}(< \mathrm{X}, \sigma >) =_{def} \quad < \mathrm{X}ne', \sigma >$

$\mathrm{RR}_{,\{\mathrm{accusative}\},\mathrm{N}}(< \mathrm{X}, \sigma >) =_{def} \quad < \mathrm{X}ko', \sigma >$

$\mathrm{RR}_{,\{\mathrm{absolutive}\},\ \mathrm{N}}(< \mathrm{X}, \sigma >) =_{def} \quad < \mathrm{X}', \sigma >$

In addition, *rules of referral* are needed to account for the shift from ergative to nominative in the non-perfect and from accusative to absolutive in the context of the feature bundle [–specific,–human], in analogy to the impoverishment rules of section 4:

(64) *Rules of referral* (informal notation)

a. In the non-perfect aspect, a noun's ergative forms are inflected however its absolutive forms are inflected.

b. In the context of [–specific,–human], a noun's accusative forms are inflected however its absolutive forms are inflected.

(65) *Rules of referral* (formal notation)

a. Where τ is any complete extension of {ASP: imperfect, CASE: erg}, and σ'=σ/{CASE: abs}, $\mathrm{RR}_{\tau,\mathrm{N}}(< \mathrm{X}, \sigma >) =_{\mathrm{def}} < \mathrm{Y}, \sigma >$, where $\mathrm{NAR}_n(< \mathrm{X}, \sigma'>) =< \mathrm{Y}, \sigma'>$.

b. Where τ is any complete extension of {–specific, –human, CASE: dat}, and σ'=σ/{CASE: abs}, $\mathrm{RR}_{\tau,\mathrm{N}}(< \mathrm{X}, \sigma >) =_{\mathrm{def}} < \mathrm{Y}, \sigma >$, where $\mathrm{NAR}_n(< \mathrm{X}, \sigma'>) =< \mathrm{Y}, \sigma'>$.

In contrast to DM, in PFM no subanalysis of the abstract cases is necessary. But on the other hand, the above stated rules of referral are considerably more complex than the impoverishment rules in DM, since those only delete information, whereas the PFM rules add or modify given information.

These conceptual issues put aside, the system is compatible with both theories and hence does not solely depend on one specific framework. The only condition that has to be met is that a morphological theory be realizational, a point independently argued for by Stump (2001).

8. References

Adger, David (2003): *Core Syntax*. Oxford University Press. Oxford. New York.

Aissen, Judith (1999/2001): Markedness and Subject Choice in Optimality Theory. *Natural Language and Linguistic Theory* 17. pp. 673-711. Reprinted in: G. Legendre, J. Grimshaw & S. Vikner: *Optimality-Theoretic Syntax*. Cambridge: MIT Press. pp. 61-96.

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

Anand, Pranav & Andrew Nevins (2006): The Locus of Ergative Case Assignment. In: A. Johns, D. Massam & J. Ndayairagije: *Ergativity: Emerging Issues*. Studies in Natural Language and Linguistic Theory 65. Dordrecht: Springer. pp. 3-26.

Anderson, Stephen R. (1992): *A-Morphous Morphology*. Cambridge University Press.

Baker, Marc (1988): *Incorporation: A Theory of Grammatical Function Changing*. University of Chicago Press. Chicago.

Bhatt, Rajesh (2003): Language & Structure: Semantics and Pragmatics. class notes. Mass.: MIT, `http://web.mit.edu/rbhatt/www/24.903/l11.pdf`

Bierwisch, Manfred (1967): Syntactic features in morphology: General problems of so-called pronominal inflection in German. In: *To Honor Roman Jakobson*. The Hague: Mouton. pp. 239-270.

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

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, Mass.: MIT, pp. 113-142.

Bobaljik, Jonathan (2007): Where's Φ? Agreement as a post-syntactic operation. In: D, Adger, S. Bjar & D. Harbour (eds.): *Phi-Theory: Phi features across interfaces and modules*. Oxford University Press.

Bobaljik, Jonathan & Susi Wurmbrand (2007): Case in GB/Minimalism. Ms. Univ. of Connecticut.

Butt, Miriam & Tracy King (2004): The status of Case. In: V. Dayal & A. Mahajan, eds.: *Clause Structure in South Asian Languages*. Boston: Kluwer. pp. 153-198.

Chomsky, Noam (1993): A Minimalist Program for Syntactic Theory.

In: K. Hale & S. J. Keyser, eds., *The View from Building 20.* Mass: MIT., pp. 1-52

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

Chomsky, Noam (2005): On Phases. Ms., Mass: MIT. To appear in: R. Freidin, C. Otero & M-L. Zubizaretta. eds., *Foundational Issues in Linguistic Theory.* Mass: MIT.

Chomsky, Noam (2007): Approaching UG from Below. In: U. Sauerland & H.-M. Grtner (eds.): *Interfaces + Recursion = Language?.* Berlin. pp. 1-29.

Das, Pradeep Kumar (2006): *Grammatical Agreement in Hindi-Urdu and its Major Varieties*, München: Lincom.

Davison, Alice (2004): Structural Case, Lexical Case and the Verbal Projection. In: V. Dayal & A. Mahajan, eds.: *Clause Structure in South Asian Languages.* Boston: Kluwer. pp. 199-226.

Epstein, Samuel David & T. Daniel Seely (2002): Rule Application as Cycles in a Level-Free Syntax. In: S. T. Epstein & T. D. Seely, eds., *Derivation and Explanation in the Minimalist Program.* Oxford: Blackwell. pp. 65-89.

Halle, Morris & Alec Marantz (1993): Distributed Morphology and the Pieces of Inflection. In: K. Hale & S. J. Keyser, eds.: *The View from Building 20.* Mass.: MIT. 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.* Volume 21 of *MIT Working Papers in Linguistics.* Mass.: MIT. pp. 275-288.

Heck, Fabian & Marc Richards (2007): A Probe-Goal Approach to Agreement Restrictions and Incorporation in Southern Tiwa, Ms., Leipzig Univ.

Kachru, Yamuna (2006): *Hindi.* Amsterdam: John Benjamins.

Kachru, Yamuna & Rajeshwari Pandharipande (1977): Relational Grammar, Ergativity, and Hindi-Urdu. In: *Lingua 41.* pp. 217-238

Kiparsky, Paul (1999): Analogy and OT: Morphological Change as Emergence of the Unmarked. talk given at the 21st annual conference of the DGfS. Konstanz. Ms. Stanford University.

Lee, Hanjung (2003): Parallel Optimization in Case Systems. Ms., Univ. of Minnesota, Twin Cities.

Lee, Hanjung (2006): Parallel Optimization in Case Systems: Evidence

from Case Ellipsis in Korean. *Journal of East Asian Linguistics* **15**. Springer. pp. 69-96.

Mahajan, Anoop (1990): *The A/A-bar Distinction and Movement Theory*. PhD thesis. Mass.: MIT.

Marantz, Alec (1991): Case and Licensing. In: German Westphal, Benjamin Ao & Hee-Rahk Chae, eds., *Proceedings of ESCOL '91*. Cornell Linguistics Club. pp. 234-253.

McCarthy & Prince (1995): Faithfulness and Reduplicative Identity. In: J. Beckman, L. Walsh-Dickie & S. Urbanczyk, eds., *Paper in Optimality Theory*. Amherst, Mass.: GSLA. pp. 249-384.

Mohanan, Tara (1994): *Argument Structure in Hindi*. Stanford: CSLI Publications.

Montaut, Annie (2004): *A Grammar of Hindi*. München: Lincom.

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

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

Pesetsky, David & Esther Torrego (2001): T-to-C Movement: Causes and Consequences. In: M. Kenstowicz, eds.: *Ken Hale: a Life in Language*. Mass: MIT. pp. 355-426.

Rizzi, Luigi (1990): *Relativized Minimality*. Mass.: MIT.

Stiebels, Barbara (2000): Linker Inventories, Linking Splits and Lexical Economy. In: B. Stiebels & D. Wunderlich, eds., *Lexicon in Focus*. Berlin: Akademie-Verlag. pp. 211-245.

Stiebels, Barbara (2002): *Typlogie des Argumentlinkings: Ökonomie und Expressivität*. Berlin: Akademie: Verlag.

Stump, Gregory (2001): *Inflectional Morphology*. Cambridge University Press.

Trommer, Jochen (2003): Feature (Non-)Insertion in a Minimalist Approach to Spellout. *Proceedings of CLS 39: Main Session*. Chicago.

Ura, Hiroyuki. (2001): Case. In: Mark Baltin & Chris Collins. eds., *The Handbook of Contemporary Syntactic Theory*. Oxford: Blackwell. pp. 334-373.

Ura, Hiroyuki (2006): A Parametric Syntax of Aspectually Conditioned Split-Ergativity. In: A. Johns, D. Massam & J. Ndayairagije: *Ergativity: Emerging Issues*. Studies in Natural Language and Linguistic Theory 65. Dordrecht: Springer. pp. 111-142.

Williams, Edwin (1994): *Thematic Structure in Syntax*. Mass.: MIT.

Woolford, Ellen (2001): Case Patterns. In: G. Legendre, J. Grimshaw & S. Vikner, eds., *Optimality-Theoretic Syntax*. Mass: MIT. pp. 509-543.

Woolford, Ellen (2007): Aspect Splits As Contextual Faithfulness. Ms. Univ. of Massachusetts.

Wunderlich, Dieter (2000): Optimal Case in Hindi. Ms. University of Düsseldorf.

Zaenen, Annie, Joan Maling & Höskuldur Thráinsson (1985): Case and Grammatical Functions: The Icelandic Passive. *Natural Language and Linguistic Theory 3*. pp. 441-483.

Clitic-Agreement Doubling in Yurok

Jochen Trommer

Abstract
In Clitic-Agreement Doubling, Φ-features of the same verbal argument are simultaneously expressed by pronominal clitics and verbal agreement. The Algic language Yurok (Robins, 1958) exhibits Clitic-Agreement Doubling (CAD) in specific syntactic contexts requiring clitics in addition to agreement, but provides also strategies to avoid this type of redundancy by suppressing otherwise expected agreement affixes. In this paper, I propose an optimality-theoretic analysis of CAD in Yurok based on spell-out constraints on different syntactic domains: head complexes, chains and sets of chains related to head complexes (Trommer, 2006). I show that the morphosyntactic system of Yurok in this area despite of many different details functions similarly as the one of Algonquian languages, especially Menominee (Bloomfield, 1962).

1. Introduction

Yurok is an almost extinct Algic language from Northwest California[1] documented primarily by the structuralist grammar of Robins (1958). In the simplest Yurok intransitive sentences, verb forms have distinct subject agreement suffixes for the standard categories 1st/2nd/3rd singular and plural, but no other crossferencing of subject features. (1) shows this for the verbs **koʔmoʔy,** 'to hear' (pg. 34)[2] and **nep̓**, 'to eat' (Blevins, 2004:3). Note that many instances of agreement affixes are preceded by "thematic vowels" such as **e** and **o** (Blevins, 2004) depending on the inflectional class of the verb and adjacent inflectional affixes. The following analysis will abstract away from the morphophonology of thematic vowels.

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[1]Algic comprises Yurok, Wiyot and Algonquian, which is one of the most widespread families among Amerindian languages.

[2]Page numbers refer to Robins (1958), unless otherwise noted.

(1) **Intransitive Forms of *koʔmoʔy*, 'to hear' and *nep̓*, 'to eat'**[3]

	Singular	Plural
1	koʔmoy-o-**k̓**	koʔmoy-o-**h**
2	koʔmoy-o-**ʔm**	koʔmoy-o-**ʔw**
3	koʔmo**ʔ**y	koʔmoy-o-**ɬ**

	Singular	Plural
1	nep-e-**k̓**	nep-o-**h**
2	nep-e-**ʔm**	nep-**uʔ**
3	ne**p̓**	nep-e-**ɬ**

In specific syntactic contexts such as subordinate clauses and certain conjunctions and adverbs, also subject clitics appear in addition to agreement suffixes.[4]

(2) **Intransitive Forms with Clitics of *tmo·l*, 'to shoot' (pg. 51)**

	Singular	Plural
1	**(ʔ)ne**-tmo·l-o-**k̓**	**(ʔ)ne**-tmo·l-o-**h**
2	**k̓e**-tmo·l-o-**k̓**	**k̓e**-tmo·l-o-**ʔw**
3	**(ʔ)we**-tmo·l-o-**k̓**	**(ʔ)we**-tmo·l-o-**ɬ**

While Robins calls these clitics prefixes since they usually appear left-adjacent to the verb stem, they can be separated from verb forms by adverbs (3-a) or adverbial phrases (3-b), providing strong evidence for their clitic status:[5].

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[3]In the following all agreement affixes and pronominal clitics are printed in boldface. Transcription and typography follows closely Robins (1958) where **ʔ** stands for the glottal stop ([ʔ]), **k̓** and **c̓** for ejective stops ([k'] and (tʃ') respectively), and vowel length is marked by "·". The 3sg suffix **-ʔ** appears often as an infix for phonological reasons.

[4]These clitics are also used to mark nominal possession.

[5]A detailed discussion on the clitic status of Yurok clitics is given in Blevins (2001) Blevins shows that a number of processes in the prosodic morphology of Yurok apply to verbal stems including agreement suffixes, but excluding pronominal clitics. Moreover she describes phenomena where idiosyncratic allomorphy of pronominal clitics is triggered by the phonology of the verbal stem, and different morphological dependencies between agreement suffixes and prnominal clitics, including the phenomena analyzed here. On the basis of these data Blevins concludes that the pronominal clitics in Yurok are actually agreement prefixes. In the framework adopted here, allomorphy is not restricted to word-internal contexts (see

(3) **Clitics Non-Adjacent to the Verb (pg. 58)**[6]

a. niki **ʔu-**ko·si **ten**
All 3-everywhere rain (uninflected)
'It was raining everywhere.' (Robins, 1958:58)

b. ʔiki newo·k̓ ku **k̓e-**skuʔy so· **ʔo·-k̓**
then see-1sg COMP 2-good so live-AGR
'then I saw that you lived a good life,' (Blevins, 2004:9)

Now, the plural forms in (2) exhibit Clitic-Agreement Doubling: the clitics instantiate a three-way person contrast, and so do the clitics. So we might infer that **k̓e-,** but also **-ʔw** specify the feature [+2] (plus probably additional features). On the other hand, in the singular forms the three-way contrast in the clitics and the suffixes of the forms without clitics neutralizes to the affix used with 1sg forms in the forms with clitics (**-k̓**).

There are in principle two ways to analyze **-k̓**. *First*, as a 1sg-affix which is extended for some reason to specific 2nd and 3rd person forms. *Second*, **-k̓** might be viewed as a default agreement marker which appears in forms without clitics by virtue of the Elsewhere Principle since there is no more specific marker, and in forms with clitics where more specific singular markers are suppressed. Since the insertion of affixes specifying features not present in syntax is marked and probably excluded in Universal Grammar (Trommer, 2003c), I will choose the latter alternative.

Viewing **-k̓** as a default agreement marker has a further advantage: Suppression of **-ʔm** and **-ʔ** can now be seen as the consequence of a ban against too many markers specifying the same features. Thus **-ʔm** marks the feature [+2], but **k̓e-** also does. **-ʔm** additionally signals the syntactic presence of agreement, but this can also be achieved by **-k̓**

Trommer, 2003b for empirical evidence) and morphological interactions between agreement suffixes and pronominal clitics are crucially predicted by the theory of morphological domains. Given this background, Blevins' data are fully compatible with a clitic analysis.

[6]Note that the 3rd person clitic **we-** has the allomorph **ʔu-** in specific phonological contexts. The following abbreviations are used in glosses: 1/2/3 = 1st/2nd/3rd person, ACC = accusative, AGR = agreement affix, C(L) = clitic, COMP = complementizer, INV = inverse marker, PER = person, TH = theme vowel, O(BJ) = object, NEG = negation, NOM = nominative, PASS = passive voice, P(L) = plural, S(G) = singular

without the redundant appearance of two instances of the feature [+2]. That there is no neutralization in the plural forms is plausibly linked to the fact that there is no other way to express the feature plural without using one of the specific plural affixes. Similarly, the person contrast in the clitics is not suppressed since there is no default clitic in the inventory, hence the only way to signal syntactic presence of clitics is to use one of the three clitics with full person specification. The optimality-theoretic analysis in the following sections is a formal implementation of these basic ideas, and extends them to transitive verb forms with object agreement, which only partially exhibit the neutralization of person agreement in the context of clitics. For example in (4b), instead of 3sg **-ˀen,** default agreement **-k̓** appears, but in (4c) the 3sg marker is retained:

(4) **Transitive Forms with Clitics (pg. 75)**

a.	**ne-**koˀmoy-o-c-e-**k̓** 1-hear-TH-O2S-TH-AGR	'I hear you'
b.	**uˀ**-koˀmoy-o-c-e-**k̓** 3-hear-TH-O2S-TH-AGR	'he hears you'
c.	**(ˀ)we-**tmo·l-o-p-e-**ˀn** 3-shoot-TH-O1S-3SG	'he shoots me'

The paper is organized as follows: In section 2, I introduce Distributed Optimality, the formal framework I will assume for the rest of the paper. In section 3, I provide an analysis of pronominal clitics in Yurok. Agreement of intransitive forms is discussed in section 4. This analysis is extended to cover transitive forms in section 5. Section 6 discusses parallels of the Yurok phenomena with a similar system in Menominee. In section 7, I show that the proposed account is superior to an alternative analysis by Blevins (2004). Section 8 gives a short summary of the paper.

2. The Theoretical Framework

The theoretical framework I will assume in the following is Distributed Optimality (DO; Trommer, 2003b, 2003d, 2006), a constraint-based approach to postsyntactic spellout merging concepts from Optimality Theory (OT, Prince and Smolensky, 1993; McCarthy and Prince, 1993,

1994) and Distributed Morphology (DM, Halle and Marantz, 1993). However, most of the arguments should carry over to any OT-based approach to spellout, where morphology has crucial access to syntactic structure (as e.g. in Noyer, 1993; Grimshaw, 1997, 2001). DO shares with Distributed Morphology the assumption that morphology is a separate module of the grammar interpreting the outputs of syntax, where the latter operates on abstract feature bundles (= heads = Lexical Items) without phonological content. Morphology assigns phonological content to syntactic structures by pairing them with strings of vocabulary items (VIs) which combine (underspecified) morphosyntactic features with phonological content. Here is an illustrative example with the Yurok verb form **newo·-ʔm**, 'you (sg.) see' (pg. 34):

(5) **Syntax-Morphology Mapping for *newo·-ʔm***

Input:	[+V]$_1$	[+Tense –past]$_2$	[+Agr +Nom +2 -pl]$_3$
Output:	**newo·**:[+V]$_1$		**ʔm:**[+Agr +2]$_3$

The input consists of a list of abstract heads, the output of a list of VIs. Both representations are linked by coindexing according to the principles of Correspondence Theory (McCarthy and Prince, 1993, 1994).[7] However, in the following I will omit indices wherever they are not relevant (or coindexing is obvious from the context), and notate the categorial features as subscripts to the feature structures to get more concise formula. Thus (6) is equivalent to (5):

(6) **Syntax-Morphology Mapping for newo·-ʔm**

Input:	[ ]$_V$	[–past]$_{Tense}$	[+Nom +2 –pl]$_{Agr}$
Output:	**newo·**:[ ]$_V$		**ʔm**:[+2]$_{Agr}$

Note that not all underlying heads and features are necessarily expressed in the output (e.g. [+Tense –past] and +Nom in (5) are not). Since the output of syntax serves in DO as the input to morphological computation, the grammar and, more specifically the generator function GEN, generates, as usual in OT, an infinite candidate set of

[7]Note that not the VIs themselves are coindexed with lexical items, but the feature structures associated with VIs.

output candidates which contains here all strings which consist exclusively of VIs compatible with input heads. For example, a VI specifying the feature [+3] (e.g. **ʔ**:$[+3]_{\text{Agr}}$ could not be part of any candidate for the input in (5) since there is no input head specifying [+3], Put another way GEN generally excludes insertion of features into morphology which are not present in corresponding syntactic structure.

2.1. Constraint Types

Which heads are actually realized by VIs and the order of VIs in a given language depend on the language-specific ranking of universal constraints on markedness, faithfulness and morpheme order. This is illustrated with the example from (5) and one very basic constraint Parse Φ in (7) disregarding the verb and the tense head:[8]

(7) **Input:** $[+\text{Nom} +2 -\text{pl}]_{\text{Agr}}$

		Parse Φ
☞ a.	V **ʔm:**$[+2]_{\text{Agr}}$	*
b.	V **k̇:**$[\quad]_{\text{Agr}}$	**!
c.	V	**!

Parse Φ induces one constraint violation for each input Φ-feature (i.e., person- and number feature) in the input which is not realized by a coindexed VI (e.g. –pl for (7a)). Since there are no appropriate VIs in the lexicon of Yurok to express this feature, violations of Parse Φ are unavoidable. However, they are minimized to guarantee maximal expression of features by VIs. In a line with Parse Φ there are also two other general Parse constraints for case features (Parse case) and categorial features (Parse cat):

[8]With Halle and Marantz (1993), I assume that agreement heads inherit case features from the DPs with which they agree.

(8) **Input:** $[+\text{Nom} +2 -\text{pl}]_{\text{Agr}}$

		PARSE Φ	PARSE case	PARSE cat
☞ a.	V **ʔm:**$[+2]_{\text{Agr}}$	*	*	
b.	V **ḱ:**$[\quad]_{\text{Agr}}$	**!	*	
c.	V	**!	*	*

Apart from the lack of VIs, also specific higher-ranked constraints can induce violations of PARSE Φ. Constraints of the COHERENCE-type require that maximally one VI of a certain type be present in a word form:[9]

(9) **Coherence X:** Allow only one morpheme of type X

For example the constraint COHERENCE [3] allows only one instance of the feature [+/−3] in a given output. Each additional instance of this feature leads to constraint violations. An example for such a restriction can be observed in Yurok. In (10-a,b), the 3rd person object is marked by the agreement suffix **-se**. However this is suppressed if the subject is also 3rd person (10-c). The form is hence homophonous with an intransitive 3sg form:

(10) **3rd person object marking (pg. 72)**

a. koʔmoy-o-**s**-e-**ḱ** — 'I hear him/her'
hear-TH-O3S-TH-AGR

b. koʔmoy-o-**s**-e-**ʔm** — 'you (sg.) hear him/her'
hear-TH-O3S-TH-2SG

c. koʔmo**ʔ**y — '(s)he hears (him/her)'
hear-3SG

PARSE Φ would favor appearance of the object marker also in forms with 3rd person subjects since in (11-b) the features of the object agreement head remain unexpressed:

[9]See Trommer (2008) for a technically more elaborate version of COHERENCE constraints in terms of index changes which has also important consequences for affix order.

(11) **Input:** $[+\text{Nom} +3 \text{ -pl}]_{\text{Agr}}[+\text{Acc} +3 \text{ -pl}]_{\text{Agr}}$

		PARSE Φ
☞	a. V **s**:$[+\text{Acc} +3]_{\text{Agr}}$ **?**:$[+3]_{\text{Agr}}$	**
	b. V **?**:$[+3]_{\text{Agr}}$	***!
	c. V **s**:$[+\text{Acc}+3]_{\text{Agr}}$	***!

Higher ranking of COHERENCE [3] correctly excludes the appearance of both agreement markers:

(12) **Input:** $[+\text{Nom} +3 \text{ -pl}]_{\text{Agr}}[+\text{Acc} +3 \text{ -pl}]_{\text{Agr}}$

		COH [3]	PARSE Φ
	a. V **s**:$[+\text{Acc} +3]_{\text{Agr}}$ **?**:$[+3]_{\text{Agr}}$	*!	**
☞	b. V **?**:$[+3]_{\text{Agr}}$		***
☞	c. V **s**:$[+\text{Acc}+3]_{\text{Agr}}$		***

However, (12-a) can also be avoided by incorrectly omitting the subject agreement marker and retaining object agreement, as in (12-c). Preference for subject agreement can be related to the general fact that languages prefer agreement for categories which rank higher on prominence hierarchies such as the ones in (13):

(13) **Basic Prominence Hierarchies**

a. [+Nom] $\succ$ [+Acc]
b. 1st/2nd Person $\succ$ 3rd Person
c. Plural $\succ$ Singular

The effects of such hierarchies on agreement are captured in DO by relativized PARSE constraints such as the ones in (15) related to hierarchies in (13) by the general constraint schema in (14):

(14) **Schema for Relativized Parse Constraints:**
If there is a prominence scale $A \succ B$ and a feature F there is a relativized PARSE constraint PARSE $[F]^{[A]/[B]}$

(15) **Relativized Parse Constraints Derived from (14) by (15)**

a. PARSE $[\text{PER}]^{[+\text{Nom}]/[+\text{Acc}]}$
b. PARSE $[\text{PER}]^{[+2]/[+3]}$

c. PARSE $[\text{PER}]^{[+\text{pl}]/[-\text{pl}]}$

PARSE $F^{A/B}$ is to be read as follows: Realize the feature F of a syntactic head containing A if this is adjacent to a head containing B. Thus, PARSE $[\text{P(ER)}]^{[+\text{Nom}]/[+\text{Acc}]}$ requires that the person features of a [+Nom] head are spelled out by an affix, if it is adjacent to a [+Acc] head. Ranking PARSE $[\text{P}]^{[+\text{Nom}]/[+\text{Acc}]}$ between COH [3] and PARSE Φ now excludes candidate (16-c) as desired:

(16) **Input:** $[+\text{Nom} +3 \text{ -pl}]_{\text{Agr}}[+\text{Acc} +3 \text{ -pl}]_{\text{Agr}}$

	COH [3]	PRS $[\text{P}]^{[+\text{Nom}]/[+\text{Acc}]}$	PRS Φ
a. V **s**:$[+\text{Acc} +3]_{\text{Agr}}$ **?**:$[+3]_{\text{Agr}}$	*!		**
☞ b. V **?**:$[+3]_{\text{Agr}}$			***
☞ c. V **s**:$[+\text{Acc}+3]_{\text{Agr}}$		*!	***

Since hierarchy effects are often sensitive to the combination of different prominence relations or restricted to specific parts of paradigms I will generalize the schema in (14) to (17):

(17) **Generalized Schema for Relativized Parse Constraints:**
There is a relativized constraint PARSE $[F]^{[A1\ldots An]/[B1\ldots Bm]}$ iff for all pairs A/B
(such that A is in $A1\ldots An$ and B is in $B1\ldots Bm$)
a.) there is at least one pair A/B
licensed by the hierarchy $A \succ B$
b.) there is no pair A/B for which there is the hierarchy $B \succ A$

This schema still allows to derive the constraints in (15) which obviously contain at least one pair of features licensed by a prominence hierarchy and none in contradiction to a hierarchy relation. In addition, also the constraints in (18) are licensed. In (18-a), two hierarchies are combined ((15-a) and (15-b)) and in (18-b), the preference of second over 3rd person is restricted to the case that the 3rd person argument is plural:

(18) **Relativized Parse Constraints Licensed by (17)**

a. PARSE $[\text{P}]^{[+\text{Nom}+2]/[+\text{Acc}+3]}$
b. PARSE $[\text{P}]^{[+2]/[+3+\text{pl}]}$

On the other hand, the constraints in (19) are not licensed by (17) and hence excluded. (19-a) does not contain any feature pair related by a prominence hierarchy (violating (17-a)), (19-b) contains a feature pair with reversed prominence (+3 over +2), violating (17-a), and (19-c) straightforwardly violates (17-a) *and* (17-b):

(19) **Relativized Parse Constraints not Licensed by (17)**

a. PARSE $[\mathrm{P}]^{[+2]/[+\mathrm{pl}]}$

b. PARSE $[\mathrm{P}]^{[+\mathrm{Nom}+3]/[+\mathrm{Acc}+2]}$

c. PARSE $[\mathrm{P}]^{[+3]/[+2]}$

Note that none of the introduced constraint types is specific to Yurok. COHERENCE and hierarchy effects are pervasive in languages with complex agreement morphology (see Trommer, 2003a, 2008).[10] and virtually any constrained-based approach to morphology requires constraints like PARSE Φ. On the other hand, we will see in the following sections that the constraints proposed so far are substantial for the explanation of redundancy avoidance in Yurok.

2.2. Constraint Domains

In lexicalist approaches to morphology, all morphological constraints apply at the word level At the core of my analysis here is the assumption that spellout constraints may apply in different syntactically defined local domains.[11] More specifically, I assume the three domain types in (20):

[10] Indeed Menominee has a number of striking effects due to COH [3] which are discussed briefly in section 6.

[11] This is analogous to OT-approaches to phonology, where phonological constraints apply in different prosodic domains such as the syllable or the phonological word.

(20) **Domains for spellout constraints**

Head Domain: A set of string-adjacent heads belonging to the same extended projection
Chain Set: The set of heads which are members of the chain C
Chain Domain: A set S such that there exists a Head Domain D and S contains all heads of all chain sets occupying a position in D

The most straightforward of these domains is the Chain Set. I assume that coindexed clitics and agreement markers are always part of a chain with the schematic form in (21) (order irrelevant):

(21) $\mathrm{DP_i}$ $\mathrm{Clitic_i}$ V $\mathrm{Agr_i}$

The Chain Set then amounts to $\{\mathrm{Clitic_i}, \mathrm{Agr_i}\}$ if $\mathrm{DP_i}$ is syntactically complex and to $\{\mathrm{Clitic_i}, \mathrm{Agr_i}, \mathrm{DP_i}\}$, if $\mathrm{DP_i}$ is a bare head. Crucially, only indexed heads are visible for Chain Sets.

A Head Domain[12] is roughly equivalent to the traditional notion of "morphological word". A simple example is a sequence of a verb stem with Tense, subject, and object agreement heads ([+V][+Tense] [+Agr +Nom] [+Agr +Acc]). Note that the exact tree structure configuration of the heads is irrelevant for the definition of a Head Domain. Thus, [+V] could be placed adjacent to [+Tense] by head movement to Tense or by remnant movement of a phrase containing [+V] to a higher specifier position. Important is only string adjacency. Another instance of a Head Domain that will become relevant are clitic clusters.

Finally, Chain Domains "combine" Head Domains with Chain Sets. In other words, a Chain Domain is a Head Domain plus all heads contained in chains with a position in this Head Domain. I will call constraints applying in Head Domains *Head-Level Constraints*, constraints applying in Chain Domains *Chain-Level Constraints*, and constraints on Chain Sets *Chain Constraints*. (22) and (23) illustrate how Chain-Level and Head-Level Constraints apply to coindexed clusters of agreement and clitic markers which I take to be the crucial configuration relevant for Yurok (coindexing is marked here by superscripts):

[12] Head Domains are called *Spellout Domains* in Trommer (2003b).

(22) **Head-Level Constraints**

Output:	$\boxed{\mathrm{Agr}^1_o\ \mathrm{Agr}^2_o \ldots \mathrm{Agr}^n_o}$	$\boxed{\mathrm{CL}^1_o\ \mathrm{CL}^2_o \ldots \mathrm{CL}^n_o}$
	↑	↑
Input:	$\boxed{\mathrm{Agr}^1_i\ \mathrm{Agr}^2_i \ldots \mathrm{Agr}^n_i}$	$\boxed{\mathrm{CL}^1_i\ \mathrm{CL}^2_i \ldots \mathrm{CL}^n_i}$

(23) **Chain-Level Constraints**

Output:	$\boxed{\mathrm{Agr}^1_o\ \mathrm{Agr}^2_o \ldots \mathrm{Agr}^n_o \qquad \mathrm{CL}^1_o\ \mathrm{CL}^2_o \ldots \mathrm{CL}^n_o}$
	↑
Input:	$\boxed{\mathrm{Agr}^1_i\ \mathrm{Agr}^2_i \ldots \mathrm{Agr}^n_i \qquad \mathrm{CL}^1_i\ \mathrm{CL}^2_i \ldots \mathrm{CL}^n_i}$

The basic motivation for assuming different spellout domains of this type is the following: On the one hand, spellout seems to be sensitive to the sum of clitics and agreement. Thus in the singular forms in (2) discussed above, the use of agreement affixes is suppressed if the corresponding features are already expressed by clitics. On the other hand, there is genuine redundancy in clitic-agreement complexes. Thus in forms like (24), the feature 1st person ([+1]) is expressed by the 1st person clitic and the 1pl agreement suffix **-h**:

(24) **(ʔ)ne-**tmo·l-oyog-o**-h** 'you (sg./pl.)/they/he shoot(s) us'(pg. 75)
1-shoot-INV-TH-1PL

If the feature [+1] is present underlyingly in a clitic head and an agreement head and there are also spellout constraints at the head level, these will require realization for both instances of [+1]. In a nutshell, head-level constraints account for redundancy, chain-level constraints for non-redundancy in agreement-clitic complexes. Which one prevails in a given context depends on the ranking of specific constraints.

In the following sections, I will show that crucial parts of Yurok pronominal inflection, and especially the forms involving Clitic-Agreement Doubling can be captured in an elegant and enlightening way by the use of different morphosyntactic domains.

3. Clitics

As in Algonquian languages, pronominal clitics in Yurok can refer either to subject (25-a) or object (25-b), and as in Algonquian only one clitic can appear in a specific clause, in other words, it is impossible to crossreference subject and object by clitics at the same time (25-c):[13]

(25) a. **k̓e**-tmo·l-o**-p-ah** 'you (sg.) shoot me' (pg. 75)
2-shoot-TH-O1-AGR
b. **(ʔ)ne-**tmo·l-o**-p-ah** 'you (sg.) shoot me' (pg. 75)
2-shoot-TH-O1-AGR
c. ***ne-k̓e-**tmo·l-o**-p-ah**
1-2-shoot-TH-O1-AGR

However, unlike in Algonquian, crossreferencing by clitics is restricted to subjects for most person-number combinations of subject and object. Thus for the proposition 'I meet you' there is a form corresponding to (25-a), but none corresponding to (25-b):

(26) a. **ne-**kceni**-c-e-k̓** 'I meet you (sg.)' (pg. 71)
1-meet-O2-TH-AGR
b. ***k̓e-**kceni**-c-e-k̓**
2-meet-O2-TH-AGR
c. ***ne-k̓e-**kceni**-c-e-k̓**
1-2 -meet-O2-TH-AGR

Crossreferencing the object is restricted to clauses with a 2nd person object and a 3pl subject (27), and to clauses with a 1pl object or a 1sg object and a singular subject (28). While object reference is obligatory for the constellations in (27), for the ones in (28) both, subject or object reference are possible. The notation X:Y stands in the following for a subject of type X and an object of type Y, e.g. 3pl:2sg for a 3pl subject and a 2sg object:

[13]See Halle and Marantz (1993), Dechaine (1999) and Trommer (2003b) for discussion of the Algonquian facts.

(27) **Forms with Obligatory Object Crossreferencing**

	Object Reference
3pl:2sg	ke-
3pl:2pl	ke-

(28) **Forms with Optional Object Crossreferencing**

	Object Reference	**Subject Reference**
2sg:1sg	ne-	ke-
3sg:1sg	ne-	we-
2sg/pl:1pl	ne-	ke-
3sg/pl:1pl	ne-	we-

I will now show that these facts follow straightforwardly from the approach to template positions and hierarchy effects proposed in section 2. First, the fact that sequences of two clitics are excluded and crossreferencing usually targets the subject can be derived from the constraint Coherence $[\ ]_{Cl}$ which punishes multiple occurrences of clitics and the relativized Parse constraint Parse $[\text{Cl}]^{[\text{Nom}]/[\text{Acc}]}$ which requires realization of the categorial feature corresponding to a nominative clitic head in the context of an accusative head. To indicate that both constraints are restricted to a head domain (the clitic complex) there is a corresponding designation under each column in the tableau:

(29) **1sg:2sg**

	Coh $[\ ]_{Cl}$	Parse $[\text{C}]^{[\text{Nom}]/[\text{Acc}]}$
☞ a. **ne**:$[+1]_{Cl}$ V		
b. **ke**:$[+2]_{Cl}$ V		*!
c. **ne**:$[+1]_{Cl}$ **ke**:$[+2]_{Cl}$ V	*!	
Domain:	**Head**	**Head**

Now recall from section 2 that the schema for relativized Parse constraints in (17) allows to derive the constraint Parse $[\text{C}]^{[+2]/[+3+\text{pl}]}$ (18-b). Ranking this constraint above Parse $[\text{C}]^{[\text{Nom}]/[\text{Acc}]}$ we get correctly the object clitic for a 3pl:2sg form (Parse is abbreviated in the following tableaus as Prs):

(30) **3pl:2sg**

	Coh[ ]$_{Cl}$	Prs[C]$^{[+2]/[+3+pl]}$	Prs[C]$^{[Nom]/[Acc]}$
a. **we**:[+3]$_{Cl}$ V		*!	
☞ b. **ke**:[+2]$_{Cl}$ V			*
c. **we**:[+3]$_{Cl}$ **ke**:[+2]$_{Cl}$V	*!		
Domain:	**Head**	**Head**	**Head**

A completely analogous tableau can be provided for 3pl:2pl. For clauses with a 2nd person subject and a 3pl object, Parse [C]$^{[+2]/[+3+pl]}$ has no other effect than reinforcing subject reference which is already predicted by Parse [C]$^{[Nom]/[Acc]}$. For other constellations such as 1sg:2sg, the constraint does not have any effects at all. In a similar way, the schema also licenses the relativized Parse constraints in (31) which correspond to the single cases in (28):

(31) a. Parse [C]$^{[+1\ +pl]/[+2\ -pl]}$
b. Parse [C]$^{[+1\ +pl]/[+3\ -pl]}$
c. Parse [C]$^{[+1\ +pl]/[+2\ +pl]}$
d. Parse [C]$^{[+1\ +pl]/[+3\ +pl]}$
e. Parse [C]$^{[+1\ -pl]/[+2\ -pl]}$
f. Parse [C]$^{[+1\ +pl]/[+3\ -pl]}$

Since the relative ranking of these constraints is irrelevant and they are otherwise ranked in the same position, I will refer to the stratum of the constraints in (27) by using the abbreviation Parse [C]$^{[1]/[2/3]}$. If the relativized Parse constraints are now unordered with respect to Parse [C]$^{[Nom]/[Acc]}$ we get the effect that clitic crossreferencing both arguments becomes possible for the cases in (28) since both lead to the same number of constraint violations. Consider for example a 2sg:1sg clause:

(32) **2sg:1sg**

	COH [ ]$_{Cl}$	PRS [C]$^{[Nom]/[Acc]}$	PRS [C]$^{[1]/[2/3]}$
☞ a. **ne**:[+1]$_{Cl}$ V		*	
☞ b. **ke**:[+2]$_{Cl}$ V			*
c. **ne**:[+1]$_{Cl}$ **ke**:[+2]$_{Cl}$ V	*!		
Domain:	**Head**	**Head**	**Head**

For the cases where the subject is favored by the constraints in (31), both PARSE [C]$^{[1]/[2/3]}$ and PARSE [C]$^{[Nom]/[Acc]}$ prefer subject clitics:

(33) **1sg:2g**

	COH [ ]$_{Cl}$	PRS [C]$^{[Nom]/[Acc]}$	PRS [C]$^{[1]/[2/3]}$
☞ a. **ne**:[+1]$_{Cl}$ V			
b. **ke**:[+2]$_{Cl}$ V		*!	*
c. **ne**:[+1]$_{Cl}$ **ke**:[+2]$_{Cl}$ V	*!		
Domain:	**Head**	**Head**	**Head**

Finally, for cases with none of the configurations targeted by PARSE [C]$^{[1]/[2/3]}$ we get straightforwardly subject reference by Parse [C]$^{[Nom]/[Acc]}$.

4. Clitic-Agreement Doubling in Intransitive Forms

Since the distribution of clitics seems to be independent from the distribution of agreement markers (but not vice versa), I will assume that the constraints on clitics introduced in section 3 are ranked above all constraints relevant for agreement and the chain domain comprising both agreement and clitics. To make the tableaus more transparent, I will omit the constraints on clitics in this and the following sections.

Let us start with simple intransitive forms with 3sg subjects. (34) shows the relevant chains, and the features associated with these chains for sentences with and without pronominal clitics. Presence or absence of clitics is here simply interpreted as an effect of different syntactic derivations:

(34) **Chains and Features in Intransitive Forms**

	Without Clitics	**With Clitics**
a. Chains	V $[+\text{Agr}+3\text{–pl}]_i$	$[+\text{Cl}+3\text{–pl}]_i$ V $[+\text{Agr}+3\text{–pl}]_i$
b. Chain Features	[+Agr+3–pl]	[+Cl+Agr+3–pl]

Since GEN in DO does not license feature insertion the only markers available to spellout the features of the chains in (34) are the following vocabulary items:

(35) **VIs for 3rd person marking**

we : $[+3]_{\text{Cl}}$

ʔ : $[+3]_{\text{Agr}}$

k̓ : $[\ ]_{\text{Agr}}$

The character of **-k̓** as a default affix is captured by the fact that it only specifies the categorial feature for agreement. Nonetheless its insertion will be forced by Parse cat if no other affix is available to realize $[\ ]_{\text{Agr}}$.[14] We have already seen the effects of Coh [3] and Parse Φ with 2sg forms and 3sg transitive forms. This ranking straightforwardly extends to intransitive 3sg forms where Coh [3] is satisfied by all relevant candidates. I assume that Parse Φ and the other general Parse constraints apply at the Chain Domain and Coh [3] at the Head Domain (constraints applying in Chain Domains are not specifically marked for their application domain in tableaus):

[14] The singular agreement markers are assumed here not to specify number. One could also assume that they are marked for –pl. which would not substantially change the proposed analysis.

(36) **3sg Intransitive Simple**[15]

	Coh [3]	Prs Φ	Prs cat	Prs case
☞ a. V **ʔ**:[+3]$_{Agr}$		*		*
b. V **k̓**:[ ]$_{Agr}$		*!*		*
c. V		*!*	*	*

Domain: **Head**

Now, recall that all constraints apply at any spellout level, possibly with different rankings. If we assume that Coh [3] also applies in Chain Sets (indicated by "Chain" in tableaus), only one appearance of a 3rd person clitic or agreement marker is possible, excluding candidate (37-a). However (37-b) avoids appearance of two instances of [+3] by using **k̓**:[ ]$_{Agr}$ instead of **ʔ**:[+3]$_{Agr}$. Crucially, (37-b) has the same constraint violations for Parse Φ as (37-a) since 3 is already spelled out by the clitic. All other candidates also avoid violation of Coh [3], but are worse for Parse cat.

(37) **3sg Intransitive Clitics**

	Coh [3]	Prs Φ	Coh [3]	Prs cat	Prs case
a. **we**:[+3]$_{Cl}$ V **ʔ**:[+3]$_{Agr}$		*	*!		*
☞ b. **we**:[+3]$_{Cl}$ V **k̓**:[ ]$_{Agr}$		*			*
c. **we**:[+3]$_{Cl}$ V		*		*!	*
d. V **ʔ**:[+3]$_{Agr}$		*		*!	*

Domain: **Head** **Chain**

The different ranking of Coh [3] in head and chain domain becomes relevant with plural forms. For 3pl agreement, there is the VI **ɬ**:[+3 +pl]$_{Agr}$ which spells out person and number. The combination **we**:[+3]$_{Cl}$- **ɬ**:[+3 +pl]$_{Agr}$ hence spells out one more feature than **w**:[3]$_{Cl}$- k̓: [ ]$_{Agr}$ and

[15] "Simple" is used in the following as a shorthand for inputs without Clitics

fares better for PARSE Φ. The additional constraint PARSE [cat]$^{[Cl]/[Agr]}$ ensures that the clitic is not omitted in favor of agreement (38-e):[16]

(38) **3pl Intransitive Clitics**

	PRS [cat] [Cl]/[Agr]	COH [3]	PRS Φ	COH [3]	PRS cat
☞ a. **we**:[+3]$_{Cl}$ V **ɬ**:[+3+pl]$_{Agr}$				*	
b. **we**:[+3]$_{Cl}$ V **ʔ**:[+3]$_{Agr}$			*!	*	
c. **we**:[+3]$_{Cl}$ V **k̓**:[ ]$_{Agr}$			*!		
d. **we**:[+3]$_{Cl}$ V			*!		*
e. V **ɬ**:[+3+pl]$_{Agr}$	*!				*
Domain:	**Chain**	**Head**		**Chain**	

Crucially, COH [3] (Chain) must be ranked below PARSE Φ because under the opposite ranking **ɬ**:[+3 +pl]$_{Agr}$ would be replaced by **k̓**:[ ]$_{Agr}$ just as in the singular forms. At the same time, COH [3] (Head) must be ranked above PARSE Φ to ensure blocking of object agreement in 3:3 forms. But different ranking is only possible if spellout constraints can be relativized to different syntactic domains. Further, a local morphological factor namely the fact that a more specific VI is available for plural than for singular agreement has the effect that suppression of double 3rd-person marking inside a syntactic chain is suspended showing that constraints at the bigger (chain) level have to interact with morphological detail at the head level. This seems to exclude any lexicalist account which is based purely on the word level.

The analysis so far could be extended in two ways to forms with 2nd person subjects. Either we assume a generalization of COHERENCE [3] to person features in general (COHERENCE [PER]), or an additional constraint COHERENCE [2]. Either possibility seems to lead to the same empirical results for Yurok, but I will assume the latter analysis here since Menominee seems to have a restriction on 3rd person affixes (cf. section 6) without evidence to the same effect for 2nd person.

For 1st person singular forms only the agreement VI **k̓**:[ ]$_{Agr}$ is avail-

[16] PARSE [cat]$^{[Cl]/[Agr]}$ must be ranked below COHERENCE [CL] since it would otherwise enforce appearance of two clitics in transitive clauses. Since it is never violated in favor of agreement-specific constraints, I will omit it from the following tableaus and only consider candidates with realized clitics.

able which does not violate either of these constraints (nor possible COHERENCE [1]). Hence, by PARSE Φ the most specific form **ne**:[+1]$_{Cl}$ V **k̓**:[ ]$_{Agr}$ is chosen. Similarly for the 1pl we get **ne**:[+1]$_{Cl}$ V **h**:[+1 +pl]$_{Agr}$.

(39) **1sg Intransitive Simple**

	COH [3]	PRS Φ	COH [3]	PRS cat	PRS case
☞ a. V **k̓**:[ ]$_{Agr}$		**			*
b. V		**		*!	*

Domain: **Head** **Chain**

(40) **1sg Intransitive Clitics**

	COH [3]	PRS Φ	COH [3]	PRS cat	PRS case
☞ a. **ne**:[+1]$_{Cl}$ V **k̓**:[ ]$_{Agr}$		*			*
b. **ne**:[+1]$_{Cl}$ V		*		*!	*

Domain: **Head** **Chain**

Taken together, we have seen that the (non-)suppression of redundant person marking in agreement can be captured by constraints against multiple instances of the same feature, and the requirement to spell out all features of a chain.

5. Clitic-Agreement Doubling in Transitive Forms

In transitive verb forms, the constraints introduced in the last section interact in a complex manner with other factors such as inverse marking (section 5.1) and contextually determined allomorphy (sections 5.2 and 5.3). Again, the presence of clitics has a crucial impact on the spell-out of agreement morphology, and again the relativization of spellout constraints to different syntactic levels plays a central role in the analysis. Since a complete account of Yurok transitive agreement is beyond the scope of this paper, I will restrict myself here largely to forms with singular subjects since we find only here (just as in intransitive forms) relevant effects of Clitic-Agreement Doubling.

Note first that there are a number of transitive forms which behave in parallel to intransitive forms with regard to CAD. Thus in forms with 3sg objects, singular subject agreement is again fully differentiated in sentences without clitics, but reduced to default **ḱ**:[ ]$_{\text{Agr}}$ in sentences with clitics:

(41) **Person Neutralization with Transitive Forms (pg. 72/75)**

	without clitics	**with clitics**	
a.	koʔmoy-o-**s**-e-**ḱ**	**ne-**koʔmoy-o-**s**-e-**ḱ**	'I hear him/her'
	hear-TH-O3S-TH-AGR	1-hear-TH-O3S-TH-AGR	
b.	koʔmoy-o-**s**-e-**ʔm**	**ḱe-**koʔmoy-o-**s**-e-**ḱ**	'you (sg.) hear
	hear-TH-O3S-TH-2SG	2-hear-TH-O3S-TH-AGR	him/her'
c.	koʔmo**ʔ**y	**ʔu-**koʔmoy-o-**s**-e-**ḱ**	'(s)he hears
	hear-3SG	3-hear-TH-O3S-TH-AGR	him/her'

(42) and (43) show how the constraints introduced so far derive 2sg:3sg forms with and without clitics. To keep bigger tableaus readable I will apply the following conventions for the rest of the paper: Category subscripts of VIs are omitted since every preverbal VI is a clitic and very postverbal VI an agreement marker. Plus signs in VIs are omitted, for example "[2]" abbreviates [+2]. Relativized PARSE constraints on person are abbreviated by the feature structures of their superscripts. Thus [Nom]/[Acc] abbreviates PARSE [P]$^{[\text{Nom}]/[\text{Acc}]}$.

(42) **2sg:3sg Clitics**

	[Nom]/ [Acc]	COH [2]	PRS Φ	COH [2]	PRS cat
☞ a. **ḱe**:[2] V **s**:[Acc 3 –pl] **ḱ**:[ ]			*		*
b. **ḱe**:[2] V **s**:[Acc 3 –pl]			*		**!
c. **ḱe**:[2] V **s**:[Acc 3 –pl] **ʔm**:[2]			*	*!	*
d. **ḱe**:[2] V **ʔm**:[2]			**!*	*	**
Domain:		**Head**		**Chain**	

(43) **2sg:3sg Simple**

	[Nom]/ [Acc]	Coh [2]	Prs Φ	Coh [2]	Prs cat
a. V **s**:[Acc 3 –pl] **k**:[ ]	*!		**		
b. V **s**:[Acc 3 –pl]	*!		**		*
☞ c. V **s**:[Acc 3 –pl] **ʔm**:[2]			*		
d. V **ʔm**:[2]			**!*		*
Domain:		**Head**		**Chain**	

For 3sg:3sg forms we have to take into account additionally the Coherence constraint at the head level banning two 3rd person agreement suffixes which was introduced in section 2. Recall that this leads to suppression of the object marker **s**:[Acc +3-pl]$_{\text{Agr}}$ in 3:3 forms without clitics:

(44) **3sg:3sg Simple**

	[Nom]/ [Acc]	Coh [3]	Prs Φ	Coh [3]	Prs cat
a. V **s**:[Acc 3-pl] **k**:[ ]	*!		**		
b. V **s**:[Acc 3-pl]	*!		**		*
☞ c. V **ʔ**:[3]			***		*
d. V **s**:[Acc 3 –pl] **ʔ**:[3]		*!	*		
Domain:		**Head**		**Chain**	

However, since Parse$^{[\text{Nom}]/[\text{Acc}]}$ applies at the chain level, it is satisfied by the 3rd-person clitic **we**:[+3]$_{\text{Cl}}$ in 3:3 forms with clitics. Since additional appearance of **ʔ**:[+3]$_{\text{Agr}}$ (45-c,d) would not fare better for this or any other higher-ranked constraints, Parse cat gets decisive, and favors default agreement for the subject and full object agreement (45-a):

(45) **3sg:3sg Clitics**

	[Nom]/ [Acc]	Coh [3]	Prs Φ	Coh [3]	Prs cat
☞ a. **we**:[3] V **s**:[Acc 3 –pl] **k̇**:[ ]			*		*
b. **we**:[3] V **s**:[Acc 3 –pl]			*		**!
c. **we**:[3] V **ʔ**:[3]			**!*	*	**
d. **we**:[3] V **s**:[Acc 3 –pl] **ʔ**:[3]		*!	*	*	*

Domain: **Head** **Chain**

There is one remaining problem with the ranking in (44) and (45). A candidate which is not excluded by this ranking is a form where like in (44-c) **ʔ**:[+3]$_{\text{Agr}}$ crossreferences the subject, but **k̇**:[ ]$_{\text{Agr}}$ crossreferences the object. This candidate fares better for Parse cat since it realizes one more category feature, and has the same violations otherwise. Thus we expect incorrectly that this candidate should become optimal:

(46) **3sg:3sg Simple**

	[Nom]/ [Acc]	Coh [3]	Prs Φ	Coh [3]	Prs cat
☛ c. V **ʔ**:[3]			***		*!
☞ c'. V **k̇**:[ ] **ʔ**:[3]			***		

Domain: **Head** **Chain**

I will assume that (46-c') is excluded by general constraints on the templatic structure of Yurok verb forms. Thus, in Yurok agreement, there are agreement markers specifying case (i.e. grammatical role) and markers unspecified for case. The unspecified markers roughly correspond to the ones used in intransitive forms. For example, **-ʔm** marks the subject in (47-a,b), but the object in (47-c). Hence it cannot be marked for a specific case such as nominative or accusative. On the other hand, the 3sg marker **-s** in (46-b) is only used for object marking, and plausibly specified as +Acc(usative).

(47) a. koʔmoy-o-**ʔm** 'you hear' (pg. 34)
hear-TH-2
b. koʔmoy-o-**s**-e-**ʔm** 'you (sg.) hear him/her' (pg. 72)
hear-TH-O3S-TH-2

It is an exceptionless generalization on Yurok agreement that in each verb form there is maximally one agreement suffix unspecified for case (i.e., maximally one marker canonically used for subject agreement) and maximally one case-marked suffix (a canonical object agreement suffix or an inverse marker, cf. section 5.1). I propose to capture these generalizations by two COHERENCE constraints for case-less (–Case) and case-specified affixes.[17] If these are crucially undominated in Yurok crossreferencing of the object by **k̓**:[ ]$_{\text{Agr}}$ in (45) is correctly excluded:

(48) **3sg:3sg Simple**

	[Nom]/ [Acc]	COH [+Case]	COH [–Case]	COH [3]	PRS Φ	COH [3]	PRS cat
☞ c. V **ʔ**:[3]$_{\text{Agr}}$					***		*
☞ c'. V **k̓**:[ ]$_{\text{Agr}}$ **ʔ**:[3]$_{\text{Agr}}$			*!		***		
Domain:		**Head**	**Head**	**Head**		**Chain**	

5.1. Inverse Forms

A number of transitive forms are homophonous with intransitive passive forms (pg. 47):

(49) **Inverse/Passive Forms**

a. tmo·l-**oy**-e-**ʔm** 'you (sg.) are shot/'he shoots you (sg./pl.)/they shoot you (sg./pl.)'
shoot-PASS/INV-TH-2

b. tmo·l-**oy**-o-**h** 'we are shot/he shoots us/ I/you (sg./pl.)/they shoot us'
shoot-PASS/INV-TH-2

[17] Extensive independent evidence for the constraint COHERENCE$_{[-\text{Case}]}$ is provided in Trommer (2008)

These forms are of central importance to the analysis of CAD since for clauses with clitics and 3sg:2sg or 3sg:2pl, the apparent passive forms are replaced by transparent forms with subject and object agreement and the familiar suppression of subject person in the agreement suffix:[18]

(50) **3sg:2sg/2pl forms with Clitics (pg. 75)**

a. **ʔu-**koʔmoy-o**-s**-e**-k̓** '(s)he hears you (sg.)'
3-hear-TH-O2-TH-AGR

b. **ʔu-**koʔmoy-o**-c̓-oʔ** '(s)he hears you (pl.)'
3-hear-TH-O2P-AGR

I will first sketch a general analysis of the apparent passive forms, and then return to the relation of this pattern and the data in (50). The forms in (49) appear in configurations which are called "inverse" in the literature on Algonquian languages. In Algonquian, transitive verbs where the object is higher than the object for a prominence hierarchy such as (51) have a specific inverse marker (**-eko** in (52-a)) while forms where the subject is higher have a direct marker (**-a·** in (52-b); examples from Menominee):

(51) **Algonquian Animacy Hierarchy:**
1st/2nd person ≻ 3rd person animate ≻ 3rd person inanimate

(52) **Menominee Direct/Inverse Examples**

a. **ne-**na·n**-eko-w** 'he fetches me' (Bloomfield, 1962:154)
1-fetch-INV-[+3]

b. **ne-**na·n**-a·-w** 'I fetch him' (Bloomfield, 1962:152)
1-fetch-INV-[+3]

[18] In (50-b), **-k̓** is replaced by the allomorph **-oʔ**. See section 5.2 for an account.

While the distribution of apparent passive forms in Yurok transitive forms is more complex (e.g. there are no passive forms for 2:1sg) all these forms appear in contexts which are inverse in Algonquian.[19]

I will assume in the following that the affixes characteristic for pseudo-passives in Yurok are also inverse markers[20] historically developed from and therefore partially homophonous with the passive morpheme. This assumption is based on two facts: First, the syntax of inverse forms does not seem to differ from the syntax of other transitive predications. Second, there are some morphological details where inverse forms differ from "true" passives. Thus for 3sg:2pl clauses, the form in (53-a) (= (49)-a) which is identical to the one for 3sg:2sg (and 2sg passive) is used even though a 2pl passive form is available (53-b):

(53) **Inverse vs. Passive in 3:2 Forms (pg. 47)**

a. tmo·l**-oy-**e**-ʔm** 'you (sg.) are shot/he shoots you (sg./pl.)/
shoot-PASS/INV-TH-2 they shoot you (sg./pl.)'

b. tmo·l-oy**-uʔ** 'you (pl.) are shot'
shoot-PASS-2PL

In the X:1pl forms, the inverse marker (**-oy**) can be extended to **-oyog** which is not possible for the corresponding passive form ((54-a) = (49)-a).

[19]In other words, all passive forms in Yurok would be inverse in Algonquian, but not all Algonquian inverse forms are passive in Yurok.

[20]Note that many other languages have inverse, but no direct markers while the opposite distribution (direct markers, but no inverse markers) is unattested. See Trommer (2003a) for discussion.

(54) **Inverse vs. Passive in X:1pl Forms (pg. 47)**

a. tmo·l**-oy**-o**-h** shoot-PASS/INV-TH-1PL	'we are shot/he shoots us/ I/you (sg./pl.)/we/they shoot us'
b. tmo·l**-oyog**-o**-h** shoot-INV-TH-1PL	'he shoots us/ I/you (sg./pl.)/we/they shoot us'

In a line with the analysis of inverse markers proposed in Trommer (2003b), I will further assume that inverse markers are portmanteau agreement affixes of the form $[\text{Nom} \ldots]_{\text{Agr}}$ $[\text{Acc} \ldots]_{\text{Agr}}$ expressing essentially case features and therefore licensed by PARSE constraints requiring feature realization, but restricted to a subset of inverse configurations, by specific impoverishment constraints. I will take it for granted in the following that a set of such constraints allows inverse markers only in X:1p and 3:2 forms and that there are two such markers with the entries in (55):

(55) **Vocabulary Items for Inverse Markers**

a. oy : $[\text{Nom} +3]_{\text{Agr}}$ $[\text{Acc}\ ]_{\text{Agr}}$
b. oy(og) : $[\text{Nom}\ ]_{\text{Agr}}$ $[\text{Acc} +1]_{\text{Agr}}$

The distribution of inverse markers is crucially governed by the constraints $\text{COH}_{[+\text{Case}]}$ and $\text{COH}_{[-\text{Case}]}$ introduced above which exclude two case-marked or two case-less agreement affixes (including inverse markers). Thus, two inverse markers (56-a) or an inverse plus a case-marked simple agreement marker (56-b) are excluded by $\text{COH}_{[+\text{Case}]}$, while the cooccurrence of two agreement markers unmarked for case is banned by $\text{COH}_{[-\text{Case}]}$ (56-c). Both constraints are unviolated for all Yurok verb forms and will therefore be omitted in the following tableaus. Note that (56) is a pseudo-tableau because (56-a,b,c) are actually excluded by competition with other candidates not with (56-d,e):

(56) **Coh$_{[+/-\text{Case}]}$ and the Distribution of Inverse Markers**

	Coh [+Case]	Coh [−Case]
a. **oy**:[Nom 3]$_{\text{Agr}}$[Acc]$_{\text{Agr}}$ **oy(og)**:[Nom −1]$_{\text{Agr}}$[Acc 1]$_{\text{Agr}}$	*	
b. **oy**:[Nom 3]$_{\text{Agr}}$[Acc]$_{\text{Agr}}$ **c**:[2 Acc]$_{\text{Agr}}$	*	
c. **ʔ**:[3]$_{\text{Agr}}$ **aʔ**:[+2]$_{\text{Agr}}$		*
✌ d. **oy**:[Nom 3]$_{\text{Agr}}$[Acc]$_{\text{Agr}}$ **ʔm**:[2]$_{\text{Agr}}$		
✌ e. **p**:[1 Acc]$_{\text{Agr}}$ **aʔ**:[2]$_{\text{Agr}}$		

Domain: **Head Head**

Let us now return to the fact that in 3sg:2sg/pl constellations, an inverse form is used in clauses without clitics (49)-a, but a transparent form with default **-k̍** in clauses with clitics. (57) shows the situation in a clitic-less clause. Both, (57-a) with caseless object agreement and the inverse marker and (57-b) with caseless subject agreement and a case-marked object affix realize the same person features, and fare equally well for all other constraints. However, (57-a) realizes one more case feature and hence becomes optimal since it incurs no violation for Parse case (in the following, I omit Parse [3] (Head) for forms without two 3rd-person candidates since it is never violated in these forms):

(57) **3sg:2sg Simple**

	[Nom]/[Acc]	Prs Φ	Coh [3]	Prs cat	Prs cas
☞ a. V **oy**:[Nom 3][Acc] **ʔm**:[2]		**			
b. V **c**:[Acc 2] **ʔ**:[3]		**			*!
c. V **c**:[Acc 2] **k̍**:[ ]	*!	***			*

Domain: **Chain**

In a clause with clitics, Coh [3] (Chain) bans presence of the inverse marker (58-a) since the clitic already realizes [+3], but also the simple agreement marker **ʔ**:[+3]$_{\text{Agr}}$. (58-b) Similarly as with 3sg:1sg forms we get an object marker and default subject agreement (58-c).

(58) **3sg:2sg Clitics**

	[Nom]/ [Acc]	PRS Φ	COH [3]	PRS cat	PRS cas
a. **we**:[3] V **oy**:[Nom 3][Acc] **ʔm**:[2]		**	*!	*	
b. **we**:[3] V **c**:[Acc 2] **ʔ**:[3]		**	*!	*	*
☞ c. **we**:[3] V **c**:[Acc 2] **k̓**:[ ]		**		*	*

Domain: **Chain**

In contrast to 3sg:2 forms, the inverse forms are retained in clauses with clitics for 3pl:2 constellations. Recall also from section 3 that there is a second difference, namely the clitic in these forms crossreferences the object, not the subject:

(59) **Inverse Forms in 3pl:2 Constellations**

a. tmo·l**-oy**-e-**ʔm** 'they shoot you (sg./pl.)' (pg. 47/70)
hear-INV-TH-2

b. **k̓e-**koʔmoy**-oy**-e-**ʔm** 'they hear you (sg./pl.)' (pg. 75)
2-hear-INV-TH-2

For 3pl:2 constellations without clitics, PARSE case again selects the inverse form:

(60) **3pl:2sg Simple**

	[Nom]/ [Acc]	PRS Φ	COH [3]	PRS cat	PRS case
☞ a. V **oy**:[Nom 3][Acc] **ʔm**:[2]		**			
b. V **c**:[Acc 2] **ʔ**:[3]		**			*!
c. V **c**:[Acc 2] **k̓**:[ ]	*!	***			*

Domain: **Chain**

For clauses with clitics the tableau is now essentially the same. Given the preference for the clitic **ne-** and hence object reference by the undominated constraints in the clitic domain, PARSE $[P]^{[Nom]/[Acc]}$ excludes a candidate with **k̓**:$[\ ]_{Agr}$ since this would realize subject person neither by the clitic nor by agreement:

(61) **3pl:2sg Clitics**

	[Nom]/ [Acc]	PRS Φ	COH [2]	PRS cat	PRS case
☞ a. **ke**:[2] V **oy**:[Nom 3][Acc] **ʔm**:[2]		**	*	*	
b. **ke**:[2] V **c**:[Acc 2] **ʔ**:[3]		**	*	*	*!
c. **ke**:[2] V **c**:[Acc 2] **k**:[ ]	*!	***	*	*	*

Domain: **Chain**

Forms with 1pl objects are slightly more complex than 3:2 forms. Recall from section 3 that 1pl is more prominent in Yurok than any other combination of person and number. Now the schema (17) in section 2 besides relativized PARSE constraints for person also licenses corresponding constraints for other features such as the ones in (62):

(62) Relativized PARSE Constraints for Case and Plural

a. PARSE case$^{[1\ pl]/[2\ sg]}$
b. PARSE pl$^{[1\ pl]/[2\ sg]}$

(62-a) requires presence of **oy(og)**:[Nom]$_{Agr}$ [Acc+1]$_{Agr}$ for a 2sg:1pl form since there is no other VI which realizes the case of a 1pl object. (62-b) requires the presence of **h**:[+1 +pl]$_{Agr}$ since there is no other VI realizing plural for a 1pl object. If both constraints are ranked high, the form must contain both markers. Since COH$_{[+Case]}$ and COH$_{[-Case]}$ are crucially undominated, no other additional affixes are possible (63-e):

(63) **2sg:1pl Simple**

	Coh [+CASE]	COH [−Case]	PRS case$^{[1pl]}$	PRS PL$^{[1]}$
☞ a. **oy(og)**:[Nom][Acc 1] **h**:[1 pl]				
b. **oy(og)**:[Nom][Acc 1] **ʔm**:[2]				*!
c. **h**:[1 pl]			*!	
d. **ʔm**:[2]			*!	*
e. **oy(og):**[Nom][Acc 1] **h**:[1 pl] **ʔm**:[2]		*		

Domain: **Head** **Head** **Head** **Head**

Just as in the analysis of clitics for 1pl forms, there is a family of constraints parallel to (62) which require **oy(og)**:[Nom]$_{\text{Agr}}$ [Acc+1] Agr and **h**:[+1 +pl]$_{\text{Agr}}$ for all forms with 1pl objects.

5.2. 3pl-Object Forms

If person neutralization in Yurok is governed by general constraints, we expect that these also hold for other affixes which have basically the same content of morphosyntactic features. This seems to be true for Yurok where the default agreement marker **-k̓** is replaced by the allomorph **-oʔ** in transitive forms with plural objects:

(64) **AGR Allomorphy with plural objects (pg. 75)**

	singular object	**plural object**	
a.	**(ʔ)ne-**koʔmoy-o**-s**-e**-k̓**	**(ʔ)ne-**koʔmoy-o**-sʔ-oʔ**	'I hear
	1-hear-TH-O3S-TH-AGR	1-hear-TH-O3P-AGR	him/them'
b.	**k̓e-**koʔmoy-o**-s**-e**-k̓**	**k̓e-**koʔmoy-o**-sʔ-oʔ**	'you(sg.) hear
	2-hear-TH-O3S-TH-AGR	2-hear-TH-O3P-AGR	him/them'
c.	**ʔu-**koʔmoy-o**-s**-e**-k̓**	**ʔu-**koʔmoy-o**-sʔ-oʔ**	'he hears
	3-hear-TH-O3S-AGR	3-hear-TH-O3P-AGR	him/them'
d.	**(ʔ)ne-**koʔmoy-o**-c**-e**-k̓**	**(ʔ)ne-**koʔmoy-o**-ċ-oʔ**	'I hear
	1-hear-TH-O2S-TH-AGR	1-hear-TH-O2P-TH-AGR	you (sg./pl.)'

Just as **-k̓**, **-oʔ** neutralizes the person contrast in singular forms with clitics. I assume that it is specified by an additional context restriction as in (65) which restricts it to the local context of accusative plural agreement heads:

(65) **oʔ**:[ ]$_{\text{Agr}}$ // [Acc pl]$_{\text{Agr}}$

Context restriction in Distributed Optimality can refer to input structure (marked by "//" as in (65)) or to output VIs. An example for the latter type is also relevant for forms with 3pl objects. Essentially, the 3pl object marker **-sʔ** is only used if subject agreement is achieved by **-oʔ**, but not, if another subject agreement affix appears:

(66) **Distribution of 3pl Object -sʔand Subject Agreement**

	1sg	**2sg**	**3sg**	**1pl**	**2pl**	**3pl**
no clitic	-sʔ-oʔ	$[+2]_{Agr}$	$[+3]_{Agr}$	$[+1+pl]_{Agr}$	$[+2+pl]_{Agr}$	$[+3+pl]_{Agr}$
clitic	-sʔ-oʔ	-sʔ-oʔ	-sʔ-oʔ	$[+1+pl]_{Agr}$	$[+2+pl]_{Agr}$	$[+3+pl]_{Agr}$

Put another way, the appearance of **-sʔ** is parasitic on the appearance of **-oʔ**,[21] which can be captured by the context restriction in its lexical entry formulated in (67):

(67) **sʔ**:$[+\text{Acc} +\text{pl}]_{Agr}$ / **oʔ**:$[\ ]_{Agr}$

Note that the context restriction here refers to the surface form (indicated by the use of "/"), especially to the VI **oʔ**:$[\ ]_{Agr}$. A context restriction referring to the underlying features of the heads realized by **-oʔ** is not possible since these do not form a natural class (the distribution of **-oʔ** is already derived by complex constraint interaction).

Two further notes regarding the formal treatment of context restrictions in DO are at place. *First*, it is assumed that context restrictions are inviolable. In other words, GEN ensures that VIs with context restrictions only appear in contexts where the condition is satisfied. *Second*, specific constraints favor the use of contextually restricted VIs. In derivational frameworks such as DM (Halle & Marantz, 1993) the preference for context-restricted affixes is usually adduced to the Elsewhere Principle since context restrictions make VIs more specific. In a constraint-based approach there must be specific constraints to the same effect. Here I assume that there are two such constraints, I-Context requiring forms with context specifications referring to the input, and O-Context requiring output context restrictions. These constraints are violated by forms containing no VI with a respective context restriction and otherwise unviolated. Since **-oʔ** appears in all environments where its context restriction is met I assume that I-Context is crucially undominated in Yurok. On the other hand, the preference for realizing **-sʔ** does not lead to suppression of more spe-

[21] Note that this statement is not valid in the other direction: **-oʔ** appears in forms without **-sʔ**, namely with the 2pl object marker **-c'**, cf. (64-d). Hence the complex **-sʔ-oʔ** cannot be analyzed as a portmanteau affix realizing subject and object agreement.

cific subject agreement markers in the forms in (68). Hence I take O-Context to be dominated by all other constraints introduced so far. I will briefly illustrate the effect of I-Context with the 2sg:3pl form in (68). Note first that a candidate such as (68-c) is simply not in the candidate set indicated here by the symbol "✝" since **-sʔ** does not appear in the appropriate context and context specifications are assumed to be inviolable preconditions on the use of a VI:

(68) **2sg:3pl Clitics**

	[Nom]/ [Acc]	Prs Φ	Coh [2]	Prs cat	Prs case
☞ a. **k̇e**:[2] V **sʔ**:[Acc 3 pl] **oʔ**:[ ]		*		*	*
b. **k̇e**:[2] V **ʔm**:[2]		**!*	*	**	**
✝ c. **k̇e**:[2] V **sʔ**:[Acc 3 pl] **ʔm**:[2]					

Domain: **Chain**

I-Context blocks the use of **-k̇** by assigning one constraint violation to a candidate without an input constraint restriction, and no violation to a candidate containing such a restriction, while the candidates are otherwise identical:

(69) **2sg:3pl Clitics**

	[Nom]/ [Acc]	I Con	Coh [3]	...
☞ a. **k̇e**:[2] V **sʔ**:[Acc 3 pl] **oʔ**:[ ]//[Acc pl]				
b. **k̇e**:[2] V **sʔ**:[Acc 3 pl] **k̇**:[ ]		*!		

Domain: **Chain**

In the corresponding clause without clitics, 2nd person **-ʔm** is used instead of **-oʔ** (70-a) since there is no other way to satisfy Parse$^{[+\text{Nom}]/[+\text{Acc}]}$. As a consequence, **-sʔ** cannot be used either since it is only possible in the context of **-oʔ**. Thus we get a form which is identical to a 2sg intransitive form:

(70) **2sg:3pl Simple**

	[Nom]/ [Acc]	I Con	Prs Φ	Coh [3]	Prs cat	Prs case
☞ a. V **sʔ**:[Acc 3 pl] **oʔ**:[ ]	*!		**			*
b. V **ʔm**:[2]		*	***		*	**
✝ c. V **sʔ**:[Acc 3 pl] **ʔm**:[2]						

Domain: **Chain**

5.3. 1sg-Object Forms

Forms with 1sg objects fail to exhibit the replacement of 2sg and 3sg subject markers by default agreement shown by forms with 2sg or 3sg objects (pg. 47/72/75):

(71) **1sg/2sg/3sg-Object Forms**

	Simple Forms	**Forms with Clitics**	
3sg: **2sg**	tmo·l-**oy**-e-**ʔm** shoot-INV-TH-2	**ʔu-**koʔmoy-o-**c**-e-**k̍** 3-hear-TH-O2-TH-AGR	‘(s)he shoots/hears ‘you (sg.)’
3sg: **1sg**	koʔmoy-o-**p-eʔn** hear-TH-O1-3	**(ʔ)we-**tmo·l-o-**p-eʔn** 3-shoot-TH-O1-3 **(ʔ)ne-**tmo·l-o-**p-ic** 1-shoot-TH-1-S3	‘(s)he’ hears me’ ‘(s)he’ shoots me’
2sg: **3sg**	koʔmoy-o-**s-e-ʔm** hear-TH-O3-TH-2	**k̍e-**koʔmoy-o-**s-e-k̍** 2-hear-TH-O3-TH-AGR	‘you (sg.) hear him/her’
2sg: **1sg**	koʔmoy-o-**p-aʔ** hear-TH-O1-2	**k̍e-**tmo·l-o-**p-ah** 2-shoot-TH-O1-2 **(ʔ)ne-**tmo·l-o-**p-ah** 1-shoot-TH-O1-2	‘you (sg.) hear me’ ‘you (sg.) shoot me’

This failure corresponds to another special property of these forms: the affixes for 2sg and 3sg subjects used here do not appear in other verbal paradigms in Yurok. Thus 2sg subjects are expressed by **-ʔm**, not **-ah** or **-aʔ** in intransitive and 2:3 forms, and 3sg is expressed by **-ʔ** in intransitive and 3sg:3 forms, not by **-eʔn** or **-ic**. In other words, the affixes not replaced by **-k̍** in clitic forms only occur in just these contexts. My analysis of these facts is based on the intuition that restricted affixes have more specific lexical entries, and are favored over less specific markers in appropriate contexts. The constraints which effect this pref-

erence also ensure that the constraints requiring appearance of **-k̓** in clitic forms are overridden. I will illustrate this with the 3sg:1sg forms with **-eʔn**. I assume that **-eʔn** has the vocabulary entry in (72):

(72) **eʔn**:[+3]$_{\text{Agr}}$ // [Acc +1 –pl]$_{\text{Agr}}$

The context restriction [Acc +1 sg]$_{\text{Agr}}$ which allows **-eʔn** only in the context of an appropriate feature structure refers again to the underlying feature structures, not to the actual VIs. Since a 1st person marker occurs with an accusative 1sg head only in 3sg:1sg forms,[22] **-eʔn** can only appear in this part of the paradigm. As we have seen in section 5.2, the fact that affixes with context restrictions referring to the input are favored over those without is the effect of the constraint I-Con, ranked above all other relevant constraints. In simple forms this leads to choice of **-eʔn** over **-ʔ**, which would otherwise become optimal:

(73) **3sg:1sg Simple**

	[Nom]/ [Acc]	I Con	Prs Φ	Coh [3]
☞ a. V **p**:[Acc 1] **eʔn**:[3]//[Acc 1 –pl]			**	
b. V **p**:[Acc 1] **ʔ**:[3]		*!	**	
c. V **p**:[Acc 1] **k̓**:[ ]	*!	*	***	

Domain: **Chain**

Similarly, in a clause with clitics, Coh [3] and Parse are irrelevant since I-Con still favors the marker with a context restriction.

(74) **3sg:1sg Clitics**

	[Nom]/ [Acc]	I Con	Prs Φ	Coh [3]
☞ a. **we**:[3] V **p**:[Acc 1] eʔ**n**:[3]//[Acc 1–pl]			**	*
b. **we**:[3] V **p**:[Acc 1] **ʔ**:[3]		*!	**	*
c. **we**:[3] V **p**:[Acc 1] **k̓**:[ ]		*!	**	

Domain: **Chain**

[22] The only other case are 3pl:1sg forms. But for these there is another specific marker **-a·l**, which replaces **-eʔn**.

6. Other Languages Constraining Clitic-Agreement Doubling

Clitic-Agreement Doubling is attested in a number of languages (e.g. dialects of Bavarian and Northern Italian), as are restrictions against the cooccurrence of clitics and agreement (e.g. Selayarese, Yimas, cf. Woolford, 2003). The systems most similar to the one of Yurok can be found in Algonquian languages. Thus, Trommer (2006) shows that in Menominee (Bloomfield, 1962) CAD is in principle possible. For example, in (75-a), the feature 1st person is realized by the clitic **ne-**, but also the 1pl suffix **-enaw**. In (75-b) the feature 2nd person ([+2]) is realized by the clitic, and the inverse marker **-enen**ϵ (page numbers refer to Bloomfield, 1962):

(75) **Clitic-Agreement Doubling in Menominee**

a. **ne-**po·se**-m-enaw** 'we (excl.) embark' (pg. 148)
1-embark-[–3]-1PL

b. **ke-**na·tom**-enen**ϵ**-m-uaw** 'I call you (pl.)' (pg. 157)
2-call-[+Nom]:[+Acc+2]-[–3]-1PL

As with similar facts in Yurok, these data suggest that spellout constraints apply independently to the two head domains constituted by the clitic complex and the verb-agreement complex. On the other hand, there are also data supporting constraints on the spellout of whole chains. *First*, person features left unexpressed by inverse marking in the so-called independent order, where they are already expressed by pronominal clitic (76), must to expressed by specific markers in the conjunct order where clitics are generally suppressed (77):[23]

[23] "Independent" and "conjunct order" is the standard terminology in the linguistic literature on Algonquian. Independent order forms are roughly used in main clauses and conjunct order forms in subordinate clauses. This corresponds to Yurok, where subordination and presence of clitics are also related.

(76) **Independent Order Forms**

a. **ne-**na·n**-eko-w** 'he fetches me' (pg. 154)
1-fetch-[+Nom]:[+Acc+an]-[+3]

b. **ke-**na·n**-eko-w** 'he fetches you (sg.)' (pg. 154)
2-fetch-[+Nom]:[+Acc+an]-[+3]

(77) **Conjunct Order Forms**

a. na·tom**-enenɛ-k** 'when he calls you (sg.)' (pg. 183)
call-[+Nom]:[+Acc+2]-[+per]

b. nɛ·w**-e-t** 'when he sees me' (pg. 181)
see-[+Nom]:[+Acc+1]-[+3]

Second, Menominee has a constraint that only one third person marker is possible in a given verb form. Thus, the suffix **-w** marks the 3rd person subject in (78-a,b) but a 3rd person object in (78-c). However, if both arguments of a transitive verb are 3rd person only one **-w** appears:

(78) **Distribution of 3rd Person -w**

a. po·se**-w** 'he embarks' (pg. 148)
embark-[+3]

b. **ne-**na·n**-eko-w** 'he fetches me' (pg. 154)
1-fetch-[+Nom]:[+Acc+an]-[+3]

c. **ne-**na·n**-a·-w** 'I fetch him' (pg. 152)
2-fetch-[+Nom+an]:[+Acc]-[+3]

d. na·n**-ɛ·-w** 'he fetches him' (pg. 152)
fetch-[+Nom+an]:[+Acc]-[+3]

This constraint also extends to the chain level thus there are forms where a 3rd person clitic is obligatory, but in these cases 3rd person suffixes are impossible (clitics and agreement affixes are also used to express nominal possession as in (79-a)).

(79) **3rd-Person Clitics**

a. **o-**hka·t ‘his leg’ (pg. 100)
3-leg

b. **o-**po·se**-n-an** ‘he doesn’t embark’ (pg. 168)
3-embark-PER-NEG

In (79-b) there is a default marker **-n** occupying the position of the 3rd person marker which seems to correspond roughly to the default suffix **-k̓** in Yurok. Finally, Menominee also has a marker for non-third person which occurs with 1st and 2nd person arguments, hence specifies [–3]:

(80) **Distribution of [–3] -m**

a. **ne-**po·se**-m** ‘I embark’ (pg. 148)
1-embark-[–3]

b. **ke-**po·se**-m** ‘you (sg.) embark’ (pg. 148)
2-embark-[–3]

c. **ke-**na·tom**-enenϵ-m-enaw** ‘we call you (sg./pl.)’ (pg. 157)
2-call-[+Nom]:[+Acc+2]-[+3]-1pl

d. **ke-**nϵ·w**-e-m** ‘you (sg.) see me’ (pg. 156)
2-see-[+Nom]:[+Acc+1]-[–3]

As might be expected, **-m** and **-w** cannot cooccur. If one of the arguments is 3rd and the other non-third, only **-w** appears:

(81) **Non-Cooccurrence of -w and -m**

a. **ne-**na·n**-eko-w** ‘he fetches me’ (pg. 154)
1-fetch-[+Nom]:[+Acc+an]-[+3]

b. **ne-**na·n-a·**-w** ‘I fetch him’ (pg. 152)
2-fetch-[+Nom+an]:[+Acc]-[+3]

What these data show is that Menominee shares with Yurok the property that Clitic-Agreement Doubling is in principle possible, but is restricted by very specific constraints. Moreover, apart from differences such as the absence of [–3] markers in Yurok, both languages share one substantial constraint, namely the ban on more than one 3rd person marker, implemented in this paper by the constraint COHERENCE [3]. Future research has to show how widespread these phenomena are in

Algic and more generally crosslinguistically. However, the Menominee data make it clear that they are not an idiosyncratic property of Yurok.

7. The Analysis of Blevins (2004)

The only other formal treatment of Yurok CAD I am aware of is Blevins (2004). I will show here that her analysis is problematic in several respects. Blevins assumes that pronominal clitics in Yurok are actually agreement prefixes and that the suppression of agreement markers in the context of clitics expressing the same features is due to the two rules of referral in (82) and (83):

(82) **Rule of Referral for Intransitive Verb Forms:**
In unipersonal[24] pronominal prefix singular (subject) forms, the base of prefixation has the same form as the unipersonal indicative first person singular (subject). (Blevins, 2004:15)

(83) **Rule of Referral for Transitive Verb Forms:**
In bipersonal pronominal prefix singular subject forms, the base of prefixation has the same form as the corresponding bipersonal indicative first person singular subject form . (Blevins, 2004:16)

Even though (82) and (83) could obviously be collapsed into a single rule, Blevins prefers to avoid this step since she assume that historically Yurok only had the rule in (83) and only in a later stage extended the process to transitive forms by adding the rule for transitive forms to the grammar.

While Blevins' analysis allows a concise statement of the facts it is problematic in a number of ways. *First*, rules of referral (Zwicky, 1985; Stump, 1993) are a highly problematic formal device which allows to relate any word form to any other form of its paradigm. Since rules of this type are linguistically unrestrictive and computationally com-

[24]Following Robins (1958), Blevins calls intransitive verb forms unipersonal, and transitive verb forms bipersonal.

plex,[25] they have been rejected by proponents of lexicalist (Wunderlich, 1995) and syntactic (Bobaljik, 2002) approaches to morphology alike. Blevins argues that "syncretism within the Yurok bipersonal paradigm stands as a serious challenge to any model of morphology which fails to incorporate rules of referral." (Blevins, 2004:16). However, the analysis in the preceding sections shows that a theoretically sound analysis of these data without such rules is possible.

Second, Blevins' assumption that pronominal clitics in Yurok form morphosyntactic words with the verb and the agreement suffixes (and hence that the clitics are actually prefixes) does not account for the fact that they can be separated from the verb by other syntactic material. Blevins acknowledges this problem, but does not provide any solution for it (pg. 9).

Third, the rules in (81) and (82) do not allow to connect the involved processes to the fact that they reduce redundancy in the agreement-clitic complex. Blevins admits that the motivation for these processes is the thrive to relate morphological features and exponent morphemes in a one-by-one fashion, but locates this motivation in the language-acquisition device, not in the grammar itself. Rules of referral are also incapable to relate the avoidance of 3sg suffixes in the context of a 3rd person clitic to other phenomena such as the suppression of 3rd person object marking in 3:3 forms or the 3rd-person restrictions in Menominee. Unlike in the OT-account for these phenomena, completely different and unrelated morphological rules would be necessary.

Note finally that Blevins' article is on the one hand more ambitious than the present paper, and on the other more restricted. While the analysis presented here presents most of the constraint inventory necessary for a complete formal analysis of Yurok verb inflection, Blevins provides hardly more morphological rules than the ones in (81) and (82). At the same time, Blevins discusses historical aspects of Yurok inflection, not covered in this paper, especially the assumption that neutralization of agreement suffixes first emerged in intransitive forms and then spread to the transitive paradigm. However, it remains unclear whether there is any evidence for the historical development she sketches apart from the synchronic data and the assumption that neutralization in the

[25] Rules of referral are in a sense similar to the unrestricted transformations of early generative grammar: They allow to express virtually any interesting generalization, but they also allow to express anything else.

transitive forms is in principle unmotivated, and can therefore only be explained by an extension of the intransitive paradigm. But if the analysis proposed here is on the right track, neutralization in both, transitive and intransitive forms follows from general principles on spellout, and does not imply anything on the historical development.

8. Summary

In this paper, I have provided an optimality-theoretic analysis of Clitic-Agreement Doubling in Yurok. It turns out that intricate aspects of CAD follow from the ranking of general constraints on spellout and the assumption that these constraints can be ranked differently for different syntactically defined spellout domains. This analysis also allows to formulate close structural similarities between the inflectional systems of Yurok and Algonquian languages (especially Menominee) which is not possible in a rule-based account such as Blevins (2004).

References

Blevins, J. (2001). The morphological status of Yurok pronominal prefixes. Ms., University of California, Berkeley.

Blevins, J. (2004). Periphrastic agreement in Yurok. In Ackerman, F., Blevins, J. P., and Stump, G. T., editors, *Paradigms and Periphrasis*. Stanford: CSLI Publications. To appear.

Bloomfield, L. (1962). *The Menomini Language*. New Haven: Yale University Press.

Bobaljik, J. D. (2002). Syncretism without paradigms: Remarks on Williams 1981, 1994. *Yearbook of Morphology 2001*, pages 53–85.

Dechaine, R.-M. (1999). What Algonquian morphology is really like: Hockett revisited. In Bar-el, L., Dechaine, R.-M., and Reinholtz, C., editors, *Papers from the Workshop on Structure and Constituency in Native American Languages (WSCLA 1)*, MITOPL 17 (MIT Occasional Papers in Linguistics):.

Grimshaw, J. (1997). The best clitic: Constraint conflict in morphosyntax. In Haegeman, L., editor, *Elements of Grammar: A Handbook in Contemporary Syntactic Theory*, pages 169–196. Dordrecht: Kluwer.

Grimshaw, J. (2001). Optimal clitic positions and the lexicon in Romance clitic systems. In Legendre, G., Grimshaw, J., and Vikner, S., editors, *Optimality-Theoretic Syntax*, pages 205–240. Cambridge MA: MIT Press.

Halle, M. and Marantz, A. (1993). Distributed Morphology and the pieces of inflection. In Hale, K. and Keyser, S. J., editors, *The View from Building 20*, pages 111–176. Cambridge MA: MIT Press.

McCarthy, J. and Prince, A. (1993). Generalized alignment. *Yearbook of Morphology*, pages 79–153.

McCarthy, J. and Prince, A. (1994). The emergence of the unmarked: Optimality in prosodic morphology. In *NELS 24*, pages 333–379. Amherst.

Noyer, R. R. (1993). Optimal words: towards a declarative theory of word formation. Ms. Princeton University, available under: http://www.ling.upenn.edu/~rnoyer/papers.html.

Prince, A. and Smolensky, P. (1993). Optimality theory: Constraint interaction in generative grammar. Technical reports of the Rutgers University Center of Cognitive Science.

Robins, R. H. (1958). *The Yurok Language*. Berkeley: University of California Press.

Stump, G. T. (1993). On rules of referral. *Language*, 69:449–479.

Trommer, J. (2003a). Direction marking as agreement. In Junghanns, U. and Szucsich, L., editors, *Syntactic Structures and Morphological Information*, pages 317–341. Berlin and New York: Mouton de Gruyter.

Trommer, J. (2003b). *Distributed Optimality*. PhD thesis, University of Potsdam.

Trommer, J. (2003c). Feature (non-)insertion in a minimalist approach to spellout. In *Proceedings of CLS 39*, pages 469–480.

Trommer, J. (2003d). The interaction of morphology and syntax in affix order. In *Yearbook of Morphology 2002*, pages 283–324. Dordrecht: Kluwer.

Trommer, J. (2006). Head-level and chain-level constraints on spellout. In Costa, J. and Silva, M. C. F., editors, *Studies on Agreement*, pages 261–281. Amsterdam: John Benjamins.

Trommer, J. (2008). Coherence in affix order. *Zeitschrift für Sprachwissenschaft*. In press.

Woolford, E. (2003). Clitics and agreement in competition: Ergative cross-referencing patterns. In Carpenter, A. C., Coetzee, A. W., and de Lacy, P., editors, *Papers in Optimality Theory II*, volume 26 of *University of Massachusetts Occasional Papers*. Amherst: GLSA.

Wunderlich, D. (1995). Minimalist morphology: the role of paradigms. In Booij, G. and van Marle, J., editors, *Yearbook of Morphology 1995*, pages 93–114. Dordrecht: Kluwer.

Zwicky, A. M. (1985). How to describe inflection. In *BLS*, volume 11, pages 372–386.

Case and Markedness in Tlapanec

Andreas Opitz*

Abstract
This paper provides an analysis of the typologically unusual patterns of case assignment in Tlapanec. The theoretical approach relies on a sub-analysis of the markers and on postulating an interaction of markedness constraints. These constraints are implemented in a more general concept of grammar in which morphology applies after syntax, as is the case in Distributed Morphology. According to this theory the output of syntax can be impoverished before the lexical insertion of concrete vocabulary items takes place. The framework of DM is slightly modified in the account proposed here, insofar as the step of impoverishment of morpho-syntactic features is designed as an optimality theoretic competition of possible output candidates. I will show that all of the constraints that are crucial for this competition emerge from independently established prominence scales by a modified version of harmonic alignment. Thereby the process of impoverishment is given a typologically/conceptually more plausible base.

1. Introduction

The typological literature describes Tlapanec, a member of the Subtiaba-Tlapanec family spoken in Mexico, as a language that exhibits some uncommon behavior regarding the assigning of case to verbal arguments (see Wichmann (2005, 2007)). Tlapanec is a head-marking language; its verbs agree with their arguments according to number, person, and case. The typologically unusual aspects of this agreement,

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as stated by Wichmann (2005), are: a zero-marked ergative, a marked absolutive, a novel case 'pegative' (that encodes the external argument of a less affecting action, the 'source' or 'stimulus'), and a split ergative marking for at least one very specific configuration (i.e., an animate 3rd person singular object of a less affecting action).

The analysis in this paper tries to cover these facts completely by a sub-analysis of the markers and by postulating an interaction of markedness constraints. These constraints are implemented in a more general concept of grammar in which morphology applies after syntax, as is the case in Distributed Morphology (DM, see Halle and Marantz (1993)). According to this theory the output of syntax can be impoverished before the lexical insertion of concrete vocabulary items takes place. The framework of DM is slightly modified in the account proposed here, insofar as the step of impoverishment of morpho-syntactic features is designed as an optimality theoretic competition of possible output candidates (Prince and Smolensky (1993)). In some aspects, the proposals of this paper are thus in line with the framework of Minimalist Morphology (Wunderlich (1997, 2004)). I will show that all of the constraints that are crucial for this competition emerge from independently established prominence scales by a modified version of harmonic alignment. Thereby the process of impoverishment is given a typologically/conceptually more plausible base.

Moreover, it can be stated that the typological oddities of Tlapanec case marking emerge from a more general observation that (at least some) languages tend to use more marked constructions to mark deviations from the norm (Aissen (1999), Stiebels (2002), Trommer (2006)).

This paper is structured as follows: In the next section, a brief overview of the typological profile of Tlapanec and the observed patterns of case assignment is given. In section 3, the theoretical framework for the analysis is established in more detail. In the fourth section, the concrete data of Tlapanec are applied to the theoretical machinery established before. Section 5 contains a short summary of the paper.

2. Case Assignment in Tlapanec – The Data

This section gives a brief outline of the typological profile of Tlapanec and the observed patterns of case assignment. As Wichmann (1996a; 1996b; 2005; 2007) has observed in his extensive work on Tlapanec,

some features of its case assignment can be described as rare from a typological perspective.

Tlapanec is a head-marking language. This means that the verb agrees with (some of) its complements in person, number, and case.[1] All three of these features are marked by verbal suffixes with portmanteau behavior: In traditional analyses, case, person, and number are expressed by a single morpheme.

Animacy is an important factor for the realization of arguments in Tlapanec. Arguments encoded on the verb always have to be animate: inanimate entities are never morphologically encoded. Thus, in addition to a distinction of transitivity vs. intransitivity of verbs, a more important distinction is made regarding the number of animate arguments. Verbs can be grouped according to whether the predicate takes:

- *no animate argument*
  one inanimate argument (I) (no case marking at all)
- *one animate argument*
  'mono-personals': one animate argument (A), or one animate and one inanimate argument (AI)
- *two animate arguments*
  'di-personals': two animate arguments (AA), or two animate arguments and one inanimate argument (AAI)
- *three animate arguments*
  'tri-personals': (AAA)[2]

In addition, the morphological case marking that takes place via suffixation allows for only one case marking suffix on the verb at a time. Thus, the number of arguments case-marked on the verb is limited to one. The complex algorithm that decides which of the (animate) arguments is represented by a certain suffix involves different factors.

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[1] As Wichmann notes, the feature 'person' is also expressed by other processes of the grammar as well. Among these are tonal alternations and – in certain contexts – additional prefixation. Thus, in Tlapanec a multiple exponence of features can be observed. (For the problem of primary and secondary exponence of features see e.g. Noyer (1992)).

[2] Tri-personal (AAA) verbs are derived from the di-personals (by adding a suffix *-i* indicating the presence in the argument structure of an animate theme) and are therefore not considered in further detail in this analysis.

Besides animacy and the factor of grammatical relation (external argument, i.e. 'subject', vs. internal argument, i.e. 'object'), Tlapanec crucially distinguishes between highly and lowly affecting actions. This distinction in turn is reflected in both the morpho-phonological form of the (case-)marker and in the distribution of markers in certain syntactic contexts.

Tlapanec is generally classified as showing ergative alignment, i.e., the sole (animate) argument of intransitive (monopersonal) verbs exhibits the same marker as the internal argument (object) of transitive (dipersonal) verbs as the following examples[3] illustrate:

(1) *intransitives: one A-argument, subject marked with Abs*

a. dask-á
smell.bad-3ABS
'S/he smells bad'

(2) *transitives: one A-argument, subject marked with Erg*

a. na-ndrehm-é iyaʔ
IPFV-sprinkle-3G.ERG$_i$ water
'S/he$_i$ is sprinkling water'

(3) *(di)transitives: two A-arguments, object marked with Abs*

a. na-ndrihm-á iyaʔ
IPFV-sprinkle-3G>3ABS$_i$ water
'S/he is sprinkling water on her/him$_i$'

This ergative case alignment interacts with the factor 'degree of affectedness'. Thus a cross-classification of 'grammatical relation' and 'affectedness' leads to four distinct morpho-phonological instantiations of case markers, including the novel 'pegative' case[4]. This interaction of factors is sketched in table 1. Turning now to the question of which argument of a verb is represented by a certain suffix attached to the stem, all of the three factors mentioned above have to be considered

[3]The notion 'G' in the glossing of the examples stands for 'given' and refers to a discourse-pragmatically known entity.

[4]The label 'pegative' for the external argument of less affecting verbs is suggested by Wichmann (2005: 135):"I have based the term 'Pegative' on the Greek *πηγή*, which means 'origin, source, emanation, etc.', to provide a name for a case that proto-typically refers to a giver as opposed to a recipient."

affectedness	grammatical relation: external argument	grammatical relation: internal argument
high	Ergative	Absolutive
low	Pegative	Dative

Table 1. interaction of grammatical relation and degree of affectedness

again: animacy, grammatical relation, and degree of affectedness. As stated earlier, only animate arguments qualify for agreement and case marking on the verb. Thus, in mono-personal verbs the sole animate argument is coded via suffixation, regardless of whether it is an internal or external argument. This is illustrated in examples (4) – (7).

(4) na-iyaʔdí
impf-sow.3ERG$_i$
'S/he$_i$ is sowing it'

(5) dask-á
smell.bad-3ABS
'S/he smells bad'

(6) na-kàš-ú
impf-skinning-3PEG$_i$
'S/he$_i$ is skinning it'

(7) bamš-ó
be.nude-3DAT
'S/he is nude'

If there is more than one animate participant, the arguments are in competition for the single possible inflectional position. Normally it is always the internal argument that triggers agreement and case marking:

(8) *default marking of di-personals:*

na-ndrihm-á iyaʔ
IPFV-sprinkle-3ABS$_i$ water

'S/he is sprinkling water on her/him$_i$'

This generalization is violated in at least one special configuration: If the internal argument (the object) of *a less affecting action* is *third person singular animate*, then it is the external argument (the subject) that is marked instead (with the pegative case):

(9) *marking in special configuration:*

a. na-ndrìhm-ú iyaʔ in-ŭ šabù
IPFV-sprinkle-3PEG$_i$ water face-3N.DAT man
'S/he$_i$ is sprinkling water on the face of the man'[5]

The difference between examples (8) and (9) is that while in example (8) there is a highly affecting action involving the whole man and triggering an absolutive marking of the object, the action in example (9) is less (in this case 'partly') affecting, leading to agreement with and case marking of the subject (with pegative case).

Thus, the algorithm accounting for the distribution of case/agreement markers on Tlapanec verbs can be summarized as follows:

(10) General rules of case assignment in Tlapanec:

- case is assigned only to animate arguments
- maximally one argument is marked with case
- the (animate) object is marked
- marking is sensitive to the degree of affectedness
- if the object is 3rd person singular, animate and the verb is lowly affecting, then the subject is marked

These fundamental typological facts of case alignment in Tlapanec are accompanied by another remarkable observation regarding the actual instantiation of (the inventory of) markers: markers representing ergative case are always zero-markers, whereas on the other hand, markers standing for absolutive case display the phonologically richest forms within the set of case markers. This contrasts with the more general typological observation that in absolutive-ergative systems, the ergative forms tend to be morphologically marked, and the absolutive forms tend to be less marked or unmarked. The full paradigm of case markers in Tlapanec is given in table 2 (see Wichmann (2007)). As the distribution of markers in table 2 shows, the ergative markers stand in sharp contrast to all other case markers, because ergative is never expressed overtly.

[5]Dative-marking here does not signal a relation between 'face' and the predicate 'to sprinkle', but rather the relation between the possessed item, 'face', and the possessor, 'man'. The verbal argument is the entire noun phrase 'the man's face', see Wichmann (2007).

		Ergative	Absolutive	Pegative	Dative
sg	1	-ø	-ũʔ	-u /[a] -o	-uʔ / -oʔ
	2	-ø	-ĩʔ / -ãʔ	-a / -i	-aʔ
	3N[b]	-ø	-i / -a	-u / -o	-u / -o
pl	1	-ø	-ãʔ	-a / -i	-aʔ
	2	-ø	-ãʔ	-a / -i	-aʔ
	3N	-ø	- ĩ	-a / -i	-ũ

[a]The slash symbol '/' here indicates a phonologically driven alternation.

[b]N here stands for 'new' (versus G for 'given', see footnote 3 above). The G form is derived from the N form by tonal affixation and, for verbs subcategorizing for ergative, additionally by a suffix -*i* which merges with the stem vowel.

Table 2. case markers in Tlapanec

This leads to a first hypothesis according to which the ergative marker might be actually deleted on the morpho-phonological surface. On the other hand, the system shows various instances of syncretisms. Identity of forms can be observed both within different instances of one case (intra-paradigmatic, e.g. '*a/i*' in the pegative case for 2nd singular and 1st, 2nd, 3rd plural) and between different cases (inter-paradigmatic, e.g. '*u/o*' for 3rd singular in pegative and dative). Moreover, a closer look at the paradigm reveals partial syncretisms, as the forms of some markers seem to be derived from other markers. The '*aʔ*' of dative forms for instance leads to a corresponding absolutive form by nasalization of the vowel. This observation in particular, and the subsequent demand for further sub-analysis of the markers will be focused on in detail in the later sections of this paper.

So far, the striking facts of the case marking system in Tlapanec can be summarized as follows:

(11)
- zero-marked ergative
- (highly) marked absolutive
- a novel case 'pegative'
- several instances of (partial) syncretism between markers
- a split marking in a specific, multifactorial configuration (subject marking instead of object marking in the context of animate, 3rd person singular objects of less affecting verbs)

The analysis in the following sections aims to explain all of these facts. As will be shown, the explanation will crucially rely on two factors: i) a sub-analysis of the case markers, and ii) typologically attested markedness restrictions and a certain strategy of the language that demands for marked configurations to be morphologically marked (Aissen (1999)).

3. Theoretical background

In this section I will introduce the theoretical background of the analysis proposed in this paper. In order to account for all of the data sketched in section 2, I will basically rely on the framework of Distributed Morphology (DM, see Halle and Marantz (1993); Noyer (1992), among many others). This theory assumes a model of grammar in which morphology takes place after syntax and thus conceives of inflection as a late, post-syntactic process. The output of syntax provides abstract, functional morphemes consisting of completely specified morpho-syntactic features, but still lacking any phonological realization. Inflectional markers, on the other hand, are assumed to be vocabulary items that pair morpho-syntactic and phonological features. In a late, post-syntactic operation, these markers are inserted into functional morphemes. This insertion is mainly driven by the Subset Principle (Halle (1997); Noyer (1992); Wiese (1999); Müller (2006)):

(12) Subset Principle
A vocabulary item *V* is inserted into a functional morpheme *M* iff:
a. The morpho-syntactic features of *V* are a subset of the morpho-syntactic features of *M*.
b. *V* is the most specific vocabulary item that satisfies (12-a).

This definition permits underspecified markers to be inserted in certain contexts. Vocabulary items whose features constitute a subset of each other are in competition for insertion. The vocabulary item whose features most specifically match the features of the abstract morpheme will be inserted. Thus, a vocabulary item may be inserted which is not specified for *all* features of the context. This possibility of underspecified vocabulary items gives rise to syncretisms.

A rather central assumption of Distributed Morphology is essential to make this theory capable of explaining systematic patterns of case marking in Tlapanec such as the distribution and the syncretisms of

markers as well as alignment patterns: Morpho-syntactic features of abstract morphemes can be altered post-syntactically. There are two operations of this kind that are crucial for an adequate analysis of case marking in Tlapanec. The first important operation is post-syntactic *impoverishment*, by means of which features are deleted before vocabulary insertion takes place. As I will show, this operation is crucially involved in the morphological marking of case in Tlapanec – although I assume a rather different approach to the nature and motivation of this operation (see below).

Traditionally impoverishment is implemented in the model of DM by specific rules (Halle and Marantz (1993)) like the one in (13):

(13) $[\alpha] \rightarrow \emptyset$ (/__ $[\beta]$): 'The morpho-syntactic feature $[\alpha]$ is deleted (in the context of $[\beta]$)'

In order to account for a sub-analysis of (some of) the markers in Tlapanec a second operation will be needed that splits up an abstract morpheme and makes some features accessible to the insertion of vocabulary items, but leaves other features of the morpheme unaffected and thus available for further vocabulary insertion. This operation is called *fission* and goes back to Noyer (1992) (at least in the sense proposed here, but see Halle and Marantz (1993) for another view). Fission can be formalized as follows (see Müller (2006)):

(14) Fission

a. A morpheme M with the features α is fissioned by insertion of a vocabulary item V bearing the features β into two separate bundles of features: β and $(\alpha - \beta)$, so that:

b. (i) $(\alpha - \beta)$ is available for further insertion according to the subset principle.

(ii) β is not available for further insertion.

Rules like (13) and (14) are just examples of a variety of different rules in the framework of Distributed Morphology as presented by Halle and Marantz (1993).

However, the notion of impoverishment as a descriptive rule fails to explain the functional *motivation* of the *distribution* of the markers, in particular the non-appearance of an ergative marker and the alternation of subject marking versus object marking in certain configurations. In order to give a more functionally motivated account for these phenomena, a different kind of impoverishment has to be proposed. However,

this operation has to share the locus of its application with the traditionally stated rules: it deals with fully specified morpho-syntactic contexts and therefore operates after syntax, but additionally it has to take place before any lexical insertion. In the derivational process, this impoverishment has to apply right on the interface between syntax and morphology. In contrast to a rule-based account of impoverishment, I argue for a process that is modeled within the framework of optimality theory (OT, see for instance Prince and Smolensky (1993), Smolensky (1995)) as is proposed also in Minimalist Morphology (see Wunderlich (1997, 2004)). The decision for implementing an optimality-theoretic competition is grounded particularly in conceptual reasons: All of the crucial constraints that are responsible for delivering the correct output emerge from typologically attested principles. In section 4 I will show that it is prominence scales and their harmonic alignment which yield appropriate constraints. This is in contrast to an analysis in which impoverishment is carried out by rules of a purely descriptive nature. Nothing inherent to an impoverishment rule as in (13) helps to explain *why* a certain feature (configuration) is to be deleted. On the other hand, a concept of impoverishment by constraints that emerge from conceptual factors of language, such as prominence scales, is much more satisfactory from an explanatory perspective of grammar.

The proposed theoretical background for the derivation of patterns and concrete morpho-phonological instantiations of case markers in Tlapanec can be summarized as follows:

1. All syntactic operations are carried out, dealing with fully specified morpho-syntactic features.

2. The output of syntax is then sent to an operation deleting certain (bundles of) features. (This deletion is modelled as an OT competition relying on typologically/conceptually motivated markedness constraints.)

3. Vocabulary insertion takes place as assumed in DM.

4. Case Assignment in Tlapanec – The Analysis

According to the observations about Tlapanec case marking, as presented in section 2, and based on the theoretical background established in section 3, I will postulate the following hypotheses:

(15) Hypotheses:

a. There are only two functionally distinct cases, which each split into two different instances because of the factor of affectedness: Pegative, in fact, is the same as ergative but with the feature 'lowly affecting' (or without the feature 'highly affecting'); dative is absolutive with the feature 'lowly affecting' respectively.

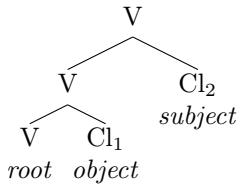
b. The main function of the two cases is to mark external arguments ('subject') on the one hand and internal arguments ('object') on the other.

c. The missing marker for the actor of highly affecting verbs ('zero-ergative marking') can be explained by a competition of markedness constraints. (Smolensky (1995); Aissen (1999, 2003))

d. The morpho-phonologically more complex markers of the absolutive, normally the unmarked case, result from an additional coding of markedness, namely 'animate object' and 'highly affecting' (sub-analysis).

As introduced in section 3, I assume that the output of syntax consists of fully specified morpho-syntactic structures. For case marking in Tlapanec, this means that the structure contains (clitic) heads for all arguments, as roughly sketched in (16) [6]:

(16) output of syntax: Example for transitive configuration

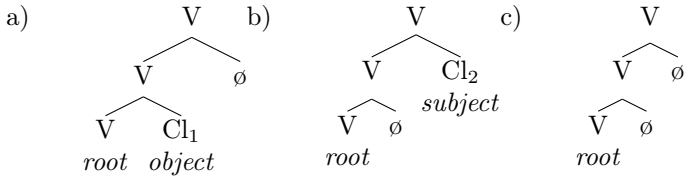


[6]For the analysis proposed in this paper it is not crucially important how such a structure as in (16) is derived. This may for example either be achieved by assuming clitic heads and head movement of the arguments (see Sportiche, 1996), or, alternatively, by AgrO and AgrS heads that the verb moves to (see Chomsky, 1995). What is important is that syntax provides a structure with two feature bundles or 'slots' for agreement adjacent to the verb: one corresponding to features of the subject and one to features of the object.

4.1. Post-syntactic Impoverishment

In the next step of the derivation, an operation is assumed that deletes some of these feature bundles, leading to either an object marking, subject marking, or zero marking, as (17) demonstrates:

(17) possible outputs[7] of post-syntactic impoverishment of transitive configurations:



According to the hypothesis in (15-c), the output of this impoverishment as sketched in (17)c corresponds to a configuration which is traditionally labeled as 'ergative' marking. Whenever the mechanism of impoverishment leads to deletion of both of the cl-heads, the morpho-phonological surface should mirror this deletion by lacking any overt marker.

As mentioned earlier, this impoverishment can best be viewed as a competition among possible output candidates in an OT setting. In order to match the facts of the differential coding of Tlapanec case alignment summarized in (10), the constraints that rule out non-optimal candidates have to consider the following factors: grammatical function, person features, animacy, and degree of affectedness. All of these four aspects correspond to specific prominence scales that are well established in linguistics (Silverstein (1976))[8]: As Aissen (1999) points out, there is also a consistent relation between differential coding (as it appears in Tlapanec) and markedness:

"There is a relation between differential coding and markedness (or

[7]A fourth possible output that leaves the input unchanged and in which none of the feature bundles (i.e. clitic heads) is deleted never becomes relevant in Tlapanec and is omitted from the illustration here for the sake of clarity.

[8]Note that there are also accounts that aim to derive the effects of differential marking not by scales as primitives of the theory but by deriving scales and there effects from an interaction of features instead (Harbour (2007)).

gram. function	subject	>	object
person	local	>	3rd
animacy	animate	>	inanimate
affectedness	high	>	low

Table 3. prominence scales involved in Tlapanec case alignment

> prototypicality). Certain semantic and pragmatic properties are prototypical (statistically more frequent) for grammatical objects, especially low animacy, low definiteness, and low topicality. Transitive subjects, in contrast, are prototypically high in animacy, definiteness, and topicality. Differential coding systems mark subjects and/or objects which diverge from the prototype, leaving unmarked those which are more prototypical, a generalization known from typological work [...] Differential coding is simply the kind of more marked construction which marks deviations from the norm."(Aissen, 1999, p. 673)

An established operation that transforms prominence scales into markedness constraints is *harmonic alignment* (as developed by Prince and Smolensky (1993)). This meta-principle takes two independently motivated scales as input and generates constraint hierarchies with a fixed internal order. The definition of this operation is given in (18):

(18) *Harmonic Alignment* (Prince and Smolensky, 1993, p.136):
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 $\succ$[9] X/b $\succ$ ... $\succ$ X/z
b. H_Y : Y/z $\succ$ ... $\succ$ Y/b $\succ$ Y/a

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

a. C_X: *X/z $\gg$ ... $\gg$ *X/b $\gg$ *X/a
b. C_Y : *Y/a $\gg$ *Y/b $\gg$ ... $\gg$ *Y/z

This operation yields two *harmony scales* from two independent scales (one of them binary). These two harmony scales in turn are the base for two constraint alignments: replacing the symbol $\succ$ with the standard

[9] Read '$\succ$' as 'more harmonic than'.

constraint ranking symbol ≫ and reversing the order of elements. Thus, for example, the aligned constraints:

(19) *X/z ≫ ... ≫ *X/b ≫ *X/a are to be read as: 'A ban on a configuration X/z is ranked higher (is less easily violable) than a ban on a configuration X/b, and a ban on this configuration in turn is ranked higher than the ban on X/a.'

In Tlapanec the *four* scales of table 3 are involved. The problem that arises here is that all of these four scales interact simultaneously, thus it becomes necessary to extend the notion of harmonic alignment. If each scale could be freely combined with each other by harmonic alignment, there would be six possible combinations. From these six different harmonic alignments of (binary) scales there would result a total number of 12 different constraint alignments of 24 markedness constraints. Making matters worse, none of the possible rankings of these 24 markedness constraints (some of them inherently ordered by the principles of harmonic alignment) could cover all facts of case alignment in Tlapanec. Therefore I propose a *hierarchy* of the four scales:

(20) hierarchy of scales

1. grammatical function
2. person
3. affectedness
4. animacy

The idea behind this assumption is that the total number of constraints can be reduced drastically if the different steps of harmonic alignment of the involved factors follow a hierarchy.[10]

I assume a procedure of harmonic alignment involving 4 (binary) scales as follows: In a first step, the highest ranking scales are harmonically aligned; in a second step the resulting two harmony scales are each harmonically aligned with the next (i.e. third) scale of the hierarchy yielding 4 harmony scales. This procedure is repeated until the last scale of the hierarchy is harmonically aligned with the output of the preceding step.

[10]The price of this reduction is an increasing 'complexity' of the constraints. However, this complexity can be simplified again, as will be shown later.

As for the scales involved in the Tlapanec case marking, the procedure looks as follows: Initially, the first two scales, *grammatical function* and *person*, are aligned harmonically:

(21) alignment of *grammatical function* and *person*

a. scales:
   (i) Subject > Object
   (ii) local > 3

b. harmony scales:
   (i) Sub/local $\succ$ Sub/3
   (ii) Ob/3 $\succ$ Ob/local

c. constraint alignment:
   (i) *Sub/3 $\gg$ *Sub/local
   (ii) *Ob/local $\gg$ *Ob/3

The next step introduces the third scale of the hierarchy: *degree of affectedness*. This time there are two separate harmonic alignments, the first operates with the first harmony scale provided by the antecedent operation, Sub/Local $\succ$ Sub/3; the second combines the scale of affectedness with the second harmony scale, Ob/3 $\succ$ Ob/Local:

(22) alignment of *affectedness* with first output of preceding harmonic alignment in (21-b-i) (*Sub/Local $\succ$ Sub/3*)

a. scales:
   (i) Sub/Local $\succ$ Sub/3
   (ii) high > low

b. harmony scales:
   (i) Sub/local/high $\succ$ Sub/local/low
   (ii) Sub/3/low $\succ$ Sub/3/high

c. constraint alignment:
   (i) *Sub/local/low $\gg$ *Sub/local/high
   (ii) *Sub/3/high $\gg$ *Sub/3/low

(23) alignment of *affectedness* with second output of preceding harmonic alignment in (21-b-ii) (*Ob/3 $\succ$ Ob/Local*)

a. scales:
   (i) Ob/3 $\succ$ Ob/local
   (ii) high > low

b. harmony scales:
   (i) Ob/3/high $\succ$ Ob/3/low
   (ii) Ob/local/low $\succ$ Ob/local/high

c. constraint alignment:
   (i) *Ob/3/low ≫ *Ob/3/high
   (ii) *Ob/local/high ≫ *Ob/local/low

The procedure results in four harmony scales (and four aligned constraints) so far:

(24) a. Sub/local/high ≻ Sub/local/low
b. Sub/3/low ≻ Sub/3/high
c. Ob/3/high ≻ Ob/3/low
d. Ob/local/low ≻ Ob/local/high

The final step of the procedure combines all of these four scales in (24) with the last scale of the hierarchy, *animacy* (anim > inanim), by harmonic alignment, yielding 8 harmony scales and 8 corresponding constraint alignments:

(25) resulting harmony scales:
a. Sub/local/high/anim ≻ Sub/local/high/inanim
b. Sub/local/low/inanim ≻ Sub/local/low/anim
c. Sub/3/low/anim ≻ Sub/3/low/inanim
d. Sub/3/high/inanim ≻ Sub/3/high/anim
e. Ob/3/high/anim ≻ Ob/3/high/inanim
f. Ob/3/low/inanim ≻ Ob/3/low/anim
g. Ob/local/low/anim ≻ Ob/local/low/inanim
h. Ob/local/high/inanim ≻ Ob/local/high/anim

(26) resulting constraint alignments:
a. *Sub/local/high/inanim ≫ *Sub/local/high/anim
b. *Sub/local/low/anim ≫ *Sub/local/low/inanim
c. *Sub/3/low/inanim ≫ *Sub/3/low/anim
d. *Sub/3/high/anim ≫ *Sub/3/high/inanim
e. *Ob/3/high/inanim ≫ *Ob/3/high/anim
f. *Ob/3/low/anim ≫ *Ob/3/low/inanim
g. *Ob/local/low/inanim ≫ *Ob/local/low/anim
h. *Ob/local/high/anim ≫ *Ob/local/high/inanim

Although all of these constraints, as well as the constraints of the intermediate steps, have to be assumed to be present in the OT process of impoverishment, nevertheless the complexity of this set of constraints can be reduced in the following way, at least for the sake of better legibility of the resulting tableaux.

As already mentioned in section 2, where the actual data of Tlapanec were presented, inanimate arguments never trigger agreement on verbs and thus are never assigned any morphologically overt case markers. Thus, the factor of *animacy* is of such importance, that the general restriction on the head-marking of verbal arguments, demanding for inanimate entities not to be overtly coded, can never be violated. This means that a markedness constraint **inanimate* has to be undominated within the process of impoverishment, leading to deletion of any clitic head that contains the feature [inanimate]. As a consequence of that, any violation of one of the constraints in (26) containing a ban on inanimates does not have to be taken into account by the evaluation process, since any candidate violating such a constraint always violates the dominating constraint **inanimate*. Candidates consisting only of animate arguments do not violate this constraint. These considerations affect half of the constraints. Therefore only eight constraints will remain relevant for the analysis:

(27) reduced constraint alignments:

a. ~~*Sub/local/high/inanim~~ ≫ *Sub/local/high/anim
b. *Sub/local/low/anim ≫ ~~*Sub/local/low/inanim~~
c. ~~*Sub/3/low/inanim~~ ≫ *Sub/3/low/anim
d. *Sub/3/high/anim ≫ ~~*Sub/3/high/inanim~~
e. ~~*Ob/3/high/inanim~~ ≫ *Ob/3/high/anim
f. *Ob/3/low/anim ≫ ~~*Ob/3/low/inanim~~
g. ~~*Ob/local/low/inanim~~ ≫ *Ob/local/low/anim
h. *Ob/local/high/anim ≫ ~~*Ob/local/high/inanim~~

These eight constraints and their interaction can be simplified even further. Recall that the data of Tlapanec indicate that the differential marking is sensitive to person features for objects only. Thus, the remaining constraints concerning subjects of highly affecting actions in (27-a) and (27-d) on the one hand, and subjects of less affecting actions in (27-b) and (27-c) on the other hand can be understood as being crucially nonranked with respect to each other (Prince and Smolensky (1993)), i.e., they belong to the same stratum (Tesar (1998)). Since the conjunction of these constraints is violated if one of its constituents is violated, they will be abbreviated henceforth as shown in (28):

(28) simplified constraints:

a. *Sub/local/high/anim, *Sub/3/high/anim = *Sub/high/anim
b. *Sub/local/low/anim, *Sub/3/low/anim = *Sub/low/anim

In addition, two of the four remaining constraints regarding object configurations can also be disregarded for the evaluation. Again according to the perceived patterns of case alignment, the differential marking is sensitive to 3rd person features. Thus constraints containing a ban on local persons have to be considered to rank below all other constraints taken into account here. It follows that the constraints **Ob/Local/high/anim* and **Ob/local/low/anim* can both be ignored henceforth, leading to four remaining markedness constraints:

(29) final set of markedness constraints:

a. *Sub/high/anim
b. *Sub/low/anim
c. *Ob/3/high/anim
d. *Ob/3/low/anim

Note that these (abbreviated) constraints, although derived from harmonic alignment, are not inherently ordered to each other. In order to account for the fact that Tlapanec argument encoding on the verb seems to prefer only one argument at a time, or sometimes no argument at all, but never allows two arguments to be coded simultaneously, two additional constraints are important for an adequate model of evaluation:

(30) additional constraints

$\mathbf{R}_{V \rightarrow Cl}$ =

Align(VP,right,Cl,right)'On every right edge of a VP there has to be a right edge of a clitic.
(Count a violation for every right edge of a VP in a candidate without a right edge of clitic)'

$\mathbf{R}_{Cl \rightarrow V}$ =

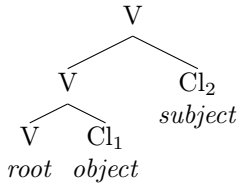
Align(Cl,right,VP,right)'On every right edge of a clitic there has to be a right edge of a VP.
(Count a violation for every right edge of a clitic in a candidate without a right edge of VP)'

The first constraint in (30), $\mathrm{R}_{V \rightarrow Cl}$, penalizes every candidate without a clitic on its right edge. As will be shown, this constraint has to be violable, since sometimes the optimal output is one in which there is no clitic feature present at all. The second constraint, $\mathrm{R}_{Cl \rightarrow V}$, on the other hand, banning a candidate in which there is a right edge of a clitic that

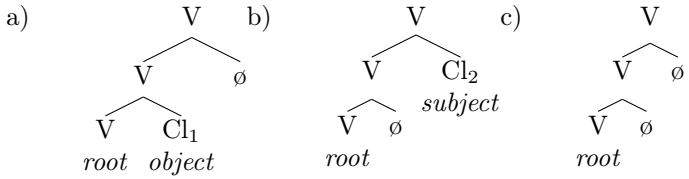
is not on the right edge of a VP, is inviolable in Tlapanec. This means it is impossible for a clitic to be situated 'deeper' in the prosodic word, that is in an intermediate position between the verb and another clitic.

Before the concrete evaluation of the alignment patterns can be considered, one further central assumption on the nature of impoverishment has to be made. As roughly sketched in graphs (16) and (17), repeated here in (31) and (32), the process deletes a certain feature bundle (cl-head) as a whole:

(31) output of syntax: example for transitive configuration



(32) possible outputs of post-syntactic impoverishment of transitive configurations:



This is in sharp contrast to for instance Wunderlich's account in Minimalist Morphology (see e.g. Wunderlich (2004)) in which single features may be deleted. Since such an account does not match the data of Tlapanec, I propose a mechanism that drops a whole clitic instead. This may be achieved in different ways: first, the generating component of this particular step of the derivation may only provide output candidates with 'fully specified' bundles of features; or, second, an additional set of faithfulness constraints has to be assumed ruling out candidates that contain any 'ill-formed', i.e. incomplete, feature bundle. For the question concerning the patterns of differential argument marking in Tlapanec, the locus of this mechanism (generator versus evaluator) is irrelevant. It is the effect of such a mechanism that is important here: a candidate can only avoid violation of a constraint if there is *no feature within a fully specified bundle of features* that violates the constraint. In addition it is also important to assume that there is no feature chang-

ing allowed for the process described here. Thus, it is again certain faithfulness constraints that have to be undominated here.[11]

Given this assumption and the derived constraints in (29), together with their assumed hierarchical ordering in (33), we can now look at the evaluation in more detail.

(33) hierarchy of relevant constraints:
$R_{Cl\rightarrow V} \gg$ *O/3/low/an $\gg$ *S/high/an $\gg R_{V\rightarrow Cl} \gg$ *O/3/high/an $\gg$ *S/low/an

Tableaux[12] 1 and 2 illustrate the derivation of the subject marking of less affecting mono-personal verbs and the zero-marking ('ergative-marking') of highly affecting monopersonal verbs.

Tableau 1. mono-personal verbs, less affecting

{sub, low}	$R_{Cl\rightarrow V}$	*O/3/low	*S/high	$R_{V\rightarrow Cl}$	*O/3/high	*S/low
Ø				*!		
☞{sub, low}						*

Tableau 2. mono-personal verbs, highly affecting

{sub, high}	$R_{Cl\rightarrow V}$	*O/3/low	*S/high	$R_{V\rightarrow Cl}$	*O/3/high	*S/low
☞Ø				*		
{sub, high}			*!			

Tableau 2 demonstrates that the candidate maintaining the feature bundle representing the single animate argument is ruled out by a fatal violation of the **S/high/an* constraint. Thus, in the optimal output

[11]This observation is remarkable at least if the account proposed here is compared with traditional notions of impoverishment in DM. There is a discussion going on in the literature concerning feature changing impoverishment (e.g., see Noyer (1998), among many others). In general, feature changing impoverishment is dispreferred, although it is assumed in some analyses (see e.g. Noyer (1998), Müller (2004) on Russian, or Lahne (2006) on Sanskrit). Nevertheless, if impoverishment is understood from an OT perspective, as it is in this paper, it becomes in principle possible to allow for–at least partial–feature changing by lowering of certain faithfulness constraints. However, such operations may be restricted for independent reasons, e.g. to ensure recoverability of arguments.

[12]For the sake of illustration, the constraints in (33) will be further abbreviated in the following tableaux: the 'animate' part (*/an*) will be disregarded in the name of the constraint (although, of course, all constraints maintain their original definition containing markedness restrictions on animate arguments).

candidate this feature bundle is deleted, and there will be no overt morpho-phonological realization on the verb. In fact, this is the core argument for handling the zero-ergative marker in Tlapanec as resulting from a post-syntactic impoverishment. In contrast, tableau 1 shows that the markedness constraint that bans subjects of low affecting actions (**S/low/an*) is ranked below the constraint against zero-marking ($R_{V \rightarrow Cl}$), therefore in such configurations the feature bundle representing the subject remains.

The same constraints and the same ranking are responsible for the differential marking of di-personal verbs. Recall that it is always only the object that gets a morphological marking – except in one very specific configuration: if the object is animate, 3rd person and the verb is less affecting, then it is exclusively the subject that will receive a morphological marking. Tableaux 3, 4, and 5 demonstrate that it is always the object alone that is morphologically marked in all 'standard' configurations.

Tableau 3. di-personal verbs, highly affecting

{sub, high} {obj, high}	$R_{Cl \rightarrow V}$	*O/3/low	*S/high	$R_{V \rightarrow Cl}$	*O/3/high	*S/low
Ø				*!		
{sub, high}			*!			
☞{obj, high}						
{sub, high} {obj, high}	*!		*			

Tableau 4. di-personal verbs, less affecting

{sub, low} {obj, low}	$R_{Cl \rightarrow V}$	*O/3/low	*S/high	$R_{V \rightarrow Cl}$	*O/3/high	*S/low
Ø				*!		
{sub, low}						*!
☞{obj, low}						
{sub, low} {obj, low}	*!					*

Tableau 5. di-personal verbs, highly affecting, 3rd person object

{sub, high} {obj, high, 3}	$R_{Cl \rightarrow V}$	*O/3/low	*S/high	$R_{V \rightarrow Cl}$	*O/3/high	*S/low
Ø				*!		
{sub, high}			*!			
☞{obj, high, 3}					*	
{sub, high} {obj, high, 3}	*!		*			

Tableau 3 shows that it is per definition the $R_{Cl \rightarrow V}$ constraint that rules out any configuration containing two different bundles of features.[13]

In contrast, the constraint penalizing a verb without any clitic on its right edge ($R_{V \rightarrow Cl}$) leads to fatal violations of all candidates in tableaux 3, 4, and 5 that represent a zero-output. Subject marking in the 'standard' configuration is avoided by markedness constraints against (animate) subjects of highly and less affecting actions (**S/high* and **S/low*).

The situation of the default-marking of the object of di-personal verbs changes dramatically when a configuration is considered in which the object is 3rd person (singular) and the verb is less affecting. Now the markedness constraint banning this specific configuration (**O/3/low*) leads to a fatal violation of the candidate containing the object features, resulting in the candidate that maintains the subject features being optimal, as illustrated in tableau 6.

Tableau 6. di-personal verbs, less affecting, 3rd person object

{sub, low} {obj, low, 3}	$R_{Cl \rightarrow V}$	*O/3/low	*S/high	$R_{V \rightarrow Cl}$	*O/3/high	*S/low
Ø				*!		
☞{sub, low}						*
{obj, low, 3}		*!				
{sub, low} {obj, low, 3}	*!	*				*

[13]Note that the labels of the features used here have to be understood as abbreviations. As will be argued later, all the features are binary. Thus, e.g. [subject] in the tableau means: [+subject, −object], hence a configuration of two bundles {...subj...} and {...obj...} are to be read as {...+subject, −object ...} {... −subject, +object ...}.

Table 4 gives a short summary of the impoverished output achieved for each possible morpho-syntactic input configuration: Thus, as a first

Input	Output	coded argument
{sub high}	Ø	
{sub low}	{sub low}	subject
{sub high}{obj high}	{obj high}	object
{sub low} {obj low}	{obj low}	object
{sub high}{obj high 3}	{obj high 3}	object
{sub low} {obj low 3}	{sub low}	subject

Table 4. input - output of post-syntactic impoverishment

conclusion it can be summarized that a post-syntactic impoverishment that emerges from a competition of independently motivated (and automatically derived) markedness constraints of the type reported in Aissen (1999; 2003) can cover the facts of a zero-marked ergative and the differential marking of arguments in Tlapanec. In the next step, the analysis of the case marking will proceed with a further sub-anaylsis of the concrete morpho-phonological realization of the markers in order to gain an explanation of the phonological complexity of some of the markers (especially the 'marked absolutive').

4.2. Sub-analysis of markers and Vocabulary Insertion

The optimization process explained in detail in the last section leads to an impoverished morpho-syntactic context. In the next step, this context is the basis for the concrete morphophonological realization of the case markers: *vocabulary insertion*. This second step of the analysis is carried out within the traditional framework of Distributed Morphology (Halle and Marantz (1993)).

Before the concrete list of vocabulary items is established, it is important to recall some of the key properties of the Tlapanec case marker inventory, which is given again in table 5: As stated in section 2, a closer look at the paradigm reveals some syncretisms as well as partially syncretic forms of markers. There are identical markers in different cells of the paradigm, e.g. *-a* / *-i* for all plurals in the pegative. On the other hand, some forms of markers show up that partially correspond to other, related forms: most of the absolutive forms correspond to dative forms except that they show an additional nasalization of the

		Ergative	Absolutive	Pegative	Dative
sg	1	-ø	-ũʔ	-u / -o	-uʔ / -oʔ
	2	-ø	-ĩʔ / -ãʔ	-a / -i	-aʔ
	3N	-ø	-i / -a	-u / -o	-u / -o
pl	1	-ø	-ãʔ	-a / -i	-aʔ
	2	-ø	-ãʔ	-a / -i	-aʔ
	3N	-ø	- ĩ	-a / -i	-ũ

Table 5. case markers in Tlapanec

vowel. One of the central questions of this section is, how can these (partial) syncretisms be derived by an adequate analysis?

As introduced in section 3, in DM it is assumed that underspecified vocabulary items, i.e. pairs of morpho-syntactic and phonological features, are in competition for insertion in certain morpho-syntactic contexts. In order to allow for underspecification and thus competition, the morpho-phonological features assumed in the analysis in section 4.1 have to be decomposed into binary features (Jakobson (1962); Bierwisch (1967); Wunderlich (1997)). As for the features involved, I assume the following notions:

{+sub, −obj}	case for external argument
{−sub, +obj}	case for internal argument
{+high}	highly affecting
{−high}	less affecting
{−1, −2}	third person

Table 6. list of relevant features, decomposed into binary features

The next central assumption is that each of the four traditional case labels in fact reflects one of two instances of subject-case or object-case in a certain morpho-syntactic configuration. The two instances of the cases differ with respect to the feature 'degree of affectedness' with which the case-labels are cross-classified (as already indicated in section 2 in table 1). The system of case marking in Tlapanec can thus be understood as exhibiting a twofold active alignment. Thus, this assumption straightforwardly leads to a decomposition of the traditional case labels in Tlapanec as illustrated in table 7. The striking observation is that these sets of binary features of the four cases in Tlapanec match the output of the post-syntactic impoverishment as derived in the last section almost exactly (person features are disregarded here).

affectedness	grammatical relation external argument	internal argument
high	{+sub, −obj +high}	{−sub, +obj +high}
low	{+sub, −obj −high}	{−sub, +obj −high}

Table 7. interaction of grammatical relation and degree of affectedness

Note that it is only the ergative configuration {+ sub −obj + high}

output of impoverishment	decomposed cases	trad. case label
Ø	{+sub −obj +high}	ergative
{+sub −obj −high}	{+sub −obj −high}	pegative
{−sub +obj −high}	{−sub +obj −high}	dative
{−sub +obj +high}	{−sub +obj +high}	absolutive

Table 8. relation of output of post-syntactic impoverishment and case labels

that was deleted by optimality-theoretic impoverishment and therefore does not show an exact match with one of the outputs. Table 9 lists

		Ø	{−sub +obj +high}	{+sub −obj −high }	{−sub +obj −high}
− pl	+1 −2	-ø	-ũʔ	-u	-uʔ
	−1 +2	-ø	-ãʔ	-a	-aʔ
	−1 −2	-ø	-i	-u	-u
+ pl	+1 −2	-ø	-ãʔ	-a	-aʔ
	−1 +2	-ø	-ãʔ	-a	-aʔ
	−1 −2	-ø	- ĩ	-a	-ũ

Table 9. case markers in Tlapanec

all the case markers in a slightly simplified form in that phonologically driven alternations are omitted. In addition, labels are replaced by the corresponding bundles of binary features as provided by the output of post-syntactic impoverishment. Thus, a closer look now reveals that some partial syncretisms of markers do not seem to be accidental.

As already mentioned above, there seems to be partial syncretism of markers. But now, identical forms can be related to identical functions: The appearance of the glottal stop (ʔ) seems to correspond with the feature {+object} and the nasalization of a vowel corresponds with the

feature {+high}. These observations lead directly to the following list of vocabulary items:

(34) list of vocabulary items

1.	/ũ/	⟷	{cl, -subj, -high -1,-2, +pl }
2.	/ĩ/	⟷	{cl, -subj, +high -1,-2, +pl}
3.	/i/	⟷	{cl, -subj, +high -1,-2, -pl}
4.	/u/	⟷	{cl, -2, -pl}
5.	/a/	⟷	{cl}
6.	/Ø/	⟷	{+object} /(-1,-2)
7.	/{nasal}/	⟷	{+high}
8.	/-ʔ/	⟷	{+object}

Not all syncretic forms can be explained completely by underspecified markers. In the list in (34), items 1. and 2. are considered to be highly specific forms for which a further decomposition, i.e. separation of the feature {nasal} and the vowel, would not yield any advantage. However, the vocabulary insertion of the eight proposed vocabulary items in (34) exhaustively derives the complete paradigm of case markers in Tlapanec according to the subset principle and the notion of fission of Noyer 1992 (see section 3).

The process of insertion is illustrated here in a little more detail. First consider for instance third person plural of the object cases (absolutive and dative). There are highly specified vocabulary items (ũ and ĩ) that best fit the specification of the morpho-syntactic context (i.e. they are most specific in the set of competing vocabulary items). The insertion of these markers leads to a discharging of all of the features that they represent. As those highly specific markers are specified for all relevant features of the context, there are no features left for a further insertion of other markers. Now consider the more interesting case of less specified markers. The item /u/ represents the bundle of features cl, −2, −pl. Therefore it is inserted in all third person singular contexts – except in the absolutive case, because there is a more specific marker (/i/) that blocks the insertion of /u/ there.

Now it is important to note that—following Noyer's notion of fission (see the definition in (14) in section 3)—all features of the context that are not specified as the features of the inserted marker remain visible for further insertion. In the concrete case of the marker /u/ for example, the features for 'case' and 'affectedness' are still available for subsequent vocabulary insertions. This is exactly the case for the items

{nasal} and *ʔ*. Both of them can be inserted in specific contexts leading to more complex markers:

(35) example of lexical insertion: 'ũʔ' in 1sgl absolutive

- basic context:
  {−sub +obj +high +1 −2 −pl}
- insertion of:
  /u/ ⟷ {cl, −2, −pl}
- results in:
  /u/ + {−sub +obj +high +1 ~~−2 −pl~~}
- insertion of: /{nasal}/ ⟷ {+high}
- results in: /u/ + {nasal} + {−sub +obj ~~+high~~ +1 ~~−2 −pl~~}
- finally, the insertion of:
  /-ʔ/ ⟷ {+object}
- results in: /u/ + {nasal} + /-ʔ/ + {−sub ~~+obj +high~~ +1 ~~−2 −pl~~}
  = *ũʔ*

In addition, another aspect of the 'unusual' behavior of Tlapanec case markers can now be explained.

Regarding the notion of 'complex' forms of the absolutive, the vocabulary items 6, 7, and 8 in (34) are of particular interest. Besides the fact that they do not refer to a clitic head as place of insertion (and may therefore belong to a different block), they do what Aissen (1999) stated as "mark[ing] deviations from the norm".

As is illustrated in example (35), the item 8. in (34), the glottal stop /-ʔ/, marks an *animate* object – a definitely non-prototypical (infrequent) configuration and therefore a deviation from the norm.

The same holds for the vocabulary item 7. in (34): Here nasalization marks a highly affecting action. More precisely, it encodes a *highly affected, animate object*, since the subject of highly affecting actions is never marked. This again is a non-prototypical configuration.

Finally, item 6. in (34), the zero-marker, in fact deletes the {+object} feature for 3rd person.[14] Third persons are prototypical objects,

[14]For a concept of deletion of features by highly specific zero-markers see Trommer (1999).

so the deletion of the {+object} feature here circumvents the marking by the glottal stop, hence it leads to a *morphologically unmarked representation of a less marked configuration.*

Thus, the complexity of the absolutive forms emerges by an additional marking of semantically/pragmatically marked configurations.

5. Conclusion

In this paper I have addressed some unusual aspects of the patterns of Tlapanec case marking. I have argued for an analysis that crucially relies on the assumption that languages may tend to represent semantically/pragmatically marked configurations by a specific morphological marking (Aissen (1999)). In Tlapanec this principle is extended by the complementary notion that semantically/pragmatically *unmarked* configurations do not have to possess an overt morphological marking. Regarding case marking in Tlapanec, this extended principle is at work in at least two instances.

First, it is responsible for the alignment patterns. Both the zero-marking of animate subjects of highly affecting actions ('zero-marked ergative') and the differential marking in certain syntactic contexts emerge from typologically attested principles. Based on this assumption I postulated markedness constraints that operate right after syntax and impoverish the morpho-syntactic context before lexical insertion takes place. All of these constraints were derived from typologically well attested prominence scales by a modified version of harmonic alignment.

Second, the complex forms of some of the markers were sub-analyzed, yielding a new interpretation of some parts of the markers. Additional phonological segments ('*ʔ*') as well as features (*nasal*) do not mark case in the first place. Rather, they *encode marked configurations* such as animate objects and highly affected animate objects.

References

Aissen, J. (1999). Markedness and subject choice in optimality theory. *Natural Language and Linguistic Theory*, 17:673–711.

Aissen, J. (2003). Differential object marking: Iconicity vs. economy. *Natural Language and Linguistic Theory*, 21:435–483.

Bierwisch, M. (1967). *Syntactic features in morphology*, pages 239–270. Mouton.

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

Halle, M. (1997). Distributed morphology: Impoverishment and fission. *Papers at the interface*, 30:425–449.

Halle, M. and Marantz, A. (1993). Distributed morphology and the pieces of inflection. In Hale, K. and Keyser, S., editors, *The View from Building 20*, pages 111–176. MIT Press.

Harbour, D. (2007). A feature calculus for Silverstein hierarchies. presented at 'Workshop on Morphology and Argument Encoding', September 2007, Harvard.

Jakobson, R. (1962). Beitrag zur allgemeinen Kasuslehre. Gesamtbedeutungen der russischen Kasus. In *Selected Writings*, volume 2, pages 23–71. Mouton, The Hague and Paris.

Lahne, A. (2006). When features are not deleted: Contextual allomorphy in Sanskrit noun declension. In Müller, G. and Trommer, J., editors, *Linguistische Arbeitesberichte (LAB)*, volume 84, pages 143–160.

Müller, G. (2004). A Distributed Morphology approach to syncretism in Russian noun inflection. In *Proceedings of FASL 12*.

Müller, G. (2006). Subanalyse verbaler Flexionsmarker. In E. Breindl, L. Gunkel, B. S., editor, *Grammatische Untersuchungen*, pages 183–203. Narr, Tübingen.

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

Noyer, R. (1998). Impoverishment theory and morphosyntactic markedness. In Lapointe, S., Brentare, D., and Farrell, P., editors, *Morphology and its Relation to Phonology and Syntax*, pages 264–285. CSLI, Palo Alto.

Prince, A. and Smolensky, P. (1993). *Optimality Theory. Constraint Interaction in Generative Grammar.*

Silverstein, M. (1976). Hierarchy of features and ergativity. In Dixon, R. M. W., editor, *Grammatical Categories in Australian Languages*. Australian Institute of Aboriginal Studies, Canberra.

Smolensky, P. (1995). *On the internal structure of Con, the constraint Component of UG*. John Hopkins University.

Sportiche, D. (1996). Clitic constructions. In J., R. and Zaring, C., editors, *Phrase structure and the lexicon*, pages 213–276. Kluwer Academic Publishers.

Stiebels, B. (2002). *Typologie des Argumentlinkings: Ökonomie und Expressivität*. Studia Grammatica 54. Akademie Verlag, Berlin.

Tesar, B. B. (1998). An iterative strategy for language learning. *Lingua*, 104:131–145.

Trommer, J. (1999). Morphology consuming syntax' resources. In *Proceedings of the ESSLI Workshop on Resource Logics and Minimalist Grammars*, University of Nijmegen.

Trommer, J. (2006). Person and number agreement in Dumi. *Linguistics*, 44:1011–1057.

Wichmann, S. (1996a). The degrammaticalization of agentivity in Tlapanec. In Engberg-Pedersen, E., Fortescue, M., Harder, P., Heltoft, L., and Falster Jakobsen, L., editors, *Content, Expression and Structure: Studies in Danish Functional Grammar*, Studies in Languages Companion Series, pages 343–360. John Benjamins, Amsterdam/Philadelphia.

Wichmann, S. (1996b). *Description and Typology of Some Grammatical Categories in Azoyú Tlapanec*. PhD thesis, University of Copenhagen.

Wichmann, S. (2005). Tlapanec cases. In Beam de Azcona, R. and Paster, M., editors, *Conference on Otomanguean and Oaxacan Languages*, volume 13 of *Survey of California and Other Indian Languages*, pages 133–145.

Wichmann, S. (2007). Case relations in a head-marking language: verb-marked cases in Tlapanec. In Malchukov, A. and Spencer, A., editors, *The Handbook of Case*. Oxford University Press, Oxford.

Wiese, B. (1999). Unterspezifizierte Paradigmen. Form und Funktion in der pronominalen Deklination. *Linguistik Online*, 4.

Wunderlich, D. (1997). A minimalist model of inflectional morphology. In Wilder, C., Gärtner, H.-M., and Bierwisch, M., editors, *The Role of Economy Principles in Linguistic Theory*, pages 267–298. Akademie Verlag, Berlin.

Wunderlich, D. (2004). Is there any need for the concept of directional syncretism? In Müller, G., Gunkel, L., and Zifonun, G., editors, *Explorations in Nominal Inflection*, pages 373–395. Mouton de Gruyter, Berlin.

A Probe-Goal Approach to Agreement and Incorporation Restrictions in Southern Tiwa

Fabian Heck & Marc Richards*

Abstract

Southern Tiwa (Tanoan) exhibits agreement with up to three arguments (ergative, absolutive, dative). This agreement is subject to certain restrictions resembling the Person-Case Constraint paradigm (Bonet (1991)). Moreover, there is a correlation between agreement restrictions and conditions on (the obviation of) noun-incorporation in Southern Tiwa, as explicitly and elegantly captured by Rosen (1990) in terms of a heterogeneous feature hierarchy and rules of association. We attempt to recast Rosen's central insights in terms of Anagnostopoulou's (2003; 2006) probe-sharing model of Person-Case Constraint effects, to show that the full range of Southern Tiwa agreement and (non)incorporation restrictions can be given a single, unified analysis within the Probe-Goal-Agree framework of Chomsky (2001). In particular, we argue that Southern Tiwa's triple-agreement system is characterized by (i) an independent class probe located on the heads T and v, and (ii) a rule that allows this class probe to be deleted in the context of local-person T-agreement. The various restrictions on agreement and nonincorporation then reduce to a single source: failure of class-valuation with DP (as opposed to NP) arguments.

1. Introduction

Rosen (1990) offers a remarkably elegant reanalysis of the complex set of agreement restrictions and conditions on incorporation in Southern Tiwa, a Tanoan language spoken in New Mexico, as first described

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and analysed in the pioneering work of Allen, Frantz and Gardiner (see, especially, Allen et al. (1990)). Southern Tiwa is a head-marking language (in the sense of Nichols (1986)) that makes extensive use of noun-incorporation and exhibits a particularly interesting system of rich agreement (using portmanteau morphemes): as argued by Rosen, Southern Tiwa is a *triple-agreement* language, in which the verb agrees with all arguments present in a clause. Thus verbs may agree with as many as three arguments: the ergative (NP_{erg}), absolutive (NP_{abs}) and dative (NP_{dat}). This agreement, which is expressed in the form of a verbal prefix, registers [PERSON], [NUMBER] and, in the case of third-person arguments, [CLASS] as well; see (1), (2), and (3), from Rosen (1990, 670).

(1) a. Te-mĩ-ban (eskwela-'ay)
1SG-go-PAST school-to
"I went (to school)"
b. A-mĩ-ban (eskwela-'ay)
2SG-go-PAST school-to
"You went (to school)"

(2) a. Ka-musa-wia-ban
1SG:A:2SG-cat-give-PAST
"I gave the cat to you"
b. Kam-musa-wia-ban
1SG:B:2SG-cat-give-PAST
"I gave the cats to you"

(3) a. 'Uide tam-musa-wia-ban
child-A 1SG:B:A-cat-give-PAST
"I gave the cats to the child"
b. 'Uide tow-keuap-wia-ban
child-A 1SG:C:A-shoe-give-PAST
"I gave the shoes to the child"

The agreement prefix is glossed as follows: a prefix that encodes agreement with NP_{erg} = X, NP_{abs} = Y, and NP_{dat} = Z is glossed as X:Y:Z; accordingly a prefix encoding for NP_{erg} and NP_{abs} is glossed X:Y, and one encoding for NP_{abs} and NP_{dat} is glossed Y:Z. The letters A, B and C indicate class-agreement: the singular and plural forms of third-person nouns in Southern Tiwa belong to one of three inflectional classes, labelled A, B and C, respectively, which follow one of the three patterns in (4):

(4) *Class patterns:*

	Pattern 1	Pattern 2	Pattern 3
Singular	A	A	B
Plural	B	C	C

Animate third-person nouns always follow Pattern 1 (Rosen (1990, 672)), a fact that will become crucial in section 4.
Example (1), then, exhibits person and number-agreement for the single, absolutive argument of an intransitive; examples (2) and (3) display triple-agreement with all three arguments of a ditransitive, with the absolutive argument registering variation in inflectional [CLASS] according to [NUMBER] in (2) and [ANIMACY] in (3).

Additionally, and of central concern to the present paper (and to Rosen (1990)), agreement and incorporation in Southern Tiwa are subject to a number of constraints, which can be summarized as follows (a more detailed exposition and explanation of these constraints can be found in sections 2, 4, and 5):

(5) *Restrictions on Southern Tiwa agreement and incorporation:*
Any two (or more) of the following three argument types are barred from cooccurring:

a. A dative DP (of any person)
b. A third-person ergative DP
c. A local-person (1st/2nd) or nonincorporating absolutive DP.

Rosen's strikingly simple and insightful analysis describes the banned configurations in terms of crossing association lines on a featural hierarchy, akin to a tier in autosegmental phonology. Thus, given the hierarchical arrangement of person, case and animacy features in (6), ungrammaticality arises wherever the linking of arguments according to these features with the corresponding points on this tier would result in the crossing of linkages, formalized as association lines.

(6) *Rosen's hierarchy:*
Sole animate $\gg$ Ergative $\gg$ 1st/2nd *or* specific *or* nonincorporated $\gg$ Dative $\gg$ 3rd $\gg$ Absolutive $\gg$ Inanimate

The reader can check for themselves that attempting to combine any two of the three categories in (5) will result in crossing associations, and thus a prohibited configuration.

Effective and explicit as this analysis surely is, the particular technology it employs (a primitive hierarchical tier to which arguments are somehow associated, presumably by special rules of association) is of questionable status, especially under the more stringent standards to which syntactic explanation is held in the recent developments of the Minimalist Program (Chomsky (1995) et seq.). Our aim in the subsequent sections of this paper is thus to attempt a further (re)rethinking of the restrictions in (5) that builds on and recasts Rosen's central insights in terms of the Probe-Goal mechanism underlying the operation Agree of (Chomsky (2000; 2001)). In particular, Rosen's crossing association lines would seem to readily suggest a reanalysis as intervention effects arising from the minimality of Agree, whereby a probe must agree (first) with the *closest* goal in its c-command domain. Insofar as such a reworking of Rosen's analysis proves possible, the typologically rare triple-agreement system of Southern Tiwa becomes amenable to principled explanation in the sense of Chomsky (2005; 2006), which, echoing Rosen's own concerns (Rosen (1990, 670)), would be an interesting theoretical result in itself.

The rest of the paper is organized as follows. Section 2 elaborates on the empirical situation, presenting the data and restrictions on agreement and nonincorporation in greater detail. Our theoretical assumptions are then summarized in section 3, which leads to an analysis of Southern Tiwa's agreement restrictions in terms of Person-Case-Constraint effects in section 4. Section 5 extends this analysis to the restrictions on nonincorporation, developing a unified account that strengthens the connection that Rosen draws between (non)agreement and (non)incorporation by removing the stipulations associated with her hierarchical rankings. Finally, section 6 offers a brief conclusion.

2. The Restrictions

2.1. Agreement restrictions

Let us first illustrate the three agreement restrictions to which Southern Tiwa is subject, adhering largely to the presentation in Rosen (1990) (see also Allen & Frantz (1983), Allen et al. (1990), Aissen (1990)); for a more crosslinguistic view of these and similar restrictions, see Aissen (1999), Haspelmath (2003), Baker (2006)).

The first restriction relates to transitive clauses and bars the cooc-

currence of a third-person ergative with a first- or second-person absolutive. As shown in (7), there is no agreement prefix to express A/B/C:1/2 in transitives (the position of the nonexisting prefix is indicated in the structure by ▭ in (7-b)). Instead, Southern Tiwa resorts to a passive to express such a proposition (see (7-c)).

(7) a. Ti-khwian-mu-ban
1SG:A-dog-see-PAST
"I saw the dog"

b. *'Uide ▭-mũ-ban
child-A A:2-see-PAST
"The child saw you"

c. 'Uide-ba ma-mũ-che-ban
child-INST 2PL-see-PASS-PAST
"You were seen by the child"

This restriction, which bears the hallmarks of the "weak" Person-Case Constraint (see in particular Anagnostopoulou (2006) and references therein, and section 4 below), may be stated as follows:

(8) *First agreement restriction (simple transitives; Rosen (1990, 675f.)):*
If NP_{erg} in a simple transitive structure is 3rd, then NP_{abs} must be 3rd, too.

The second restriction on Southern Tiwa agreement applies to "dative intransitives", intransitive clauses in which the absolutive cooccurs with a dative goal, and by extension to ditransitives too (see also the third restriction, (12), below). The dative argument may or may not control agreement (i.e. be expressed in the verbal prefix). If it is an agreement-controlling dative, then the cooccurring absolutive is once again barred from being first- or second-person, as shown in (9). Propositions involving a first- or second-person absolutive require a non-agreeing dative, i.e. the language must resort to an oblique dative (marked by a postposition, as for instance *-'ay* in (9-c)).

(9) a. Im-seuan-wan-ban
B:1SG-man-come-PAST
"The men came to me"

b. *▭-wan-ban
2SG:1SG-come-PAST
"You came to me"

c. A-wan-ban na-'ay
2SG-come-PAST me-to
"You came to me"

This restriction, which resembles the "strong" Person-Case Constraint (see Bonet (1991), Boeckx (2000), Anagnostopoulou (2003; 2006), Rezac (2004), Richards (2006), Adger & Harbour (2007), and section 4 below), may be stated as follows:

(10) *Second agreement restriction (dative intransitive; Rosen (1990, 678f.)):*
In a structure with NP_{abs} and NP_{dat}, NP_{abs} must be 3rd (NP_{dat} is free).

Finally, the third restriction on agreement in Southern Tiwa applies to ditransitives, such that a dative may not cooccur with a third-person ergative, as in (11-b). Since a dative is present, the previous restriction (10) applies here too, thus excluding a first- or second-person absolutive (see (11-c)).

(11) a. Tow-wia-ban
1SG:C:A-give-PAST
"I gave them to him/her"
b. *[ ]-wia-ban
A:C:A-give-PAST
"He gave them to him/her"
c. *[ ]-wia-ban
1SG:2SG:A-give-PAST
"I gave you to him"

We might state this restriction as in (12), which includes the strong PCC restriction in (10) as its second part.

(12) *Third agreement restriction (ditransitives; Rosen (1990, 677)):*
In a ditransitive structure, NP_{erg} must not be 3rd and NP_{abs} must be 3rd (NP_{dat} is free).

In sum, the three restrictions on Southern Tiwa agreement ban the three logically possible pairings of datives, third-person ergatives, and first- or second-person absolutives:

(13) *Summary of agreement restrictions:*
a. $*NP_{erg,3rd} + NP_{abs,1st/2nd}$ (weak PCC)

b. $*NP_{dat} + NP_{abs,1st/2nd}$ (strong PCC)
c. $*NP_{erg,3rd} + NP_{dat}$ (restriction on NP_{erg})

2.2. (Non)incorporation restrictions

Rosen (1990) shows that there is a correlation between agreement restrictions and the "seemingly intricate" conditions on noun-incorporation in Southern Tiwa, specifically the conditions under which a third-person absolutive nominal may obviate otherwise obligatory incorporation and thus appear in a "free-standing" form (see also Allen et al. (1984), Sadock (1985), Baker (1988) on N-incorporation in Southern Tiwa). Though apparently "chaotic" and "idiosyncratic" at first sight, these conditions are shown to follow a simple pattern by Rosen, who reduces them to the same formal restriction as the agreement conditions reviewed above: namely, the ban on crossing association lines. Noting that an absolutive may only "stand unincorporated if it has [...] a high degree of specificity" (Rosen (1990, 683)), Rosen captures this effect by ranking the property of "High Specificity" high on the hierarchy in (6), at the same position as 1st/2nd person.

The various conditions on (non)incorporation in Southern Tiwa may be stated as follows.

Firstly, in intransitives, if the sole (absolutive) argument is inanimate then it must incorporate; if it is animate then it must stand unincorporated:[1]

(14) *First condition on incorporation (Rosen (1990, 680)):*
If NP_{abs} is the sole argument of a clause, then it must incorporate if inanimate and must not incorporate if animate.

[1] In fact, this restriction is rather more flexible than it sounds. As Rosen (1990, 699, fn. 16) puts it, "when the grammar is manipulated in real discourse", exceptions are possible: thus examples of unincorporated inanimates with class-A ("animate") agreement instead of the expected class-B/C-agreement can be found. In effect, a speaker is free to optionally promote an inanimate to the class of "animate", nonincorporating absolutives (i.e. to invest it with the "High Specificity" property of high pragmatic salience) at their discretion. In the analysis we propose below (section 5), this equates to the free optionality of embedding an NP under a DP shell, a choice which is subject only to considerations of pragmatic deviance.

(15) a. Musan i-teurawe-ban
cats B-run-PAST
"The cats ran"
b. *I-musa-teurawe-ban
B-cat-run-PAST

(16) a. I-k'uru-k'euwe-m
B-dipper-old-PRES
"The dipper is old"
b. *K'uru i-k'euwe-m
dipper B-old-PRES

Secondly, ergatives can never incorporate. Consequently, this allows disambiguation in sentences such as (18-b).

(17) *Second condition on incorporation (Rosen (1990, 681)):*
NP_{erg} never incorporates.

(18) a. Seuanin ibi-musa-mban
men B:B-cat-see-PAST
"The men saw the cats" Not: "The cats saw the men"
b. Ibi-kan-hwiwimu-'an
B:B-horse-hate-PRES
"They hate horses" Not: "Horses hate them"

The same is true of datives:

(19) *Third condition on incorporation (Rosen (1990, 681f.)):*
NP_{dat} never incorporates.

(20) a. Ta-'u'u-wia-ban hliawrade
1SG:A:A-baby-give-PAST woman
"I gave the baby to the woman"
b. *Ta-hliawra-'u'u-wia-ban
1SG:A:A-woman-baby-give-PAST

For all other cases, incorporation is normally obligatory. Thus, where the absolutive is not the sole argument (i.e. in transitives), incorporation is mandatory (pending the exceptions to be stated in the final condition (24) below), including for animates:

(21) *Fourth condition on incorporation (Rosen (1990, 682f.)):*
An NP_{abs} that is not the sole argument of the clause obligatorily incorporates (unless (24)).

(22) a. Musan i-hliaw-ban na-'ay
cats B-come.down-PAST me-to
"The cats came down to me"
b. *I-musa-hliaw-ban na-'ay
B-cat-come.down-PAST me-to

(23) a. Im-musa-hliaw-ban
B:1SG-cat-come.down-PAST
"The cats came down to me"
b. *Musan im-hliaw-ban
cats B-come.down-PAST

In (22), "cats" is the sole argument controlling agreement (the dative is a prepositional oblique), and so cannot incorporate, in accordance with the first condition (14), above. By contrast, (23-a) involves a dative intransitive in which both arguments control agreement; "cats" is thus not the sole argument, and must incorporate, by (21).

Though generally obligatory, such incorporation of non-sole absolutives is obviated under two conditions. Firstly, as noted above, the absolutive must be interpreted as "highly specific". Secondly, nonincorporation cannot cooccur with either a third-person ergative (see (26)) or any dative (see (27)).

(24) *Fifth condition on incorporation (Rosen (1990, 683, 688)):*
An NP_{abs} that is not the sole argument can optionally obviate (otherwise obligatory) incorporation (see (21)) if it is interpreted as specific and if a. and b. hold.
a. NP_{erg} is 1st/2nd.
b. There is no NP_{dat} co-argument.

(25) a. Ti-seuan-mũ-ban
1SG:A-man-see-PAST
"I saw the man"
b. Seuanide ti-mũ-ban
man 1SG:A-see-PAST

(26) a. Ø-seuan-mũ-ban
A:A-man-see-PAST
"He/she saw the man"
b. *Seuanide Ø-mũ-ban
man A:A-see-PAST

(27) a. Ka-'u'u-wia-ban
1SG:A:2SG-baby-give-PAST
"I gave the baby to you"
b. *'U'ude ka-wia-ban
baby 1SG:A:2SG-give-PAST

Thus nonincorporating absolutives, i.e. those associated with specific interpretations, induce the same kinds of Person-Case Constraint effects as 1st- and 2nd-person absolutives: both nonincorporating ("highly specific") absolutives and 1st/2nd-person absolutives are barred from cooccurring with datives or third-person ergatives. This can be summarized as follows, a slight modification of (13):

(28) *Summary of agreement and nonincorporation restrictions:*
a. $*\mathrm{NP}_{\mathrm{erg,3rd}} + \mathrm{NP}_{\mathrm{abs,1st/2nd/nonincorporating}}$ (weak PCC)
b. $*\mathrm{NP}_{\mathrm{dat}} + \mathrm{NP}_{\mathrm{abs,1st/2nd/nonincorporating}}$ (strong PCC)
c. $*\mathrm{NP}_{\mathrm{erg,3rd}} + \mathrm{NP}_{\mathrm{dat}}$ (restriction on $\mathrm{NP}_{\mathrm{erg}}$)

The restrictions on agreement and nonincorporation thus unified, the challenge is to identify a single property common to both these types of absolutives (1st/2nd and nonincorporating/specific) that is responsible for inducing them. For Rosen, this property is an identical ranking on her featural hierarchy (cf. (6)). We will suggest in section 5 that the unifying property is simply the presence of a D head on the absolutive argument. This D head contributes both the person feature (1st/2nd) and the animacy/specificity interpretation, and serves to block the kind of agreement with the head noun that yields both (non)incorporation and Person-Case Constraint effects in Southern Tiwa. Before presenting the workings of this analysis, we must first make explicit the theoretical assumptions from which our analysis proceeds. These are outlined in the following section.

3. Theoretical assumptions

Our aim is to develop an account of the restrictions in (28) that follows from independently motivated conditions on agreement within a minimalist architecture of the language faculty (Chomsky (1995; 2005)). As such, we adopt the Probe-Goal model of feature-agreement as first set out in Chomsky (2000), in which designated checking configurations are

replaced with simple c-command between a probe (which lacks feature values) and a goal (which bears the corresponding feature values and specifies these values on the probe).

We adopt the standard assumption that T and v are the locus of unvalued agreement features (i.e. probes), and that these agreement features include [PERSON] and [NUMBER]. Further, we assume that T and v in Southern Tiwa additionally have an unvalued class feature, as indicated in section 1. These features must all seek values from the corresponding interpretable agreement features of NP arguments (goals). The goal arguments, for their part, bear case features that must be valued in the syntax by the verbal heads, T or v. Case valuation on NP is thus a by-product of agreement valuation on T/v (in the spirit of the long-standing insight that case and agreement are two sides of the same coin, cf. George & Kornfilt (1981)).

Valuation of case and agreement features on probe and goal is effected by the operation Agree, a standard version of which is given in (29):

(29) *Agree*:
α can agree with β with respect to a feature bundle Γ iff a.-d. hold:

a. α bears at least one unvalued probe feature in Γ and thereby seeks the β-value of a matching goal feature β in Γ.
b. α c-commands β.
c. β is the closest goal to α.
d. β bears an unvalued case feature.

"Closest" in (29-c) captures an important property of the minimalist computational system: search is minimized (on grounds of operative efficiency), so that the first goal encountered values as many features as it can. For concreteness, Closeness can be structurally defined as in (30), and the maximization of feature valuation may be stated as in Next, though the effects of both of these are simply the result of minimal search.

(30) *Closeness:*
Goal β is closer to probe α than goal γ if a. and b. hold.

a. α c-commands both β and γ.
b. β asymetrically c-commands γ.

(31) *Maximize (Chomsky (2001)):*
One application of Agree values all features of the probe that find a matching feature on the currently selected goal (see also Pesetsky's (1989) Earliness Principle).

The condition (29-d) on Agree is sometimes subsumed under the Activation Condition. As argued in Richards (2007), case features render interpretable ϕ-sets (i.e. goals) visible to the syntax and thus contribute to optimal design. A goal is thus only visible (active) for as long as it has an unvalued case feature. In effect, case thus acts as a boolean switch: if it is unvalued (switched on), then the goal is visible to probes; if it is valued (switched off), then the goal is invisible. We further assume that, for a goal's case feature to be valued, it is in principle sufficient for the goal to Agree with just *one* of the probe's agreement features, in the spirit of maximizing valuation opportunities (cf. (31)); that is, a blind, local computational system should not allow valuation to be delayed in the hope of finding a better (fuller) match later in the derivation. (See also Rezac (2003; 2004) for an approach to the individual deactivation of goal features.)

As is standard, we further assume that T and v each come in two varieties: a defective variant, which lacks ϕ features, and a nondefective, ϕ-complete variant able to partake in agreement and case valuation. For Southern Tiwa, we thus have nondefective variants of T and v with unvalued agreement and class features [AGR:□] and [CLASS:□] (the feature's lack of value is indicated by the presence of □) and defective variants of T and v that lack these features. The various variants of T and v are allowed to combine freely in principle as lexical choices in the numeration; some of these combinations will simply lead to nonconvergent derivations due to unvalued features. Thus a combination of defective T and defective v is unable to value case at all and so is incompatible with the presence of nominal arguments; on the other hand, a combination of T and v each bearing [AGR:□] and [CLASS:□] will fail to converge in a simple transitive due to the presence of more probe features than two arguments are able to value ([PERSON], [NUMBER] and [CLASS] are never valuable by the same argument in Southern Tiwa, for reasons of the complementary distribution of these features across D and N: see (36) below). It follows that the only possible (convergent) combinations of T-types and v-types are those given in (32), and that each corresponds to a particular clause type that provides just the right

number of arguments for the features of all the probes and goals to be valued.[2]

(32)

T/v-combinatorics		Clause type
$T_{[\text{AGR}:\square,\text{CLASS}:\square]} + v_{[-]}$	→	transitive
$T_{[\text{AGR}:\square,\text{CLASS}:\square]} + v_{[\text{AGR}:\square,\text{CLASS}:\square]}$	→	ditransitive
$T_{[-]} + v_{[\text{AGR}:\square,\text{CLASS}:\square]}$	→	dative intransitive
$T_{[\text{AGR}:\square,\text{CLASS}:\text{A}]} + v_{[-]}$	or	
$T_{[\text{PERS}:3,\text{NUM}:\text{SG},\text{CLASS}:\square]} + v_{[-]}$	→	simple intransitive

The simple clause structure in (33) shows the base positions that we assume for the various probes and goals. The latter are identified by their valued case forms. By Closeness (30), these case forms can be identified with particular probes, as given in (34).

(33) *Clausal structure:*
$[_{\text{TP}}\ \text{T}\ [_{\text{vP}}\ \text{NP}_{\text{erg}}\ [_{\text{v'}}\ \text{v}\ [_{\text{VP}}\ (\text{NP}_{\text{dat}})\ [_{\text{V'}}\ \text{V}\ \text{NP}_{\text{abs}}\ ]]]]]$

(34) *Case assignment:*

$T_{[\text{PERS}]}$	→	Ergative
$v_{[\text{PERS}]}$	→	Dative
$T/v_{[\text{CLASS}(/\text{NUM})]}$	→	Absolutive

Our final set of assumptions relates to the categorial status of nominal arguments as NPs versus DPs. As noted in the previous section, Rosen (1990) claims that nonincorporating absolutives are "highly specific", belonging to a class of definite or specific referring expressions that she calls "HiSpec". Further, she also notes that ergatives and datives, which may not incorporate, are always animate (Rosen (1990, 682); see also Fillmore (1968), Pesetsky (1995), Adger & Harbour (2007)). Animacy and specificity thus characterize the entire class of nonincorporating arguments. Recent work has revealed an implicational link between the specification of person features, on the one hand, and precisely these semantic properties (animacy and specificity) on the other: see

[2]The simple intransitive case employs a defective (probeless) v with a "semi-defectivized" T that comprises either (i) unvalued [AGR:□] and a default valued [CLASS:A] or (ii) unvalued [CLASS:□] and default valued [AGR] ([PERSON:3,NUMBER:SG]). See section 4.3 for empirical and conceptual justification of this.

Adger & Harbour (2007) on the person-to-animacy entailment, and Richards (2007) on the person-to-specificity entailment. If, following Postal (1970) and Richards (2007), we take person to be a property only of DPs (bare NPs being inherently third-person), then we can provide a structural definition of the entire class of nonincorporating arguments (regardless of case): these are all DPs. We thus equate Rosen's (1990) category HiSpec with the presence of a D-head. Nominals that are not HiSpec (i.e. incorporating nominals) lack a DP-shell, i.e. they are bare NPs, and optionality of HiSpec now translates to optionality of DP over NP.

As mentioned above, Adger & Harbour (2007, 20), in their study of the related language Kiowa, propose an implication from person (specifically, the presence of [PARTICIPANT]) to animacy. This can now be restated as an implication from DPs to animacy:

(35) *DP-animacy implication:*

DP	$\Rightarrow$	animate
animate	$\not\Rightarrow$	DP

DPs are always animate, by virtue of the syntactic person feature that they specify. Animates may still be NPs, however, and thus incorporate, as in (23-a). Further, the obligatory animacy of datives and ergatives now follows if these are obligatorily DPs (in Adger & Harbour's (2007) terms, dative arguments are obligatorily person/participant-specified since indirect objects must be capable of mental experience; see Harbour (2007) for similar claims about agents and ergatives). We will thus refer henceforth to DP_{erg} and DP_{dat} instead of NP_{erg} and NP_{dat}. Absolutives, by contrast, may be optionally DP_{abs} or NP_{abs} (i.e. optionally HiSpec, for Rosen), and we will refer to them accordingly in what follows.

The structural difference between DPs and NPs has important consequences for the accessiblity of the class feature of goals. We take [CLASS] to be a lexical property of the category N; thus [CLASS] is located on the head of NP. [PERSON] and [NUMBER], on the other hand, are contributed by D. We thus arrive at the DP-internal structure in (36).

(36) *Nominal structure:*

$[_{\text{DP}}\ \text{D}_{[\text{PERS,NUM}]}\ [_{\text{NP}}\ \text{N}_{[\text{CLASS}]}\ ]]$

We assume that the category D, like C and v, constitutes a *phase* in

the sense of Chomsky (2001). (See Heck & Zimmermann (2004) for arguments that DP is a phase.) As such, it is subject to the Phase Impenetrability Condition, as defined in (37).

(37) *Phase Impenetrability Condition, PIC; (Chomsky (2001))*: The domain of a head X of a phase XP is not accessible to operations at ZP (the next phase); only X and its edge (SpecX) are accessible to such operations.

As a result of (37), everything on the complement side of D (of an object within VP) becomes inaccessible once the phase head v has been introduced into the structure; only SpecD and D remain accessible. It follows that an NP's class feature is not accessible from outside of DP; i.e., [CLASS] on NP is only accessible to probes when that NP is not "protected" by a DP-layer. Third-person DPs, unlike NPs, thus have "invisible" [CLASS], a factor which will play a crucial role in the following sections in deriving the agreement and incorporation restrictions in (28).

4. Analysis 1: Agreement restrictions

With the above assumptions in place, we proceed to our analysis of the three agreement restrictions in (13) across the various clause types – transitives (section 4.1), ditransitives (4.2), and intransitives (4.3).

As noted in section 1, the agreement restrictions found in Southern Tiwa bear a close resemblance to a class of phenomena that has been dubbed the Person-Case Constraint (PCC) in the literature: so-called "weak" PCC effects in the case of transitives, and "strong" PCC effects in the case of ditransitives. Such effects may traditionally be analysed in terms of a Silversteinian prominence scale, such that the lower argument cannot be more prominent or salient in terms of its person/animacy properties than the higher argument (see Silverstein (1976)). Thus, for weak PCC, the lower argument cannot be 1st or 2nd person if the higher argument is 3rd person; for strong PCC, the lower argument cannot be high-ranked (local-person) at all. Instead of this, we adopt an approach to the PCC and PCC-like argument restrictions along the lines of recent minimalist analyses such as Anagnostopoulou (2003; 2006) and Rezac (2004), which dispense with primitive hierarchies and derive their effects from the mechanics of the Agree operation and the variable featural make-up of probes and goals. Specifi-

cally, agreement restrictions arise in the context of what we might call "probe sharing", that is, where a single probe relates to and values multiple goals. The first (higher, closer) goal encountered by the probe is invariably fully specified for person features (see, e.g., Adger & Harbour (2007), Harbour (2007) for independent semantic arguments that arguments occupying specifier positions, namely indirect objects and external arguments, must be capable of mental experience, affectedness, volitionality and the like, which they equate with presence of a person/participant feature, implying animacy, as discussed in section 3 above). Consequently, the person (and number) features of the probe are consumed by this first goal (in line with (31)), leaving only a sharply reduced set of probe features with which to value the second argument (we assume that probe features, once valued, are no longer active and so cannot enter further Agree relations – cf. Chomsky (2001) and the discussion of the Activity Condition in section 3 above; there is thus no "true" multiple Agree). It follows that the second argument must be less featurally specified than the first, in order for its case to still be valuable by the remaining feature(s) of the reduced probe. Agreement restrictions on the second, lower argument thus arise as a consequence of its having to make do with the leftover features not valued by the first, higher goal. In sum, the (set of) probe features available for more remote arguments is constrained, resulting in PCC-effects (see Bonet (1991), Boeckx (2000), Anagnostopoulou (2003), Haspelmath (2003), Rezac (2004), Richards (2006)).

In the specific case of Southern Tiwa, we are assuming the ϕ-set of a probe to comprise person, number and, crucially, also class features. Since only third-person arguments bear [CLASS] (cf. section 1), the third-person restriction on absolutive arguments (PCC) follows wherever [PERSON] and [NUMBER] are consumed (valued) by the higher argument, leaving only [CLASS] to probe and value the lower, absolutive argument.

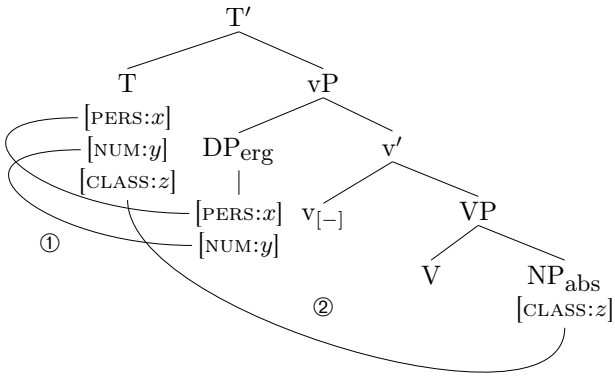
4.1. Transitives

Transitives with DP_{erg} and DP/NP_{abs} involve a T probe with unvalued ϕ-agreement (person, number) and class features, and a defective v probe, i.e. $T_{[AGR:\square,CLASS:\square]} + v_{[-]}$. Assuming that $v_{[-]}$ selects for a VP with only one argument (since otherwise there would be insufficient probes to value all the case features present), the probe(s) on T must

value the case features of both the DP_{erg} and DP/NP_{abs} argument. Accordingly, agreement restrictions (PCC effects) will arise on the second argument, DP/NP_{abs}.

Scenario 1:
Assume first that DP_{erg} is 1st/2nd-person and NP_{abs} is 3rd-person. The T probe first encounters the closer DP_{erg}, which values T's person and number features and, in turn, has its own case feature valued ergative by the T (see ① in (38)). Since 1st/2nd-person DPs are without class features, the class probe is left unvalued on T and is therefore able to probe further, for NP_{abs}. Insofar as the absolutive argument is an NP and not a DP, its class feature is accessible (by PIC, (37)) and so both the NP_{abs}'s case feature and the class probe on T (see ② in (38)) are valued in this second step of Agree. With all unvalued features thus valued, the derivation converges.

(38)



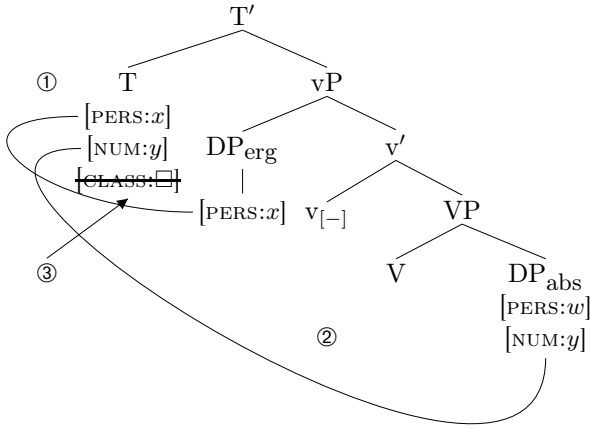
Scenario 2:
Assume next that both DP_{erg} and DP_{abs} are 1st/2nd-person. Since neither of these arguments bears [CLASS], both require probing by [PERSON] and/or [NUMBER] if they are to have their case features valued. This means that, in this particular case, T cannot expend both its person and number features on the closer, ergative argument; rather, it must withhold one of these for the more distant, absolutive argument. Clearly, this poses a lookahead problem, since the probe cannot know the 1st/2nd-person value of the second, lower argument prior to its agreeing with it, by which time it is too late to withhold a probe from agreeing with the first, higher argument. One possibility would be to allow violations of (31), so that a probe is not *forced* to maximize

agreement with the first goal that it finds. However, this would be an undesirable move on both empirical and conceptual grounds. Empirically, it would predict the absence of strong PCC effects with ditransitives (modulo rule (41) below; see also next section), since datives and 1st/2nd-person absolutives could freely cooccur in the absence of (31) by sharing v's person and number probes. Conceptually, this solution introduces optionality into the workings of the syntax itself (specifically, the Agree operation, which now may or may not maximize valuation), weakening the local, feature-driven determinism of the system. Instead, optionality in a minimalist system should be confined to the numeration, i.e. to lexical choices.

In that spirit, we propose a local alternative in terms of variable defectiveness of the goal rather than variable defectiveness ((31)-violability) of Agree. Let us simply assume that D in Southern Tiwa comes in two varieties: either defective, with only a person feature, or else complete, with person and number features (cf. Anagnostopoulou (2003; 2006) on the defective nature of dative DPs, which she claims to check only [PERSON]; see also Richards (2007) on the person-only agreement of quirky dative subjects in Icelandic). We thus have a lexical choice between defective $D_{[\text{PERS}]}$ and complete $D_{[\text{PERS,NUM}]}$. For the most part, choice of the defective variant will simply result in nonconvergence due to an unvalued number probe on T; in such cases, the complete (nondefective) variant must be chosen. However, wherever the lower argument is a DP and thus has accessible number features (i.e. when it is 1st/2nd-person or nonincorporating/HiSpec), choice of the defective variant has the potential to converge. The present example, scenario 2, is such a case.

Thus, suppose first that DP_{erg} is complete. Then both [PERSON] and [NUMBER] on T are valued by DP_{erg}, leaving no probe by which DP_{abs} could value its case feature. On the other hand, if DP_{erg} is defective, then it consumes only [PERSON] on T (see ① in (39)), leaving [NUMBER] for DP_{abs} (see ②). (Note that the derivation would crash if DP_{abs} were also of the defective, number-less kind, since T's person feature is already consumed by DP_{erg}.)

(39)



This defective-DP approach to the cooccurrence of local (1st/2nd person) subjects and objects predicts that it is exclusively the DP_{abs} argument that controls number-agreement in this scenario. Interestingly, the syncretisms in (40) illustrate that this prediction is borne out – there is no variation for [NUMBER] with the ergative argument – and thus support the claim that D may optionally be defective in Southern Tiwa. (Note that the apparent covariation of person-agreement with the absolutive argument in this paradigm can be readily attributed to variation in the ergative argument's person value, and so does not speak against this claim.)[3]

(40)

DP_{abs}	DP_{erg}	1st SG	1st DU	1st PL	2nd SG	2nd DU	2nd PL
1st	SG				*bey-*	*bey-*	*bey-*
	DU				*ku-*	*ku-*	*ku-*
	PL				*ku-*	*ku-*	*ku-*
2nd	SG	*i-*	*i-*	*i-*			
	DU	*men-*	*men-*	*men-*			
	PL	*ma-*	*ma-*	*ma-*			

The present analysis is thus able to explain why these syncretisms show up in the morphology of Southern Tiwa.

[3]Affixes for contexts in which both arguments are marked for the same person belong to a special reflexive paradigm, which we do not address here. See Rosen (1990) for discussion.

At this point, T's person and number features and the case features of both arguments are all valued. However, the derivation as yet will fail to converge, since there is still the unvalued class feature on T to take care of (see [CLASS:□] in (39)). To that end, it seems reasonable to assume that a triple-agreement language such as Southern Tiwa, i.e. a language with a separate class probe, will have at its disposal a last-resort deletion rule for removing unvalued class probes in precisely the context where no corresponding class features on goals are to be found, i.e. in the context of local-person arguments. We thus propose that a postsyntactic rule such as (41) is operative in Southern Tiwa at the PF interface, without which a class probe language would be unable to license canonical, prototypical, high-salience subjects (i.e. 1st/2nd-person ergatives).

(41) *Feature deletion:*
Unvalued [CLASS:□] on T can be deleted in the context of local (1st/2nd) person.

It is rule (41) which is responsible for the weak PCC effect characterizing Southern Tiwa T-agreement (i.e. transitives), rescuing as it does those configurations in which no class features are present on either subject or object, i.e. where both arguments are local person. As we will see below, rule (41) will equally account for the restriction against third-person ergative arguments in ditransitives as well as for the corresponding restriction of nonincorporation to local-person environments.

Scenario 3:
Let us now consider the scenario in which both DP_{erg} and NP_{abs} are third-person. Here, the derivation proceeds almost exactly as in scenario 1, except that this time the DP_{erg} is third-person and so bears a class feature. However, given our assumption that [CLASS] is a property of N, this feature is not accessible, being embedded under the DP-shell of the ergative (cf. section 3). This means that the pattern of feature valuation should be identical to scenario 1, with the ergative valuing only [PERSON] and [NUMBER] (its class feature being PIC-inaccessible), leaving T's class probe for NP_{abs}. Unfortunately, the morphological evidence appears to speak against this, since DP_{erg} does indeed seem to control for class (see, e.g., *u-* vs. *in-* vs. *iw-* with a class-C NP_{abs} in (42)).

(42)

	DP_{erg}	1st			2nd			3rd		
NP_{abs}		SG	DU	PL	SG	DU	PL	A_{sg}	A_{du}	B_{pl}
	A	*ti-*	*in-*	*i-*	*a-*	*men-*	*ma-*	*Ø-*	*in-*	*i-*
3rd	B	*bi-*	*imim-*	*ibi-*	*i-*	*mimim-*	*bibi-*	*i-*	*imim-*	*ibi-*
	C	*te-*	*kin-*	*kiw-*	*ku-*	*men-*	*mow-*	*u-*	*in-*	*iw-*

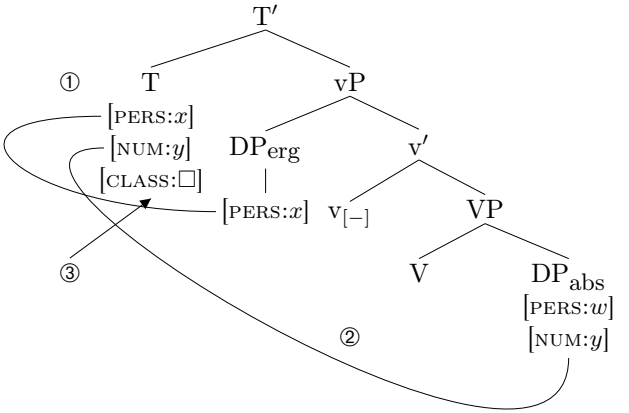
It would seem, therefore, that all of T's probes ([PERSON], [NUMBER] and [CLASS]) are exhausted by the third-person DP_{erg}, which should fatally leave no probe to value NP_{abs}.

To draw such a conclusion on the basis of (42) would be premature, however. Recall from section 1 the observation that animate NPs always follow Pattern 1 of the inflectional classes in (4). That is, in the singular they uniformly belong to class A, whereas in the plural they uniformly belong to class B. Number thus entirely determines "class" in the case of animates. The alleged class-A/B-agreement of DP_{erg} in (42) can therefore be readily reinterpreted as singular/plural number-agreement. Since the ergative argument is obligatorily animate (and thus a DP, on our assumptions) and [NUMBER] is located on D (cf. (36)), [NUMBER] on the ergative goal is always PIC-accessible to T (unlike [CLASS] on N), lending further support to our claim that what is usually taken to be class-agreement with ergative (and dative) DPs is really just number-agreement. The class probe on T therefore remains unvalued by the ergative, freeing it up for further probing and allowing NP_{abs}'s case feature to be valued. (Note that the number-less, defective variant of DP_{erg} would lead to a nonconvergent derivation in which T's [NUMBER] goes unvalued in this scenario, thus number must always be present on D in this context, on independent grounds).

Scenario 4:
The final transitive scenario to consider is the one which is excluded as a weak PCC effect: a 3rd-person DP_{erg} with a 1st/2nd-person DP_{abs}. As in scenario 2, T's [PERSON] and/or [NUMBER] must value both DP_{erg} and DP_{abs}, since neither of these goals bears (accessible) [CLASS]. DP_{erg} must therefore, as in scenario 2, be defective in order for the derivation to be viable, consuming just the person feature of T (see ① in (43)) and thereby leaving [NUMBER] for the absolutive argument (see ②). However, as in scenario 2, there again remains an unvalued class feature on T (see ③). Since the context is not one of local (1st/2nd)

ergative-agreement on T, the rule in (41) cannot apply in this case. The unvalued class feature thus remains undeleted and the derivation crashes, yielding the weak PCC restriction (8) on transitives.

(43)



4.2. Ditransitives

Whereas "upstairs"-agreement (T-Agree) is characterized by a weak PCC effect (barring local objects only in the context of nonlocal subjects), the "downstairs"-agreement domain (v-Agree) is characterized by a strong PCC effect, barring local direct objects with any (person of) indirect object. This difference between strong and weak PCC, we propose, reduces simply to the unavailability of a rule like (41) for v.

In the case of ditransitives, there are two probes present with unvalued agreement features: T and v both bear [AGR:□] and [CLASS:□]. Assuming that v with [AGR:□] selects for a VP with two arguments (cf. the clausal structure in (33)), it is the v probe that will enter into Agree with multiple goals, valuing the case of both DP_{dat} and DP/NP_{abs}. DP_{dat} is closer to v than DP/NP_{abs}, and so agreement restrictions will once again arise on the absolutive argument as the more distant of v's two goals (the closer argument, DP_{dat}, being obligatorily animate and thus obligatorily specified for [PERSON], i.e. a DP in our terms). T, on the other hand, has just a single goal to take care of in ditransitives, namely the DP_{erg}. We first consider the Agree operations initiated by the v probe, and the associated strong PCC restriction, in section 4.2.1, before turning to the T probe and the ban on third-person ergatives (section 4.2.2).

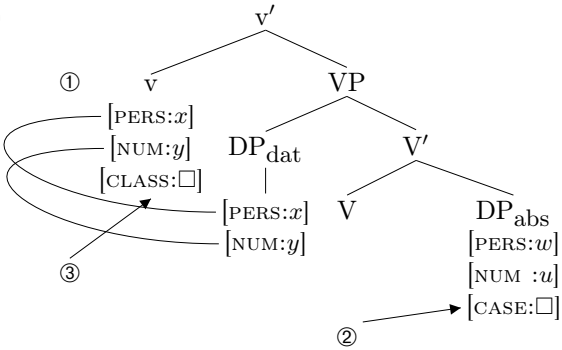
4.2.1. Probing from v

Scenario 1:
Suppose first that DP_{dat} is 1st/2nd-person and NP_{abs} is 3rd-person. As with the T-DP_{erg} relation in transitive scenario 1, DP_{dat} consumes both [PERSON] und [NUMBER] on v. This leaves [CLASS] for NP_{abs}, which possesses an (accessible) class feature, enabling valuation of [CASE] on NP and [CLASS] on v. (If a defective DP_{dat} were selected here, [NUMBER] on v would remain unvalued and thus crash the derivation.)

Scenario 2:
If DP_{dat} and NP_{abs} are both 3rd-person, then the derivation proceeds exactly as in scenario 1. As in transitive scenario 3, apparent class-A/B-agreement with DP_{dat} (whose embedded class feature on N should be PIC-inaccessible to v) can be reconceived as singular/plural number-agreement.

Scenario 3:
We finally consider the illicit cases, i.e. those in which DP_{abs} is 1st/2nd-person, ruled out as a strong PCC effect. This ban on local-person direct objects emerges as a "class Filter" effect: no matter what the person value for DP_{dat}, [CLASS] is left unvalued on v, since neither the DP_{dat} nor a 1st/2nd-person DP_{abs} is able to match and value it. The derivation involving a nondefective (ϕ-complete) DP_{dat} is shown in (44); here, case on DP_{abs} also goes unvalued, since no probe is available to match it ([PERSON] and [NUMBER] being both consumed by DP_{dat}). If a defective (number-less) DP_{dat} is selected instead, it consumes just [PERSON] on v, leaving [NUMBER] for DP_{abs}; all case features are then valued, but [CLASS] on v still remains unsatisfied. Crucially, the deletion rule in (41) cannot apply here, since it is restricted to local person agreement with T. On the assumption that no last-resort deletion rule on a par with (41) is available for dealing with v's class feature, the strong PCC restriction (10) on dative intransitives, and equivalently the second half of restriction (12)) on ditransitives, is derived.

(44)



4.2.2. Probing from T

Turning now to the role of T-agreement in ditransitives, a nondefective 1st/2nd-person DP_{erg} will consume T's [PERSON] and [NUMBER] (a defective, number-less DP_{erg} will leave T's [NUMBER] fatally unvalued, since the lower arguments, DP_{dat} and NP_{abs}, are already rendered inactive through v-Agree). [CLASS] on T thus remains, with no active arguments left to value it. However, this is nonfatal, as the context for the last-resort deletion rule (41) is met ((41) is available for T in the context of 1st/2nd-person), which takes care of T's remaining class probe. On the other hand, a 3rd-person DP_{erg} (whose class feature is embedded under a DP-shell) is similarly unable to value T's [CLASS]; however, in this case T's retention of an unvalued class feature *is* fatal, since last-resort deletion by (41) requires a local context (valued 1st/2nd-person on T). As a consequence, T's [CLASS] remains unvalued, crashing the derivation as a class Filter effect. The first half of restriction (12) on ditransitives, which bars third-person ergatives with (any person of) datives, is thus derived.

4.3. Simple intransitives

The final clause type to consider is that which contains a single argument. Proceeding from the assumption that intransitives involve only a T probe (i.e. v in intransitives is defective and thus unable to value internal case – cf. Burzio's Generalization), we face the immediate problem of how a solo third-person argument is able to fully value T's agree-

ment and class features (see, e.g., example (15)). If that third-person argument is a DP, then T's [CLASS] should go fatally unvalued, since rule (41) applies (by assumption) only in local-person contexts. That is, we have an unexpected discrepancy between transitive and intransitive T, in that only the former is incompatible with third-person DPs (i.e. the PCC effects discussed in the previous sections). On the other hand, if the solo third-person argument is a bare NP, then the opposite problem arises: now the goal can value only the complement set of features, namely [CLASS], leaving T's person and number features unvalued.

Our suggestion is that the defectivization of probes in intransitive clauses in Southern Tiwa extends beyond v to a subset of T's probe features. That is, in a language like English in which transitive clauses involve separate probes on distinct heads (T and v) for valuation of subject and object respectively, intransitives involve defectivization of one of these heads (namely v) in order to implement the "one argument - one probe" characteristic of Burzio's Generalization. In languages like Southern Tiwa, however, in which transitive clauses involve valuation of subject and object by the probes of a *single* head (namely [AGR] and [CLASS] on T), the "one argument - one probe" profile of intransitives must be achieved through defectivization of one of those features of T. Thus, intransitive T may comprise either active agreement (person/number) features or an active class feature, but not both, and is thus "defectivized". We suggest that in each case, the other (inactive) feature simply bears a pre-specified default value: simple intransitives therefore involve either T with [AGR:□] and [CLASS:A] or with [PERSON:3], [NUMBER:SG] and [CLASS:□], the two logical possibilities for defectivizing the T head. As we shall see, both these possibilities receive independent morphological support, suggesting that our approach to the defectivization of intransitive T is on the right track.

Scenario 1:

Let us first consider the scenario in which the only argument is (complete, nondefective) DP_{erg}, valuing [PERSON] and [NUMBER] on T. In this case, convergence requires that the $T_{[AGR:\square,CLASS:A]}$ variant of the defectivized T head is selected (if T bears [PERSON:3], [NUMBER:SG] and [CLASS:□], then [CLASS] on T and [CASE] on DP_{erg} go unvalued due to the unavailability of a matching class feature on the goal). T's [CLASS] thus bears the default value A in this scenario. An inspection of the intransitive paradigm (45) bears this out: the prefixes that ex-

press a single-argument DP are almost completely identical to those that constitute that part of the transitive paradigm (46) where NP_{abs} belongs to class A (see Rosen (1990, 673, fn. 4)).[4]

(45)

DP_{erg}	1st			2nd			A		B_{pl}
	SG	DU	PL	SG	DU	PL	SG	DU	
	te-	*in-*	*i-*	*a-*	*men-*	*ma-*	*Ø-*	*in-*	*i-*

(46)

	DP_{erg}	1st			2nd			A		B_{pl}
		SG	DU	PL	SG	DU	PL	SG	DU	
NP_{abs}		*ti-*	*in-*	*i-*	*a-*	*men-*	*ma-*	*Ø-*	*in-*	*i-*

An important difference thus emerges between *deletion* of unvalued class features by rule (41) in transitives and *defaulting* (or lexical pre-specification) of [CLASS] to the A-value in intransitives. Only in the latter case does [CLASS] have a value, and so only there do we expect a morphological reflex of [CLASS] to be detected in the paradigm. The (41)-deleted class feature of transitives, by contrast, should fail to affect the morphology. This is indeed what we find. Thus, in a transitive scenario 2 derivation of the kind *I saw you*$_{pl}$, the 1st-person singular subject values T's [PERSON] to 1, the 2nd-person plural object values T's [NUMBER] to PL, and rule (41) deletes T's unvalued class feature. The features to be realized by the morphology are therefore [PERSON = 1, NUMBER = PL], with no expression of [CLASS]. This feature bundle is realized by the prefix *ma-*. On the other hand, in an intransitive derivation of the kind *We arrived*, the 1st-person plural argument values T's [PERSON] to 1 and T's [NUMBER] to PL, with [CLASS] (pre-)specified as default A. The features to be realized by the morphology are thus [PERSON = 1, NUMBER = PL, CLASS = A]. This feature bundle is realized by the prefix *i-* (cf. (45)). Thus the different strategies for dealing with syntactically unvalued [CLASS] in transitive versus intransitive clauses result in different morphemes, *ma-* versus *i-*, corresponding purely to the difference between deleted (non-)class and default A-class. Without this difference, we would expect these two derivations to yield identical morphological forms, since both result in

[4]Only the 1st-person singular prefixes introduce a slight disparity between the two paradigms (*te-* vs. *ti-*), a minor deviation, albeit one for which we presently have no account.

valuation of T's agreement features to 1st-person plural.

Scenario 2:
In the second sceanrio, the single argument is NP_{abs}, thus able to value only [CLASS] on T. The corresponding convergent choice of T bears [PERSON:3], [NUMBER:SG] and [CLASS:□]: its [PERSON] and [NUMBER] being already default-valued, only [CLASS] is unvalued and active as a probe, for which NP_{abs}'s accessible [CLASS] provides the appropriate goal. (If T with [AGR:□] and [CLASS:A] is chosen, then both [PERSON] and [NUMBER] on T and [CASE] on NP_{abs} remain unvalued.) Again, there is ample morphological evidence in support of this alternative defectivization of the T probe. The endings we find with a solo third-person argument in the intransitive row in (45), the relevant part of which is repeated and augmented for NP_{abs} in (47), are *Ø-, i-, u-*, and these are identical to those found in the transitive paradigm with a class-A and thus third-person singular ergative: see the first column in (48).

(47)

NP_{abs}	A_{sg}	B_{pl}	C
	Ø-	*i-*	*u-*

(48)

	DP_{erg}	3rd	
NP_{abs}		A_{sg}	B_{pl}
	A	*Ø-*	*i-*
3rd	B	*i-*	*ibi-*
	C	*u-*	*iw-*

Since third-person singular is exactly what one would expect to find as a default specification for [PERSON] and [NUMBER], and since the intransitives with a third-person argument show precisely these same forms, our postulation of a defectivized intransitive T bearing [PERSON:3], [NUMBER:SG] and [CLASS:□] is empirically corroborated.

5. Analysis 2: Incorporation

As described in section 2, theme arguments (direct objects) generally undergo obligatory incorporation in Southern Tiwa. The exceptions always involve nominals which, as Rosen (1990, 685) describes them, are "likely to [be] definite, or at least specific, referring expressions".

Such nominals, along with human and animate nouns, belong to the category that Rosen dubs "HiSpec" (for "highly specific"), which can be equated with high prominence on a Silversteinian referential hierarchy. Let us pursue the suggestion put forward in section 3 that we can associate the HiSpec property with the presence of a D-head and thus DP-shell above the relevant NP. If [PERSON] is a property of D rather than N (there being no first- or second-person bare nouns, cf. Postal (1970), Richards (2007)), then this amounts to the suggestion that it is the specification of a person feature that translates to the interpretive properties of animacy, definiteness, etc., i.e. to the interpretive complex that Rosen refers to as HiSpec (see Adger & Harbour (2007), Richards (2007) on the relation between person (or participant) features in the syntax and animacy and definiteness in the semantic component). In short, DPs are person-specified nominals and therefore bear the person-associated semantic properties of animacy and/or specificity; as such, DPs are the categorial equivalent of Rosen's HiSpec class of nominals.

The patterns of obligatory (non)incorporation in Southern Tiwa can then be simply restated as follows: DPs cannot incorporate, whereas bare NPs must (see Baker (1996) on incorporation as a property of bare, unmodified, lexical nouns only).[5] For our present purposes, the technical reasons underlying this difference between the obligatory incorporation of NPs versus the obligatory nonincorporation of DPs need not concern us further. Plausibly the PIC (37) is again implicated in blocking the movement of N to V across the phase head D. Alternatively, one might adopt and adapt some of the central insights of Roberts's (2006) recent treatment of head movement within the probe-goal framework: namely, Agree is indistinguishable from Move just in case Agree involves total matching of *all* features of probe and goal (rather than probe and goal being in a subset-superset relation, as is usually the case). In that case, the values of all the formal features of the goal are copied onto the probe, which in effect creates a new insertion site at the probe, allowing the goal to be spelled out at the position of the probe, yielding the effect of head movement. Roberts employs

[5]The ban on incorporating ergatives (17) and datives (19) now follows automatically if these arguments are always DPs, i.e. person-specified and animate. See also footnote 6 below. Similarly, the restriction in (14) falls out if, for whatever reason, sole animate arguments in intransitives must necessarily be DPs, i.e. person-specified. Obligatoriness of (non)incorporation thus correlates with the optional presence vs. absence of D.

similar reasoning as the basis of a compelling treatment of clitic movement. Given our claim that bare NPs in Southern Tiwa bear just a single formal feature, namely [CLASS], incorporation of the Southern Tiwa kind would seem to instantiate the same basic pattern: Agree with NP_{abs} copies the values of all of the goal's formal features (i.e., [CLASS]) onto the probe, and thus the noun is spelled out as if it had moved to the probe. Head movement (incorporation), thus construed, would have both a syntactic (Agree) and morphophonological (realizational) component, striking a balance between the two sides of the "syntax versus PF" debate in the recent literature (both approaches to head movement are correct, at least in part).

Assuming, then, that DPs cannot whereas NPs must incorporate in Southern Tiwa, the conditions on nonincorporation reviewed in section 2.2 become conditions on when a direct object may or may not appear as a DP (as opposed to as an NP). Recall the contexts in which obviation of incorporation obtains: In intransitives, animates resist incorporation (cf. (14)-(16)); in transitives, nonincorporation is possible only with specific and/or animate nominals (i.e., HiSpec nominals, and thus DPs on our assumptions), and then only when two further conditions are met, as given in (24) above, repeated here.

(49) *Fifth condition on incorporation (Rosen (1990, 683, 688)):*
An NP_{abs} that is not the sole argument can optionally obviate (otherwise obligatory) incorporation (see (21)) if it is interpreted as specific and if a. and b. hold.

a. NP_{erg} is 1st/2nd.
b. There is no NP_{dat} co-argument.

As noted in section 2.2, the resemblance between the conditions on nonincorporation in (49-a), (49-b) and the agreement restrictions in (8) and (10), respectively, is striking. The contexts where incorporation may be obviated are identical to those in which a 1st/2nd-person absolutive may not appear in transitive and ditransitive clauses: (a) DP_{erg} must not be 3rd-person; and (b) no DP_{dat} may be present. Datives and third-person ergatives thus block nonincorporating (i.e. DP) absolutives in the same way that they block 1st- and 2nd-person absolutive DPs (yielding weak and strong PCC effects).

This identity of behaviour between HiSpec and local-person direct objects is surely not a coincidence, but rather indicates an underlying unity, such that nonincorporating (HiSpec) absolutives share a formal

property with 1st/2nd-person absolutives. Rosen (1990) captures this identity by ranking HiSpec in the same position as 1st/2nd-person on her alignment hierarchy (see (6)). Whilst this identity of ranking affords an effective and neat unification within her system, it is still an arbitrary stipulation. Building on her central insight, our approach allows us to take the unification a step further – the identitical behaviour of 1st/2nd-person and HiSpec absolutives follows automatically for us, reducing to the presence of a single shared property, namely the D head. Both local-person nominals and Hi-Spec absolutives are DPs – as argued above, it is D that contributes [PERSON] (and is thus obligatorily present on 1st/2nd-specified nominals) and it is [PERSON], in turn, that contributes semantic animacy, specificity and so on. It follows that all 1st/2nd-person nominals are, in effect, HiSpec: all are DPs, hence the unity of behaviour.

Agreement restrictions due to D thus automatically become constraints on incorporation too, since these now all involve the same set of nominals, namely those with a person-specification: DPs. What blocks agreement with local-person direct objects in the presence of datives and third-person ergatives will also block nonincorporation in these contexts. We thus attain the simplest possible unification of the categories of 1st/2nd-person and HiSpec, reducing the conditions on nonincorporation to the conditions on agreement (weak and strong PCC) as analysed in the previous section.

To show how this works in practice, we now run through the derivation of the restrictions on nonincorporation in transitive (5.1) and intransitive (5.2) clauses, in each case considering first the case where an NP (i.e. non-HiSpec) absolutive is chosen and then the case where the absolutive is a DP (i.e. the category of nominal that resists incorporation). Since the category of nominal that obligatorily incorporates (i.e. NP) bears only a class feature, we arrive at a system in which valuation of a class probe on T/v always goes hand-in-hand with incorporation of the matching goal. DP direct objects, and thus nonincorporation, are then only tolerated where class-Agree is allowed to fail, and this, as we have seen in our derivation of the agreement restrictions in section 4, is independently determined by the deletion rule in (41).

5.1. Transitives

Assume first that the absolutive is not HiSpec, i.e. that it is NP_{abs}. As familiar from section 4.1, (complete) DP_{erg} consumes [PERSON] and [NUMBER] on T, leaving NP_{abs} to consume [CLASS]. All features are thus valued, ensuring convergence, and incorporation occurs due to the categorial status of the direct object (NP): in terms of Roberts (2006), the values of all of NP_{abs}'s formal features (namely: [CLASS]) are copied onto T, which results in spelling-out of NP_{abs} in the position of the probe. This yields (21) (the obligatory incorporation of non-HiSpec absolutives, NP_{abs}).

If the absolutive is HiSpec, i.e. if it is DP_{abs} (and thus interpreted as specific/animate), its class feature is not accessible to T, by (37). The class probe on T thus goes unvalued, and this failure of class-Agree is accompanied by failure of incorporation: DPs cannot incorporate (in terms of Roberts (2006), complete copying of the DP's formal feature values to the probe does not take place). Consequently, [CLASS] on T must be taken care of by the last-resort deletion mechanism (41). Since this is only possible if DP_{erg} is 1st/2nd-person, nonincorporation is only legitimate with 1st/2nd person ergatives. Thus the derivation of the restriction on nonincorporation in (49-a) reduces to that of the weak PCC restriction in (8): both are due to (41).

5.2. Ditransitives

Turning now to ditransitives, the same logic applies as in the transitive scenarios, except that the relevant class probe is now that of v, not T. If the absolutive is not HiSpec (i.e. if it is NP_{abs}), then the derivation involves class-Agree and incorporation, just as in scenario 1 of the transitive case above (section 5.1).

If, on the other hand, the absolutive is a DP (i.e. HiSpec), the class probe is left unvalued on v and incorporation is concomitantly impossible. However, in this case the context for last-resort deletion of [CLASS] by (41) is not met: the offending class feature is on v, not T. The derivation thus crashes, yielding (49-b): the ban on nonincorporation in the

presence of a dative DP reduces to the strong PCC restriction in (10) and thus, once again, to (41); cf. section 4.2.[6]

6. Conclusion

We have attempted to show that the seemingly complex restrictions on agreement and incorporation in the typologically rare triple-agreement system of Southern Tiwa are to a large extent derivable from independently motivated, universal conditions on Probe-Goal Agree plus some special, but nonarbitrary, assumptions about the featural make-up of the heads T, v and D (which all exist in defective and nondefective forms) and of DP versus NP arguments. The three overlapping conditions on agreement identified in section 1, such that combinations of any two out of the three categories of DP-argument (datives; 3rd-person ergatives; 1st/2nd-person and/or "HiSpec" absolutives) are banned, have been shown to reduce to a single feature-deletion rule that we have argued to be a necessary property of a triple-agreement language with an independent class probe. The differences between the weak PCC effect characterizing transitives and the strong PCC effect characterizing ditransitives in Southern Tiwa is then a function of the applicability of that rule: last-resort deletion of unvalued [CLASS] is available "upstairs", in the T domain, but not "downstairs", in the v domain, thus yielding the stronger PCC restriction on the lower domain. Person-Case-Constraint and incorporation restrictions thus arise in a specific context in Southern Tiwa, that of class-agreement, and are thereby unified into a single set of constraints on the licensing of DPs (i.e. that category of nominal which cannot value [CLASS] in the

[6]Note that, in terms of Roberts (2006), the ban on incorporation of datives and ergatives (cf. (17), (19)), which are always HiSpec/DPs, would follow in the same way as the ban on incorporation of HiSpec/DP absolutives (direct objects): at least where third-person DPs are concerned, it will never be the case that the values of *all* the formal features of DP_{erg} or DP_{dat}, i.e. [PERSON] and [NUMBER] *and* [CLASS], are copied onto the probe by Agree. Thus DP_{erg} and DP_{dat}, like DP_{abs}, never "move" to the probe and so incorporation is never possible (cf. also Baker (1988; 1996)). The situation is less clear for local-person DPs, where arguably person and number are the only features present (since local nominals lack [CLASS]). The technical possibility thus arises, at least in principle, of treating 1st/2nd-person agreement morphemes as incorporated pronominal (DP) arguments. We leave this for future research.

syntax). In this way, we have uncovered and identified an interesting difference between Southern Tiwa and its Tanoan relative, Kiowa: as analysed by Adger & Harbour (2007), the postulation of a class probe is unnecessary for deriving the (strong) PCC effects found in Kiowan ditransitives.

References

Adger, David & Daniel Harbour (2007): Syntax and Syncretisms of the Person Case Constraint, *Syntax* 10, 2–37.

Aissen, Judith (1990): Towards a Theory of Agreement Controllers. In: B. Joseph & P. Postal, eds., *Studies in Relational Grammar 3*. University of Chicago Press, Chicago, pp. 279–320.

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

Allen, Barbara J. & Donald G. Frantz (1983): Advancements and Verb Agreement in Southern Tiwa. In: D. Perlmutter & C. Rosen, eds., *Studies in Relational Grammar 1*. University of Chicago Press, Chicago, pp. 303–314.

Allen, Barbara J., Donald G. Frantz & Donna B. Gardiner (1984): Noun Incorporation in Southern Tiwa, *International Journal of American Linguistics* 50, 292–311.

Allen, Barbara J., Donald G. Frantz, Donna B. Gardiner & David Perlmutter (1990): Verb Agreement, Possessor Ascension, and Multistratal Representation in Southern Tiwa. In: B. Joseph & P. Postal, eds., *Studies in Relational Grammar 3*. University of Chicago Press, Chicago, pp. 321–383.

Anagnostopoulou, Elena (2003): *The Syntax of Ditransitives: Evidence from Clitics*. Studies in Generative Grammar, Mouton De Gruyter, Berlin.

Anagnostopoulou, Elena (2006): Strong and weak person restrictions: A feature checking analysis. In: L. Heggie & F. OrdoÃśez, eds., *Clitics and Affixation*. Amsterdam, pp. 199–235.

Baker, Mark (1988): *Incorporation. A Theory of Grammatical Function Changing*. University of Chicago Press, Chicago.

Baker, Mark (1996): *The Polysynthesis Parameter*. Oxford University Press, New York.

Baker, Mark (2006): The Syntax of Agreement and Concord. Ms., Rutgers University.

Boeckx, Cedric (2000): Quirky Agreement, *Studia Linguistica* 54, 354–380.

Bonet, Eulália (1991): Morphology after Syntax: Pronominal Clitics in Romance. PhD thesis, MIT.

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

Chomsky, Noam (2000): Minimalist Inquiries: The Framework. In: R. Martin, D. Michaels & J. Uriagereka, eds., *Step by Step: Essays on Minimalist Syntax in Honor of Howard Lasnik*. MIT Press, Cambridge, Mass., pp. 89–156.

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

Chomsky, Noam (2005): On Phases. Ms., MIT.

Chomsky, Noam (2007): Approaching UG from Below. In: U. Sauerland & H.-M. Gärtner, eds., *Interfaces + Rekursion = Language? Chomsky's Minimalism and the View from Syntax-Semantics*. Mouton de Gruyter, Berlin, pp. 1–30.

Fillmore, Charles (1968): The Case for Case. In: E. Bach & R. Harms, eds., *Universals in Linguistic Theory*. Holt, Reinhart and Winston, New York, pp. 1–88.

George, Leland & Jaklin Kornfilt (1981): Finiteness and Boundedness in Turkish. In: F. Heny, ed., *Binding and Filtering*. MIT Press, Cambridge, Massachusetts, pp. 105–127.

Harbour, Daniel (2007): A Feature Calculus for Silverstein Hierarchies. Ms., Queen Mary, University of London.

Haspelmath, Martin (2003): Explaining the Ditransitive Person-Role Constraint: A Usage Based Approach. Ms., MPI Eva, Leipzig.

Heck, Fabian & Malte Zimmermann (2004): Remarks on the Status of DP as a Phase. Ms., Universität Tübingen, Humboldt-Universität Berlin.

Nichols, Johanna (1986): Head-Marking and Dependent-Marking Grammar, *Language* 62, 56–119.

Pesetsky, David (1989): Language Particular Processes and the Earliness Principle. Ms., MIT.

Pesetsky, David (1995): *Zero Syntax. Experiencers and Cascades.* MIT Press, Cambridge, Massachusetts.

Postal, Paul (1970): On So-Called Pronouns in English. In: R. A. Jacobs & P. S. Rosenbaum, eds., *Readings in English Transformational Grammar.* Ginn and Company, Waltham, Massachusetts, pp. 56–82.

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

Rezac, Milan (2004): Elements of Cyclic Syntax: Agree and Merge. PhD thesis, University of Toronto.

Richards, Marc (2006): Quirky Expletives. To appear in: *Agreement Restrictions*, R. d'Alessandro, G. H. Hrafnbjargarson and S. Fischer (eds).

Richards, Marc (2007): Defective Agree and Case Alternations. Ms., Universität Leipzig.

Roberts, Ian (2006): Clitics, Head-Movement, and Defective Goals. Ms., University of Cambridge.

Rosen, Carol (1990): Rethinking Southern Tiwa: The Geometry of a Triple Agreement Language, *Language* 66, 669–713.

Sadock, Jerrold M. (1985): The Southern Tiwa Incorporability Hierarchy, *International Journal of American Linguistics* 51, 568–72.

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.

Spellout and the Weak, Strong, Mixed Declension in German and Definiteness in Bulgarian

Petr Biskup*

Abstract
In this paper, I argue that certain features can be spelled out only once in certain languages. Specifically, the pattern of behavior of German and Bulgarian DPs can be attributed to the fact that the relevant feature - the gender feature in German DPs and the definiteness feature in Bulgarian DPs - can be spelled out only once. To analyze this pattern of behavior, I pursue an approach that assumes spellout of non-terminal elements and feature inheritance. I show that feature inheritance is limited by phase boundaries and argue that adverbials are invisible for the set-merge spellout procedure because they are merged by the pair-merge operation.

1. Introduction

It is known about German that it has the weak (1a), strong (1b) and mixed (1c) adjectival declension. The determiner marker *-er* can appear either on the definite article, as shown in (1a), or on the adjective, as shown in (1b) and (1c). However, it cannot coexist on both, as demonstrated in (2). The generalization drawn from this is that the adjective and the article compete for the same marker. If the marker is not present on the article, it must appear on the adjective.

(1) a. der alte Mann
the old man-nom
b. alter Mann
old man-nom

*I would like to thank participants of the Workshop on theoretical morphology 3 for their comments and suggestions. I would also like to thank Tarald Taraldsen for his valuable comments.

1-2-many, 241-261
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c. ein alter Mann
an old man-nom

(2) a. *der alter Mann
the old man-nom

b. *einer alter Mann
an old man-nom

In Bulgarian, the definite article *-ta* can appear either on a noun, as shown in (3a), or on an adjective, as in (3b) and (3c), but it cannot appear on more elements at the same time, as illustrated in (4). Thus, the generalization is that the noun and the adjective(s) compete for the same marker. And the marker must appear on the leftmost element in the DP; compare example (3c) with (5).

(3) a. knigata
book-the

b. interesnata kniga
interesting-the book

c. goljamata interesna kniga
big-the interesting book

(from Franks 2001)

(4) a. *interesnata knigata
interesting-the book-the

b. *goljamata interesnata knigata
big-the interesting-the book-the

(5) a. *goljama interesnata kniga
big interesting-the book

The rest of the paper is organized as follows. In section 2, I will introduce the background assumptions. Then, I will discuss the gender feature in German DPs and will develop an analysis that relies on spell-out of non-terminal elements and feature inheritance. I will show that feature inheritance is limited by phase boundaries. Then I will turn to the definiteness feature in Bulgarian and will argue that it can be spelled out only once in DPs. I will also show that languages differ with respect to whether a certain feature is to be deleted after its spellout. I will discuss spellout of adverbials and argue that they are invisible for the proposed spellout procedure because they are merged by the pair-merger. Conclusions will be drawn in section 3.

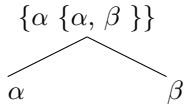
2. Proposal

2.1. Background

Let us begin with the background assumptions. I follow Chomsky's set-merger proposal (1995); consider (6a). The proposal is illustrated by the tree with label α in (6b).

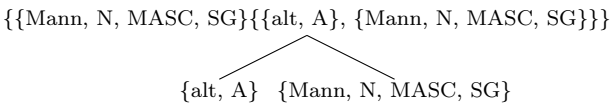
(6) a. Chomsky (1995, 243–244)
Merger of α and β forms $\{\gamma\ \{\alpha,\ \beta\ \}\}$, where γ is the label and α and β sets of features.
The label (head) γ is either α or β.

b.

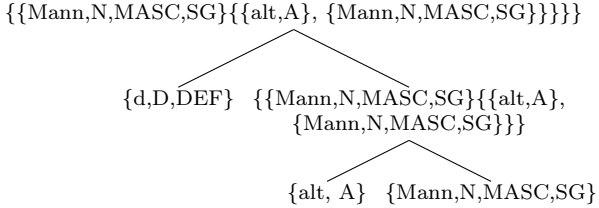


From this point of view, syntactic structure means growth of information, growing sets. Based on the set-merger proposal in (6), example (1a) *der alte Mann* is derived as follows. First, adjective *alt* is merged with *Mann*, which bears features 'noun', 'masculine' and 'singular', and they form the set with label {Mann, N, MASC, SG}, as shown in (7a). This set then is merged with *d* with features 'determiner' and 'definite' and now *d* determines the label, as demonstrated in (7b).

(7) a.



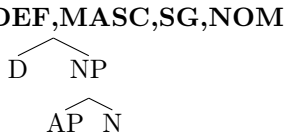
b.



There is a morphological and syntactic commonality. Morphologically, as already said, the article and the adjective compete for the same marker *-er*. If the marker does not appear on the article, it must appear on the adjective. Syntactically, both competing elements are dominated by the common node DP, as illustrated in (7b). Because of

these commonalities, I will pursue an approach that assumes spellout of non-terminal nodes (see Weerman & Evers-Vermeul 2002, Neeleman & Szendrői 2005, or Caha 2006) and employs feature inheritance. Thus, spellout of nominal phrases begins with the DP node. As usual, in the course of derivation, the DP gets a case. In our example (1a), it is nominative. Then, after narrow syntax, the DP node with features to be spelled out looks like (8), which is simplified (7b).[1] However, in the lexicon, there is no vocabulary item that can realize *d, alt, Mann, DEF, MASC, SG, NOM.*

(8)



Therefore, as the next step, spellout goes down, first to the left to the specifier, as is standardly assumed, see Kayne (1994) or Fukui & Takano (1998). I distinguish between terminals (in our example *d, alt, Mann*) and their features *DEF, MASC, SG, NOM.* I assume that terminals do not spell out other terminal roots - they can spell out just the inherited features - only non-terminal nodes can spell out more terminal roots. In other words, terminal roots are not inherited. This makes the job that is done by the agree relation or by the feature percolation (extended maximal projections) in other approaches, and has the advantage that it renders blocking of phrasal items (i.e. more complex items) by lexical items.

More specifically, now, the determiner node *d* with the definiteness feature *DEF* and the inherited features *MASC, SG, NOM* should be spelled out, as (9) demonstrates. For this combination, spellout finds *er* in the lexicon and it is inserted, which results in *der.*

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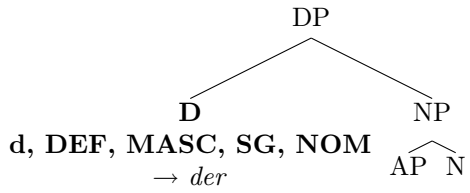
[1]The number of occurrences of particular features does not play a role here, hence features are listed on the nodes only once, and brackets are omitted. For ease of exposition, from now on, I make use of the standard labels.

(9)



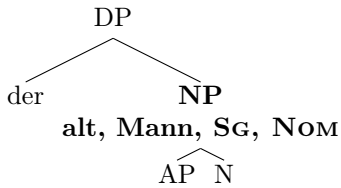
Sentence (10) shows that the determiner marker -*er*, which is common for personal pronouns and determiners, indeed can express case, gender and number; compare also table (14).

(10) (D)er hat Probleme.
(t)he has problems.

2.2. Deleted gender feature

As the next step, spellout goes to the NP node with *alt, Mann* and the inherited features *SG, NOM*[2] but there is no vocabulary item for this NP in the lexicon (compare Schlenker 1997 who also proposes that features can be inherited, but in his proposal features can be transmitted only in a head-to-head way).

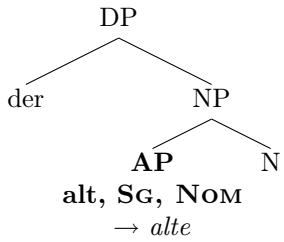
(11)



Then, spellout moves to the adjectival node with *alt* and with the inherited features *SG, NOM*, as illustrated in (12).

[2]For the gender feature, see below.

(12)



The question arises why marker -*e* appears on the adjective *alt* and not marker -*er* as on the head D. The reason for this is that the gender feature has already been deleted - specifically, it was deleted after spellout of D – because this feature can be spelled out only once in German.[3] This proposal is supported by the mixed declension paradigm in (13). A comparison of (13) and the determiner marker paradigm in (14) shows that in cases where the determiner marker appears on (*k*)*ein* (*kein* = no, *ein* = a) in (13), the default marker -*en* appears on the adjective (the only exception is *NOM/ACC.FEM.SG*). If the determiner marker does not appear on (*k*)*ein*, it must appear on the adjective; consider Nom.Masc.Sg and Nom/Acc.Neut.Sg.

(13) The mixed declension

	Masc	Fem	Neut	Pl
Nom	kein alt*er*	kein*e* alt*e*	kein alt*es*	kein*e* alt*en*
Acc	kein*en* alt*en*	kein*e* alt*e*	kein alt*es*	kein*e* alt*en*
Gen	kein*es* alt*en*	kein*er* alt*en*	kein*es* alt*en*	kein*er* alt*en*
Dat	kein*em* alt*en*	kein*er* alt*en*	kein*em* alt*en*	kein*en* alt*en*

(14) The determiner marker

	Masc	Fem	Neut	Pl
Nom	*er*	*e*	*es*	*e*
Acc	*en*	*e*	*es*	*e*
Gen	*es*	*er*	*es*	*er*
Dat	*em*	*er*	*em*	*en*

[3]In DM words, -*er* cannot be inserted into environments without the gender feature because it would violate the Subset Principle because -*er* is specified for the masculine gender feature.

Given the fact that (*k*)*ein* appears only in singular and only in NOM.MASC and NOM/ACC.NEUT and the fact that marker -*es* is always common for NOM and ACC in NEUT.SG, the main task of the determiner marker (-*er* and -*es*) on the adjective in NOM.MASC.SG and NOM/ACC.NEUT.SG is to differentiate the masculine gender from the neuter gender.

Consider also (15) with the personal pronoun *du*. This example shows that the determiner marker -*er* disambiguates gender. The personal pronoun *du* expresses case and number but does not express gender. Thus, after spellout of *du* the gender feature is still alive. Consequently, the gender feature is spelled out on the adjective.

(15) du alt-er
you old

The same argument can be done with elliptical noun phrases in (16). In sentence (16a), the gender feature is spelled out on the head D (*d-er*), hence, it is deleted from the featural bundle[4], and the possessive pronoun gets just the adjectival marker -*e* (see discussion below). In contrast, in (16b), there is no article; hence the gender feature cannot be spelled out on it. And since the possessive pronoun *dein* itself does not express gender, the gender feature is spelled out on it as -*er*.

(16) a. Es ist der dein-e.
It is the your
b. Es ist dein-er.
It is your

Another question concerning (12) is why marker -*e* appears on *alt* and not the default adjectival marker -*en*[5]. A look at the weak declension table in (17) reveals that marker -*e* prevents -*en* from appearing in adjectival singular structural case environments (with the exception of

[4]The same holds for the DEF feature; this feature does not play a role in the further spellout procedure.

[5]The weak declension (17) and the mixed declension (13) show why -*en* is analyzed as the adjectival default marker; it can appear in all case environments as well as gender and number environments. In fact, -(*e*)*n* seems to be a general default marker in German. Consider e.g. its occurrences in verbal morphology *singen* (inf./1.pl./3.pl.), relatives *dessen*, *deren*, plural *Frauen*, or in the weak noun declension *Studenten*.

-*en* in ACC.MASC.SG). This exactly happens in (12). Since there are SG and NOM in the set of features, the marker -*e* must be inserted instead of the default -*en*. This shows that the case and number features – in contrast to the gender feature – cannot be deleted after their spellout.[6]

(17) The weak declension

	MASC	FEM	NEUT	PL
NOM	d*er* alt*e*	d*ie* alt*e*	d*as* alt*e*	d*ie* alt*en*
ACC	d*en* alt*en*	d*ie* alt*e*	d*as* alt*e*	d*ie* alt*en*
GEN	d*es* alt*en*	d*er* alt*en*	d*es* alt*en*	d*er* alt*en*
DAT	d*em* alt*en*	d*er* alt*en*	d*em* alt*en*	d*en* alt*en*

That the case feature and the number feature are relevant for next steps of the spellout procedure, thus, they are inherited, is also supported by the weak noun declension. Example (18) demonstrates that *Bär* has different nominative markers for singular and plural and different case markers for nominative and dative. Note that the value of the case feature is not intrinsic to N – as already said, case is valued in narrow syntax – hence contrasts in (18) cannot only be determined by the noun. A comparison of (18) and (19) confirms that the definiteness feature – in contrast to the case and number feature – does not play a role in the lower spellout procedure.

(18) a. der Bär
the bear-nom

b. dem Bären
the bear-dat

c. die Bären
the bears-nom

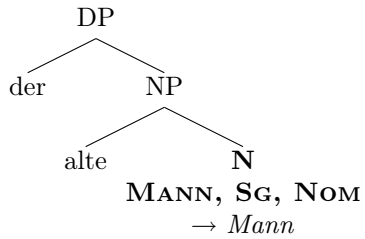
(19) a. ein Bär
a bear-nom

[6]In German, like in many other languages with adjectival concord, multiple adjectives belonging to the same DP bear the same marker (with the exception of indeclinable adjectives). It seems that the unique spellout of the gender feature in German DPs should be specified with respect to categories because in the case of multiple adjectives in the strong and mixed declension the gender feature spells out x times. This means that the gender feature cannot be deleted from the featural bundle before the spellout procedure goes through all members of the A category.

b. einem Bären
   a bear-dat
c. Bären
   bears-nom

Let us come back to the derivation of *der alte Mann*. In the final step, the spellout procedure continues to the N node with *Mann* and the inherited features *SG, NOM* and consequently *Mann* is spelled out, as illustrated in (20).

(20)



There are a few interesting issues concerning the gender feature in the mixed declension. As shown in (1c), the mixed adjectival declension has *ein alter Mann* for MASC.SG.NOM, where -*er* appears on the adjective and not on the article, contrary to the weak declension *der alte Mann*. However, marker -*er* can appear on *ein* (or *dein*), as shown in (21a) and (16b). It is possible only when the noun is not present overtly in the DP, as indicated by (21b) and (22). The emerging generalization is that the presence of the determiner marker -*er* on *ein* or *dein* is licensed by the ellipsis.

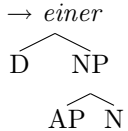
(21) a. Einer kam.
   one came
b. *Einer Mann kam.
   one man came.

(22) *deiner Mann
   your man

Depending on the context (on the elided material), the spellout procedure of *einer* can look e.g. like (23), where *einer* stands for *ein alter Mann*. It is clear that elements that are to be elided must be marked for deletion and that this information must be accessible for spellout. Thus, given the set-merger, there are, *ein*, ~~*alt*~~, ~~*Mann*~~, INDEF, MASC, SG, NOM on the DP node. This means that ~~*alt, Mann*~~ are marked for

deletion and that the spellout procedure – which begins with the DP node – sees this information.[7] And since the determiner marker -*er* can spell out the features Masc, Sg, Nom on the DP node, the DP node is spelled out as *einer*.

(23)



In the case of *ein alter Mann*, the DP node prepared for spellout has the same features but *alt*, and *Mann* are not marked for deletion. Since there is no vocabulary item in the lexicon that can realize *ein, alt, Mann, INDEF, MASC, SG, NOM*, the spellout procedure must go to the D node with *ein*. Since *einer alte Mann* is ungrammatical, -*er* must be somehow blocked from appearing on the *ein* node. We have seen that the determiner marker can appear on an adjective, that is on the A node, as in (1b), and on *d*, that is on the D node, as in example (1a). Thus, the environment where the determiner marker cannot appear is the indefinite D node, which means that -*er* must be specified for some feature that can block its presence on this node. Therefore -*er* will also be negatively specified for the indefinite D head, as shown in (24).[8]

(24) er: [MASC, SG, NOM, -INDEF D]

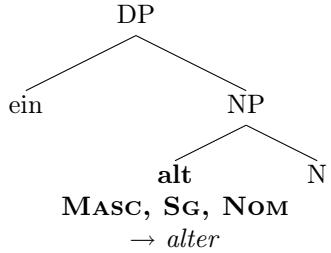
Since -*er* cannot be inserted into the D node, the gender feature is not deleted from the featural bundle and spellout goes to the NP node. But there is no vocabulary item for *alt*, *Mann*, *MASC, SG, NOM* (the

[7] To be more accurate, this case would probably be an ellipsis of the NP node.

[8] Alternatively, the markedness for deletion could be treated e.g. as a pron(ominalization) feature. This analysis would be preferred by Romance languages like Spanish or Italian. As pointed out to me by Tarald Taraldsen, e.g. in Spanish, the masculine marker -*o* does not appear on D (on articles) in singular, in contrast to the feminine marker -*a*. But -*o* can appear on D when the head noun is elided and even in cases where an adjective is present; see the contrast between *un nuevo libro* and *uno nuevo*. Since *uno nuevo* cannot be a spellout of the DP node, *uno* must be a spellout of the D node. Thus, -*o* on D would be licensed by the presence of the inherited pron feature in the featural bundle.

INDEF feature was deleted after spellout of ein), hence spellout goes to the AP (A) node with alt and the inherited features *MASC, SG, NOM*, as illustrated in (25). There, the determiner marker can be inserted (it is more specific than -*e* or -*en*, as shown below), thus after spellout of the N node as *Mann*, we get e*in alter Mann*.

(25)



So far we have seen that *ein* can spellout the DP node as well as the D node. It seems that der and ein do not always need to instantiate the same category. Consider example (26), where both elements co-occur in the DP, and where *ein(e)* spells out the node A. Then it is not surprising that the interpretation of *ein* – and the whole noun phrase – depends on which node it spells out. When *ein* spells out the D node, the DP gets the indefinite or specific indefinite interpretation, when it spells out the A node, the DP gets the partitive or contrastive interpretation, and when *ein* spells out the DP node, it brings about the pronominal or anaphoric interpretation.

(26) der eine Mann

The feminine gender is even more interesting. There are the elliptical form *eine* (spellout of the DP node, as in the case of the masculine *einer*), the indefinite DP *eine Frau* (where *eine* spells out the D node), and *die eine Frau* (where *eine* spells out the A node) for Fem.Sg.Nom; all with the exponent -*e*. Forms *eine Mann* and e*ine Kind* are ungrammatical, therefore the determiner marker -*e* will be specified for the feminine gender, to block its appearing in masculine and neuter environments. Since -*e* can also appear in plural – consider paradigms in (13), (14) and (17) – this marker is specified as disjunction (27).

(27) e: [[Fem, Sg] v [Masc/Fem/Neut, Pl]][9]

[9]This marker is blocked from the feminine and plural non-structural cases by

The gender specification in plural is necessary because it blocks bad forms such as *die alte Männer* for MASC.PL.NOM/ACC. Since the gender feature is deleted after its spellout, i.e. after spellout of *die* in this case, marker (27) cannot be inserted into the A node alt (given the Subset Principle) and the default marker -*en* is inserted instead. And since the gender feature is also deleted after its spellout in feminine singular environments, it is clear that -*e* on e.g. *alte* in *eine alte Frau* in FEM.SG.NOM/ACC must be different from the marker in (27). Thus, I specify this type of -*e* as follows:

(28) e: [A, SG, STR]

The singular specification blocks this adjectival structural case marker from appearing on the A node in cases like **die alte Männer/Frauen* in PL.NOM/ACC in favor of the default marker -*en*. The adjectival specification blocks this type of -*e* from appearing on the D node in cases like **eine Mann/Kind* in MASC/NEUT.SG.NOM. And the structural specification favors -*e* against the default marker -*en* in adjectival structural case environments.

2.3. Non-deleted gender feature and phasehood

One may ask whether it holds generally that the gender feature is spelled out only once in DPs. There are languages showing that it is not a general rule. For example, in Czech, the gender feature is not deleted from the featural bundle. Consider the contrast between the feminine DP in (29a), and the masculine DP in (29b). In Latin, the gender feature must also be spelled out throughout the DP, as demonstrated by the contrast between the feminine DP *nulla magna civitas* in (30a) and the neuter *nullum magnum ingenium* in (30b). Thus, languages can differ with respect to whether or not a certain feature is to be deleted after its spellout.

(29) a. t-a star-á žen-a
the-fem.sg.nom old-fem.sg.nom woman-fem.sg.nom
b. t-en star-ý muž
the-masc.sg.nom old-masc.sg.nom man-masc.sg.nom

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more specific case markers. The fact that only the feminine gender is expressed in singular seems to be more general, see note 8.

(30) a. Null-a magn-a civitas quiescere
no-fem.sg.nom big-fem.sg.nom state-fem.sg.nom to rest
potest
can
There can not be a large state living in peace ...
(Livius, Ab urbe condita libri CXLII)

b. Null-um magn-um ingenium sine
no-neut.sg.nom big-neut.sg.nom nature-neut.sg.nom without
mixtura dementiae
mixture of madness
There is no one great ability without a mixture of madness.
(Seneca, De tranquilitate animi XVII. 10.)

Since the gender feature does not have to be deleted after its spellout in certain languages, the question arises how deep the featural inheritance can go. The prediction is that the featural inheritance is maximally one phase deep because phases are spellout domains. Chomsky (2005, 2006) argues that DPs are phases. Therefore I will test the prediction with *tisíc* 'thousand', which can categorially be noun or numeral. In example (31a), *tisíc* modifies *ženami* and agrees with it in case, gender and number. In contrast, in (31b), *tisíc* bears its gender and number feature and blocks agreement between the head noun *žen* and the demonstrative *tím*. This means that the prediction is valid because in (31a) there is one spellout domain – i.e. one DP – and in (31b) there are two spellout domains.

(31) a. s t-ěmi tisíc
with the-fem.pl.instr thousand-fem.pl.instr
star-ý žen-ami
old-fem.pl.instr women-fem.pl.instr

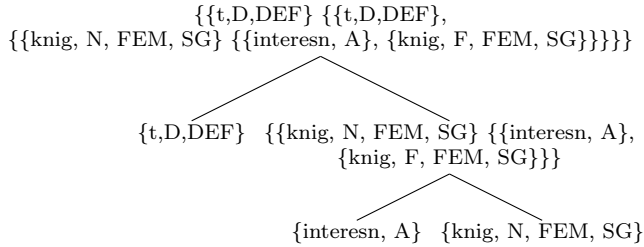
b. s t-ím tisíc-em
with the-masc.sg.instr thousand-masc.sg.instr
star-ých žen
old-fem.pl.gen women-fem.pl.gen

2.4. Definitness feature

In this section, I turn to the definiteness feature in Bulgarian. We have seen that in Bulgarian DPs the noun and the adjective(s) compete for the definiteness marker and that the marker must appear on the

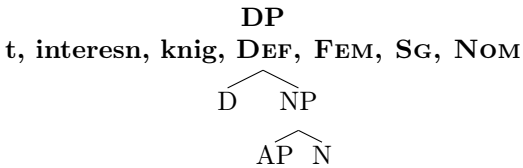
leftmost element. Thus, we can employ the same analysis as in the case of the gender feature in German. Example (3b) *interesnata kniga* 'the interesting book' then is derived as shown in (32).

(32)



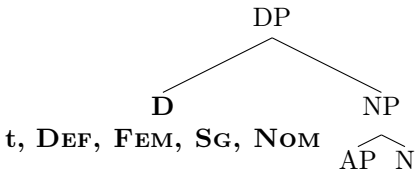
This DP gets a case in narrow syntax. Let us suppose that it is nominative. Then, the spellout procedure works as follows. Spellout begins with the DP node, which bears *t, interesn, knig*, *DEF, FEM, SG, NOM*, as shown in (33). However, there is no vocabulary item in the lexicon that can realize this node.

(33)



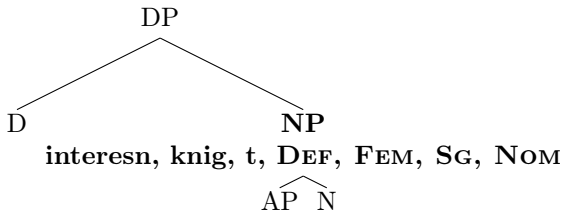
Therefore spellout goes down and the node D with its feature *DEF* and the inherited features *FEM, SG, NOM* should be spelled out, as demonstrated in (34). Spellout finds -*ta* but it cannot be spelled out by itself because it is specified as suffix in the lexicon. Thus, the definiteness feature cannot be deleted.

(34)



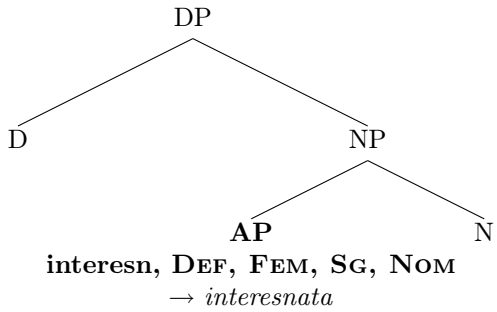
Spellout then continues with the node NP, as illustrated in (35). However, there is no vocabulary item in the lexicon that can realize *interesn, knig*, *DEF, FEM, SG, NOM.*

(35)



Thus, spellout goes to the adjectival node interesn and there features *DEF, FEM, SG, NOM* should be spelled out, as illustrated in (36). Spellout finds *interesna*, which can host suffix -*ta*. Thus, *interesnata* is inserted and the definiteness feature is deleted.

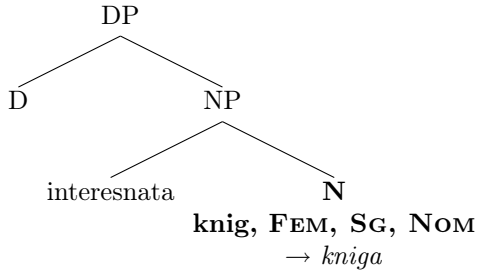
(36)



That the spellout of articles must wait for their host is also obvious from the fact that the form of the appropriate article is sensitive to phonological properties of its host.[10] Finally, spellout goes to the noun with features *FEM, SG, NOM* and consequently *kniga* is inserted. Since the definiteness feature can be spelled out only once in Bulgarian, we cannot get *knigata* here, as it is e.g. in (3a).

[10]This holds for both nouns and adjectives.

(37)



Similarly as in the case of the gender feature, there are languages in which the definiteness feature does not have to be deleted from the featural bundle. It is known that Arabic has definiteness concord. Both adjectives and nouns can take a definiteness marker and adjectives take the same definiteness marker as the noun they modify. Consider example (38a) for the indefinite definiteness feature and (38b) for the definite feature. Since the definiteness feature was not deleted after its spellout on the adjectival node, it is inherited by the node N and can be spelled out on it as well. Thus, in Arabic, in contrast to Bulgarian, the definiteness feature is specified as non-deletable.

(38) a. rağul-u-n ṭawīl-u-n
man-nom-indef tall-nom-indef
b. al-rağul-u al-ṭawīl-u
def-man-nom def-big-nom

(from Kremers 2003)

2.5. Blocking of more complex spellout

An advantage of the present approach is that it can elegantly derive blocking effects. More specifically, spellout of a non-terminal node (i.e. a lexical form) can block spellout of more complex forms (phrasal forms). For example, in Danish, *hesten* (39a) can spellout the DP node. Generally, if there is a vocabulary item in the lexicon that can spell out the appropriate features, it must be inserted. Spellout simply cannot omit hesten and go down in the structure. Therefore *hesten* blocks the more complex form *den hest* (39b). The control example (39c) shows that the definiteness feature can be spelled out on the D node.

(39) a. hest-en
horse-the
b. *den hest
the horse
c. den gamle hest
the old horse

(from Hankamer & Mikkelsen 2004)

2.6. Spellout and pair-merger of adverbials

Data like (40) are a potential problem for the present approach. In the Bulgarian example in (40a), the definiteness marker is spelled out on the adjectival node but one would expect the marker on the adverbial node *mnogo* because spellout targets this node before the adjectival node. However, this spellout is ungrammatical, as shown in (40b).

(40) a. mnogo xubavi-te knigi
very nice-the books
b. *mnogo-to xubavi knigi
very-the nice books

(from Franks 2001)

Similar facts can be observed in Amharic. The definiteness marker is attached to the noun if it is the only word in the DP, as demonstrated in (41a). When an adjective precedes the noun, the definiteness marker must be attached to it, as shown in (41b). And when the adjective is modified by an adverbial, the definiteness marker appears on the adjective and not on the adverbial, as in Bulgarian, compare (41c) with (41d).

(41) a. bet-u
house-def
b. tɨlɨk'-u bet
big-def house
c. [bət'am tɨlɨk'-u] bet
very big-def house
d. *[bət'am-u tɨlɨk'] bet
very-def big house

(from Kramer 2007)

Kramer (2007) assumes that CPs and APs like the one in (41) – in her analysis DegPs – are phases, hence they are subject to the Phase Impenetrability Condition. She proposes that the morphological operation Local Dislocation cannot target elements in previously spelled out phases since the Phase Impenetrability Condition also holds at PF. Therefore the definiteness marker -*u* cannot attach to the adverbial *bət'am*, as shown in (41d), and attaches to the edge of the whole phase domain, as (41c) shows. However, such a phase analysis cannot be employed here because of data like (42) or (43).

(42) [počti nerazrabotena-ta u nas] problematika
almost not-worked-out-def by us problematics
'the problematics (which are) almost not worked out here [in Bulgarian]' (from Franks 2001)

In example (42) the definiteness marker -*ta* appears inside the adjectival domain, preceding the adverbial PP *u nas*, which should not be possible if the adjectival phrase were a phase. The example below shows that the same happens when the PP is argumental.

(43) [verni-jat na demokratični idei] prezident
faithful-def to democratic ideas president
'the president (who is) faithful to democratic ideas'
(from Franks 2001)

In Danish, even argumental PPs license the suffixed definiteness marker, as demonstrated in (44a). However, one would expect the definite article *den* because in the lexicon there is no vocabulary item for the whole DP *ejeren af grisen* and spellout must target the D node in the next step. But the definite article is ungrammatical in this case, as shown in (44b). This suggests that the PP *af grisen* is invisible for the spellout procedure, similarly as the adverbial *mnogo* (40), *bət'am* (41), or *počti* in (42).

(44) a. ejer-en [af grisen]
owner-def of pig-def
b. den ejer [af grisen]
def ownder of pig-def
(from Hankamer & Mikkelsen 2004)

To explain the peculiar behavior of adjuncts, Chomsky (2001) proposes that adjuncts – in contrast to other elements, which are merged by the symmetrical set-merge operation – are merged by the pair-merge operation, which produces ordered pairs. I build on his proposal here but I assume that the set-merge operation applies to adverbials rather than adjuncts. This means that PPs such as in (44) are merged by the pair-merger but adjectives are merged by the set-merge operation. Recall that so far the spellout procedure has been based on the set-merger operation. Thus, if the pair-merged elements are not visible for this type of spellout, there must be two different types of the spellout procedure, one for set-merged elements and another one for pair-merged elements. This proposal seems to be supported by the ordering of affixes in Navajo verbs, see Hale (2001). Hale argues that preverbal-modifier affixes (iterative, distributive, preverbs) in Navajo verbs belong to a separate dimension, and in contrast to other affixes, they are ordered from right to left, in accordance with their semantic scope.

It has been argued that adverbials in English or Scandinavian do not block PF merger, which requires adjacency, see e.g. Bobaljik (1995). The argument goes as above, if an adverbial merged to the left of vP were visible for the set-merger spellout procedure, one would expect the T morphology on the adverbial, contrary to the facts; compare also Åfarli (1997) who argues that adverbials are merged in a third dimension.

3. Conclusion

I have argued that differences between the strong, weak and mixed adjectival declension in German are due to the gender feature that can be spelled out only once. The behavior of the definiteness marker in Bulgarian DPs can be attributed to the fact that the definiteness feature can also be spelled out only once. I have shown that it is not a general property of the definiteness and gender feature and that languages differ with respect to this property. I have argued that both phenomena can be straightforwardly analyzed in an approach that assumes spellout of non-terminal elements with feature inheritance. Then I have shown that feature inheritance cannot cross phase boundaries and argued that adverbials are invisible for the set-merge spellout procedure because they are merged by the pair-merge operation.

Appendix

(45) The strong declension

	Masc	Fem	Neut	Pl
Nom	alt*er*	alt*e*	alt*es*	alt*e*
Acc	alt*en*	alt*e*	alt*es*	alt*e*
Gen	alt*en*	alt*er*	alt*en*	alt*er*
Dat	alt*em*	alt*er*	alt*em*	alt*en*

References

Åfarli, T.A. (1997). *Dimensions of phrase structure: the representation of sentence adverbials.* Motskrift: Institutt for nordistikk og litteraturvitenskap, NTNU, 91–113.

Bobaljik, J.D. (1995). *Morphosyntax: The syntax of verbal inflection.* PhD. dissertation. MIT.

Caha, P. (1995). *The Superset Principle.* Ms. University of Tromsø.

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

Chomsky, N. (2001). *Beyond Explanatory Adequacy.* MIT Occasional Papers in Linguistics 20. Cambridge, Mass.: MITWPL.

Chomsky, N. (2005). *On Phases.* Ms. MIT.

Chomsky, N. (2006). *Approaching UG from below.* Ms. MIT.

Franks, S. (2001). The Internal Structure of Slavic NPs, with Special Reference to Bulgarian. In: A. Przepiórkowski & P. Bański (eds.), *Proceedings of GLiP-2: Syntax and Morphosyntax*, 53–69.

Fukui, N. and Y. Takano (1998). Symmetry in Syntax: Merge and Demerge. *Journal of East Asian Linguistics 7*, 27–86.

Hale, K. (2001). *Navajo Verb Stem Positions and the Bipartite Structure of the Navajo Conjunct Sector.* Linguistic Inquiry 32, 678–693.

Hankamer, J. and L. Mikkelsen (2004). *A puzzle about PPs in Danish definite DPs.* Handout from LSA Annual Meeting, Boston.

Kayne, R. (1994). *The Antisymmetry of Syntax.* Cambridge, Mass.: MIT Press.

Kramer, R. (2007). *The Amharic Definite Marker and the Syntax-PF Interface.* Handout from the Workshop on theoretical morphology 3, Leipzig.

Kremers, J. (2003). *The Arabic noun phrase: A minimalist approach.* PhD. dissertation. University of Nijmegen. LOT Publication Series 79.

Manzini, M.R. and Savoia L.M. (2005). *I dialetti italiani e romanci. Morfosintassi generativa.* Alessandria, Edizioni dell'Orso.

Neeleman, A. and K. Szendrői (2005). Pro Drop and Pronouns. In: *Proceedings of the 24th West Coast Conference on Formal Linguistics*, ed. John Alderete et al., 299–307. Somerville, MA: Cascadilla Proceedings Project.

Schlenker, P. (1997). *Consequences of Underspecification in the German Noun Phrase.* Handout from ESSLLI Workshop on Formal Elegance and Natural Complexity in Morphology.

Weerman, F. and Evers-Vermeul, J. (2002). *Pronouns and Case.* Lingua 112, 301–338.

Noun Phrase Structure by Reprojection

Doreen Georgi & Gereon Müller*

Abstract

In this paper we argue that the concept of reprojection, often applied in the verbal domain, should be extended to the nominal domain. We develop an analysis according to which a moved N does not adjoin to a functional category; rather, it moves out of its projection and remerges with it. This movement is (indirectly) triggered by a certain kind of categorial probe feature that we call "Münchhausen feature" (Fanselow, 2003). In this way, conceptual problems resulting from head movement conceived as adjunction of one head to another are avoided. Furthermore, one of the main arguments for D as the head of the nominal projection (viz., that evidence for N movement is also evidence for DP on top of NP) is refuted, and we can return to the classic assumption that nominal projections involve an NP-over-DP structure (rather than a DP-over-NP structure; the DP hypothesis). In addition to showing that an NP approach to nominal projections is viable (given reprojection), we also provide one independent argument for it: The reprojection approach to NP structure turns out to automatically derive a core assumption that must otherwise be stipulated in the theories of word order variation in nominal projections developed by Cinque (2005) and Abels & Neeleman (2006) (viz., that only those projections can undergo movement within nominal projections that contain N).

1. Introduction

Head movement is required within the nominal projection for both empirical and conceptual reasons. To give just a few examples: Ritter

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(1988) argues for N movement in construct state nominals in Hebrew, Longobardi (1994) gives convincing arguments for head movement of proper names in Romance languages, and Abels & Neeleman (2006) need it to derive the typology of word order within NP. Chomsky (2007) argues that there is a functional category n that c-commands N and acts as the head of the nominal projection (rather than D). N raises to n, just as V raises to v in the verbal projection.[1]

However, the conception of head movement as adjunction of one head to another creates several problems with respect to highly general (and independently motivated) constraints on movement, e.g., the Extension Condition (Chomsky, 1995), or the (related) c-command requirement for traces; see Brody (2001), Mahajan (2001), Müller (2004), and Matushansky (2006) (among others) for relevant discussion. Requirements such as these cannot be fulfilled by head movement as adjunction unless one is prepared to invoke extra concepts (compare, e.g., Baker's (1988) more liberal notion of c-command which deviates substantially from what is the simplest version of the concept: α c-commands β iff β is, or is included in, the sister of α). Another principle that is systematically violated by head movement as adjunction to a higher head is Abels' (2003) Anti-Locality Constraint, which excludes attraction of a head by a c-commanding head as an operation that is too local. Thus, there is a dilemma: On the one hand, there is good evidence for head movement in nominal projections; on the other hand, the standard view of head movement as adjunction to the next higher head is incompatible with several well-established constraints on displacement.

A way out is to treat head movement as reprojection: A head H moves out of a phrase α and remerges with α, projecting its category label in the derived position.[2] We would like to contend that it

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[1]This is motivated by the assumption that verbal and nominal projections are structurally similar. Still, the semantic motivation of the phonologically empty categories v and n is questionable (for discussion see Larson (2004)).

[2]Early versions of this concept include Pesetsky (1985) (where reprojection after head movement at LF serves to circumvent bracketing paradoxes) and von Stechow & Sternefeld (1988) (where German verb-second clauses are treated as reprojections of a moved finite V). Holmberg (1991), Ackema et al. (1993), Koeneman (2000), Haider (2000), Hornstein & Uriagereka (2002), and Fanselow (2003) argue for reprojection in verb phrases; Bury (2003) and Bayer & Brandner (2007) apply the concept to *wh*-CPs, and Bhatt (2002) to N raising out of relative clauses (a version

is promising to transfer the concept of reprojection to the nominal domain, where movement of N to a functional head (D, or n, or something else) is often postulated. It turns out that such a move not only avoids conceptual problems with head movement as adjunction; what is more, it also calls into question one of the most important types of argument for a DP-over-NP structure of nominal projections (the DP hypothesis).

Indeed, it seems to us that many of the arguments that were presented in favour of a functional category D that heads the nominal phrase (see in particular Abney (1987) and Szabolcsi (1994)) have lost their force under minimalist assumptions (Chomsky, 1995, 2001, 2005). For instance, the availability of two separate positions in front of a noun in examples like (1-ab) (in English and Hungarian, respectively) does not provide evidence for a DP outside of NP if a multiple specifier approach is adopted.

(1) a. $[_{\text{NP}}$ [the Emperor's] $[_{\text{N}'}$ [every] $[_{\text{N}}$ wish]]]
b. $[_{\text{NP}}$ [Peter] $[_{\text{N}'}$ [valamannyi] $[_{\text{N}}$ kalap-ja]]]
Peter's every hat-DEF

As indicated, both prenominal items can be specifiers of N, given the possibility of multiple specifiers. In the same vein, it seems that many other arguments in support of D as the head of nominal projections can be shown to be spurious under minimalist assumptions. However, there is one type of argument in favor of the DP hypothesis that has so far resisted a straightforward minimalist elimination: There is strong evidence for movement of N, and if N moves, there must be a landing site (D) (cf. Alexiadou et al., 2007). The main claim of this paper is that reprojection of N severely weakens this argument (and, therefore, the DP hypothesis) because no further functional head is needed as a target for movement.

We will proceed as follows: In section 2 we discuss data that lend support to the assumption of N movement in nominal projections. Section 3 introduces the concept of reprojection and shows how it can be implemented in a derivational approach to grammar along the lines of the minimalist program. Next, we illustrate our theory of reprojection by implementing the approach to argument realization in verb phrases in German developed by Haider (2000, 2005, 2006). Finally, in section

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of Vergnaud raising, as in Kayne (1994)). Surányi (2005) offers a comprehensive theoretical discussion of the issue.

4 we return to nominal projections and show how N movement by reprojection derives the empirical evidence of section 2. In this context, we address the approach to word order variation in the nominal projection in Cinque (2005), and particularly the somewhat simpler version of this approach developed by Abels & Neeleman (2006); and we show how the sole remainig stipulative assumption that Abels and Neeleman need to make crucial use of (following Cinque) in their (otherwise simple and elegant) analysis (viz., that only categories including N can undergo movement in the nominal projection) can be dispensed with under reprojection.

Throughout this paper, we will use the term *nominal projection* in a theory-neutral sense that leaves open the question of whether D or N (or, in fact, n) is the overall head.

2. Arguments for N Movement

In this section we give an overview of three empirical domains that provide arguments for N movement and the DP hypothesis, and sum up relevant analyses given in the literature: N movement of proper name in Italian (Longobardi, 1994); N movement in construct state nominals in Hebrew (Ritter, 1988); and movement of (a category containing) N that derives the typology of the orders of noun, determiner, numeral and adjective (Cinque, 2005; Abels & Neeleman, 2006). In these analyses (which can to some extent be viewed as representative of a much larger research enterprise), a recurring pattern of argumentation emerges: First, there is evidence for movement of N to a higher position within the nominal projection. Second, if N is the head of the nominal projection, there is no such position. Third, consequently, a higher X^0 category must be available as a landing site for N movement. Fourth, this landing site may exhibit characteristic properties of D. Fifth and finally, at least in these cases, the landing site can be assumed to be D, and DP must thus be above NP (minimally, a functional head above NP is needed). If this reasoning is on the right track, then, at least in these environments, NP is a complement of D and the nominal projection is a DP; and if one assumes that selection of nominal arguments

obeys categorial uniformity (such that V may not alternatively select DP or NP), then the DP hypothesis must be generalized.[3]

2.1. N Movement in Italian

Longobardi (1994) argues for movement of proper names in Italian on the basis of the following observations: Count nouns in the singular that function as arguments must be preceded by a phonologically non-empty determiner. Nouns that are not arguments (in vocative, predicative, or exclamation environments) do not fall under this requirement. The conclusion Longobardi draws from this is that a nominal expression can only be an argument of a predicate if it is introduced by an element of category D. Two problems arise for this simple generalization. First, bare count nouns in the plural and mass nouns show up without a visible determiner.

(2) Ogni giorno mangia patate.
every day eat.3SG potato
'He eats potatoes every day.'

This problem can be solved by assuming that these nouns are combined with an empty D which gives rise to an indefinite interpretation associated with bare plurals and mass terms.

Second, and more importantly in the present context, proper names do not have to be introduced by a determiner either. However, in this case, the solution cannot be this empty D because (singular) proper names are neither interpreted as plural entities nor are they indefinite. To solve this problem, Longobardi argues that proper names belong to the category N (an assumption that is supported by the fact that proper names can in principle be preceded by a determiner); a proper name N then moves to D, the head of the nominal projection. Strong evidence for this movement comes from the placement of adjectives in nominal projections in Italian. Consider the following examples.

(3) a. *[$_{DP}$ mio [$_{D'}$ il [$_{NP}$ [$_{N}$ Gianni]]]
my DEF Gianni

[3]However, see Franks & Pereltsvaig (2004) and Pereltsvaig (2006) on what looks like variable categorial features of nominal projections in Russian.

b. $[_{DP}$ il $[_{NP}$ $[_{AP}$ mio $]$ $[_{N}$ Gianni $]]]$
DEF my Gianni

c. #$[_{DP}$ il $[_{NP}$ t_1 $[_{N}$ Gianni $]]$ $[_{AP_1}$ mio $]]$
DEF Gianni my
(only contrastive reading)

d. *$[_{DP}$ D $[_{NP}$ $[_{AP}$ mio $]$ $[_{N}$ Gianni $]]]$
my Gianni

e. $[_{DP}$ $[_{D}$ $[_{N_1}$ Gianni $]$ D $]$ $[_{NP}$ $[_{AP}$ mio $]$ t_1 $]]$
Gianni my
(no contrastive reading)

Adjectives (As) are merged between (overtly realized) D and N, never before D (see (3-a)). An adjective is unmarked in its prenominal base position, but if A is in postnominal position it receives a contrastive interpretation. This is shown for the possessive adjective *mio* in (3-bc). Thus, (3-c) implies a contrastive reading: There must be more than one *Gianni* provided by the context. Interestingly, when proper names appear without determiner, we might a priori expect (3-d), but this is impossible. Instead, the string N–A in (3-e) is well formed (and unmarked), which suggests that A is in its base position. Longobardi concludes that the base structure of (3-e) must then be as in (3-bd), with N having undergone movement to D in (3-e). The analysis accounts for the complementary distribution of N and D in the only position to the left of the adjective in the nominal projection; and it is far from obvious whether a convincing alternative analysis could be given of these facts that does not rely on N movement (given that *mio* has all the properties associated with in-situ prenominal adjectives in (3-e)).[4]

[4]Despite its many virtues, it should not go unnoticed that Longobardi's analysis also faces several (albeit arguably minor) problems. First, if head movement is adjunction of one head to another (as is standardly assumed), N must be adjoined to an empty D in (3-e). But then it is not evident why the usual (indefinite) interpretation of the empty D does not apply even in cases of N adjunction – the D head as such is still part of the structure. The problem does not arise if N is moved to D by substitution (rather than adjunction). But if N replaces D with all of its features, it should in fact become the head of the constituent and project an NP. Longobardi does not discuss these consequences, but the result of N movement via substitution would be quite similar in its consequences to the reprojection approach we will propose in section 4 – similar, but not quite identical, most obviously because movement via substitution is still at variance with the Extension Condition (X' must exist before substitution movement of Y^0 out of the complement YP of

More generally, we can conclude that movement of N in proper name nominal projections in Italian is well motivated on the one hand, and incompatible with an analysis in which DP is merged in the specifier of N (an NP-over-DP analysis) on the other hand: The nominal projection has to be a projection of D (or of some other functional category).

2.2. N Movement in Modern Hebrew

Construct state (CS) nominals in Modern Hebrew arise when the head noun is immediately followed by a genitive phrase. The linear order in construct state nominals must be NSO, so the structuce is head-initial. (Following Ritter (1988), O stands for 'object' and S for 'subject', where both describe structural positions: S is the specifier of N and O its complement.) In construct state nominals, the definiteness marker *ha-* shows up postnominally as a proclitic to the genitive phrase, but in non-construct state nominals it appears in front of the head noun. Furthermore, definiteness spreading takes place in construct state nominals: *ha-* is realized in front of every item to the right of N. Relevant data are given in (4).

(4) a. beyt ha-mora
house DEF-teacher
'the house of the teacher'

b. ha-bayit
DEF-house
'the house' (*non-CS*)

c. harisat ha-oyev ′et ha-′ir
destruction DEF-enemy OM DEF-city
'the enemy's destruction of the city'

d. beyt ha-mora ha-yafe
house DEF-teacher DEF-pretty
'the pretty house of the teacher'

Ritter (1988) postulates the following structures for construct state nominals and non-construct state nominals:

X^0 can take place to the X^0 position) and other general principles (e.g., conditions of structure-preservation).

(5) a. $[_{\text{DP}}$ N (ha-) XP_{gen} ...] (*CS*)
b. $[_{\text{DP}}$ (ha-)N ...] (*non-CS*)

Ritter's argument for N-to-D movement is as follows: First, the basic assumption is that construct state nominals and non-construct state nominals are to be derived from the same underlying structure (D-structure, in her case – governed by the principles of X-bar theory, and based on the assumption that heads precede complements). Second, SNO is assumed to be the base order. Third, this means that in construct state nominals, N must move to the left; the only position that is available for such movement is D. Movement of N necessarily takes place via left-adjunction to D. By assumption, D then assigns abstract genitive case to the specifier of NP; and the definiteness marker *ha-* cliticizes onto the following item (the genitive specifier); this latter movement, however, is not considered to be strictly syntactic (rather, it is viewed as a PF operation). The derivation of construct state nominals in Modern Hebrew in Ritter's analysis is sketched in (6).

(6) $[_{\text{DP}}\ [_{\text{D}}\ \text{N}_1\ \text{D}\ ]\ [_{\text{NP}}\ \text{DP}_{gen}\ [_{\text{N}'}\ \text{t}_1\ \text{DP}\ ]]]$

If this analysis is on the right track, it provides a strong prima facie argument against analyses in which DP acts as a specifier of NP (rather than as a projection above NP): There must be a position to which N can move in construct state environments, so that it can end up in front of its genitive specifier.[5]

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[5]That said, Ritter's analysis has not gone unchallenged; in particular, her premise concerning the uniform base order (i.e., SNO) may not be fully unproblematic. As a case in point, Borer (1999) presents an alternative analysis of construct state nominals in Modern Hebrew; she shows that the word order facts can be derived without movement of N to D. For concreteness, Borer argues that there is a crucial difference between construct state nominals with de-verbal process nominals and construct state nominals with non-derived nominals. In the former case, there is syntactic nominalization of a verb embedded under N that is accomplished by V-to-N movement; in this construction, word order is fixed (except for active/passive alternations); see (i). In the latter case, there is free word order, with NOS as the base order (where S is right-adjoined to $[_{\text{NP}}$ N O], yielding $[_{\text{NP}}\ [_{\text{NP}}$ N O] S]); on this view, NSO is derived by subsequent right-adjunction of O: $[_{\text{NP}}\ [_{\text{NP}}$ N t_{O}] S] O]; see (ii).

(i) a. ha-harisa šel ha-oyev ʼet ha-ʼir
DEF-destruction of DEF-enemy OM DEF-city
'the enemy's destruction of the city'

2.3. N Movement and Constraints on Word Order in Nominal Projections

Cinque (2005) observes that out of the 24 possible orders of demonstrative (D), numeral (n = Num), adjective (A), and noun (N) given in (7), only the 14 orders in I are attested (as unmarked orders); the orders in II are not.[6]

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b. *ha-harisa ′et ha-′ir šel ha-oyev
DEF-destruction OM DEF-city of DEF-enemy
'the enemy's destruction of the city'

c. ha-harisa šel ha-′ir al yedey ha-′oyev
DEF-destruction of DEF-city by DEF-enemy
'the destruction of the city by the enemy'

(ii) a. ha-sefer šel ha-sifriya ′al ha-štixim
DEF-book of DEF-library about DEF-rugs
'the library's book about rugs'

b. ha-sefer ′al ha-štixim šel ha-sifriya
DEF-book about DEF-rugs of DEF-library
'the library's book about rugs'

If this approach is adopted, there is no argument for the DP hypothesis based on N movement because the word order can be derived without such movement: In (i), V moves to a nominalizating N head, and in (ii) both orders are derived by right-adjunction of nominal projections. Despite this lack of evidence from word order, Borer (1999) postulates that D is the head of the nominal projection after all, because [±def] is assumed to be a feature of N (rather than of D). It is realized as *ha-* and can only appear in its overt position if N raises to D.

In general, the analysis of construct state nominals is widely disputed in the literature, and we cannot attempt to do the phenomenon justice here. However, at least for the sake of the argument (and also taking into account that the kinds of right-adjunctions that Borer assumes are considered dubious in many theories of projection), we will henceforth assume that construct state nominals in Modern Hebrew do provide direct word order evidence for N movement, at least with non-derived nouns.

[6]Here and in what follows, we abbreviate Number heads as n, not as Num. This should not be confused with 'light' n as it was briefly discussed in the first section.

(7) *Possible and impossible orders in nominal projections*:

Ia	D	n	A	N
	D	n	N	A
	D	A	N	n
	D	N	A	n
	N	A	n	D
	A	N	n	D
	n	A	N	D
	n	N	A	D

Ib	D	N	n	A
	N	n	A	D
	N	D	n	A
	N	D	A	n
	N	A	D	n
	A	N	D	n

II	*	D	A	n	N
	*	A	D	n	N
	*	n	A	D	N
	*	A	n	D	N
	*	A	D	N	n
	*	n	D	A	N
	*	n	D	N	A
	*	A	n	N	D
	*	n	N	D	A
	*	N	n	D	A

For now, the difference between the orders in Ia and the orders in Ib orders can be ignored; it will become relevant later. An example from English instantiating one of the fourteen legitimate orders is given below:

(8) these seven white mice
D n A N

In the following two subsections we briefly outline two analyses that derive the data.[7]

2.3.1. Cinque's (2005) Analysis

Cinque makes five assumptions concerning base structure and constraints on movement to derive the possible orders and to exclude the impossible ones. First, he invokes the Linear Correspondence Axiom (LCA) (see Kayne (1994)) according to which each phrase has the following structure:[8]

---

[7]Throughout this paper, we will not be concerned with potential counter-examples to these generalizations; these are tackled in the two articles on which our analysis is based. As before, our main concern is not so much the empirical correctness of every minute detail; recall that we are mainly interested in reanalyzing arguments for movement in nominal projections in an approach that does not envisage functional projections on top of NP. To this end, the arguments for movement must be assumed to be basically valid.

[8]Strictly speaking, it follows from the LCA that YP must be a unique adjunct, and X′ is XP. We ignore this complication here.

(9) $[_{\mathrm{XP}}$ (YP) $[_{\mathrm{X'}}$ X (ZP)]]

Heads always precede their complements and follow their specifiers; specifiers must be unique (thus, there are no multiple specifiers). Furthermore, the following hierarchy of the elements in their base position is postulated: D $\succ$ n $\succ$ A $\succ$ N, where $\succ$ stands for c-command. As a consequence, only this order can be base-generated and the other 13 possibilities are derived by movement. By assumption, head movement is excluded; all movement is phrasal. Movement must always go to the left (because of the LCA). Thus, movement targets specifier positions of additional functional heads in the nominal projection. In addition to these general assumptions, Cinque (2005) makes a number more specific assumptions about possible and impossible movement operations in nominal constructions. First, movement may apply totally to an XP that is the specifier of the highest functional category in the nominal projection, or it applies partially to a specifier of a functional category below the highest one. Second (and this will be of particular importance in the context of the analysis we propose in section 4), movement can only involve a subtree containing N. There are further restrictions on what such a subtree can look like. It may contain N and no other lexical item. Alternatively, it may involve pied piping of further material by N. Such pied piping comes in two varieties: In one, N stays in its base position and the constituent immediately containing N and its sister is moved (the *whose picture* type); in the other, N first moves alone and pied pipes its sister node in a second movement step (the *picture of who* type). The basic structure of nominal projections presupposed by Cinque's (2005) approach involves a number of additional functional projections (abstract agreement projections and projections providing specifiers for items like DP, nP, and AP to be merged in, here labelled WP, XP, and YP). It is given in (10):

(10) $[_{\mathrm{Agr}_w\mathrm{P}}$ – $[_{\mathrm{Agr}_w{}'}$ Agr_w $[_{\mathrm{WP}}$ DP $[_{\mathrm{W'}}$ $[_{\mathrm{W}}$ $[_{\mathrm{Agr}_x\mathrm{P}}$ – $[_{\mathrm{Agr}_x{}'}$ Agr_x $[_{\mathrm{XP}}$ nP $[_{\mathrm{X'}}$ X $[_{\mathrm{Agr}_y\mathrm{P}}$ – $[_{\mathrm{Agr}_y{}'}$ Agr_y $[_{\mathrm{YP}}$ AP $[_{\mathrm{Y'}}$ NP]]]]]]]]]]]]]

Consider a few examples. The order N–D–n–A can be derived by totally moving (a constituent containing) N alone successive-cyclically through each specifier. D–A–N–n is the result of partially moving (a constituent containing) N and A (the *whose picture* type) to $\mathrm{SpecAgr}_X$. Movement of (a constituent containing only) N to $\mathrm{SpecAgr}_Y$ followed by movement of Agr_{YP} (*picture of who* type) to $\mathrm{SpecAgr}_X$ results in D–N–A–n. This way, all the established orders can be generated. However, if only one

of the assumptions mentioned above were to be abandoned (e.g., the restriction that only subtrees containing N can be moved), unattested word orders would be predicted to arise. For instance, if AP could undergo movement alone, landing in, say, SpecAGR$_W$, the unattested word order *A–D–N-n would arise; or if nP could undergo movement alone, e.g., to SpecAgr$_W$, the unattested word order *n–D–A–N could come into existence.

2.3.2. Abels & Neeleman's (2006) Reanalysis

Abels & Neeleman (2006) show that one can derive the patterns in (7) in a somewhat simpler way that shares some of Cinque's assumptions while abandoning others; in particular, the LCA is not adopted. Thus, Abels & Neeleman keep the assumption that the underlying hierarchical order of elements is D $\succ$ n $\succ$ A $\succ$ N for external Merge, but they abondon the LCA. Consequently, complements and specifiers may be generated to the left or to the right of a head, regulated by language-specific parameterization. Therefore, the orders in Ia in (7) can all be base-generated. In contrast, the orders in Ib in (7) are derived by movement. As before, there are a number of constraints on movement: General restrictions on movement imply that it must go to the left, and that it always ends in a c-commanding position. Interestingly, as in Cinque's (2005) approach, a specific assumption for movement in nominal projections is required: By stipulation, only those subtrees can undergo movement in nominal projections that contain N. These assumptions suffice to exclude the orders in II in (7). And again, each of these assumptions is necessary to achieve this result. If, for instance, movement of a constituent that does not contain N is permitted, or if the hierarchy of projections is not strict, unattested orders arise, exactly as we have seen with Cinque's (2005) analysis.

Some possible movements do not lead to new orders. For example, D–N–A–n may be base-generated with A and n to the right of N, and D to its left, but it may also be the result of moving the subtree N out of the basic order D–A–N–n. Both possibilities are shown below.[9]

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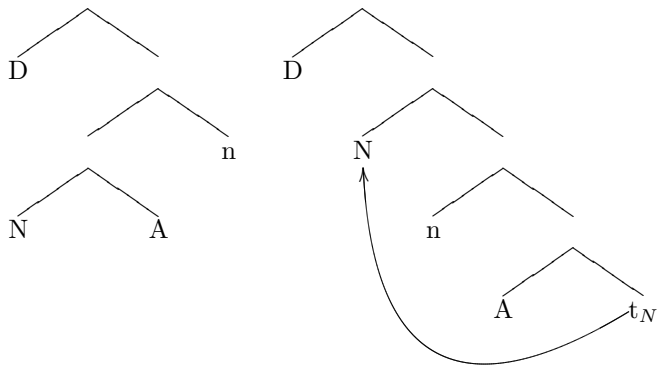
[9]Abels and Neeleman do not label non-terminal nodes in their trees, because, as they point out, the labels do not have any impact on the point they want to make. Therefore, it is not clear whether the moved element adjoins to or substitutes for

(11)



Cinque (2005) assumes a single strict basic linearization of D, n, A and N, but allows various types of movement. In contrast, Abels & Neeleman (2006) permit more word orders to be base-generated (by abandoning the LCA) and constrain movement more strictly, thereby simplifying Cinque's system.[10]

Note that without the LCA, the lexical elements D, A and n do not need to be introduced by functional heads anymore. Given the possibility of multiple specifiers they do not have to erect their own projection each, a point that will also be important in our analysis in section 4. Nevertheless, in both analyses there remains the crucial but not independently motivated assumption that only a subtree containing N can move. We will show below that this follows automatically in an analysis that relies on reprojection of N.

3. Reprojection

3.1. Background

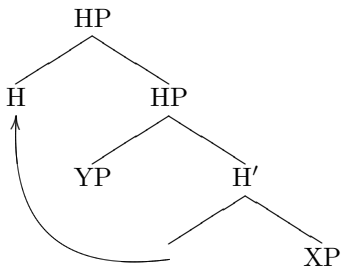
Surányi (2005) argues that assuming reprojection of heads (or 'root

a functional head, or neither of both. We will return to this question, and to the question of labelling the non-terminal nodes in our reanalysis in section 4.

[10]As shown by Abels & Neeleman (2006), a formal proof can be given that the two approaches are empirically equivalent: Translation rules can transform Cinque's approach into Abels & Neeleman's, and vice verse.

merger') instead of head movement as adjunction solves a range of problems associated with the latter concept. An adjoined head behaves differently from moved phrases in several respects, which gives rise to various problems. Among these problems are the following: An adjoined head does not c-command its base position (cf. Brody, 2001; Mahajan, 2001; Matushansky, 2006) unless the definition of c-command is complicated (as, e.g., in Baker (1988)); it does not extend the tree at its root as demanded by the Extension Condition (Chomsky, 1995); and it cannot apply successive-cyclically because the Head Movement Constraint (see Travis (1984)) excludes excorporation of a head (but also cf. Roberts (1991, 2001) for possible qualifications). If, however, head movement is interpreted in terms of movement and reprojection, these problems do not arise. Reprojection means that a head is moved out of its projection and takes it as its own complement by merging with it, projecting anew in the derived position; see (12).

(12)



Here, the remerged head c-commands its base posititon; the movement operation extends the tree generated so far; and the operation may be applied recursively.

An analysis that makes uses of reprojection (-like operations) is developed by Haider (2000, 2005, 2006). Haider is concerned with the question of how phrase structure is generated in SVO systems, where there is asymmetric c-command (from left to right) of items that are attached to the main projection line. His analysis relies on a specific version of a Larsonian VP shell approach (Larson, 1988). More specifically, Haider argues that VP shells are not introduced by designated (and semantically non-empty) functional categories, such as Caus-v, Voice-v, or Appl-v (see, e.g., Harley (1995), Kratzer (1996), Adger (2003), Schäfer (2007), and references cited in the latter two works). Rather, VP shells arise for purely formal reasons, due to the necessity of discharging subcategorization features of V – by assumption, such a

feature discharge is not possible in English (or SVO systems more generally) by creating right-peripheral specifiers. Haider derives this from his *Branching Conjecture*, which demands that for any two nodes that are directly attached to the same projection line, the preceding node must c-command the node that follows. Hence, to derive the linearization of an English-type system, V must raise out of its base position and thereby create a VP shell, so that it can end up in a position to the left of its argument, which would otherwise precede the verb. In essence, then, this analysis relies on reprojection.[11] In what follows, we will essentially adopt Haider's subcategorization-based motivation for reprojection movement. However, our approach dispenses with the Branching Conjecture, and derives reprojection by invoking a special type of probe feature that may accompany a subcategorization feature, and that may trigger movement of a head in order to be checked under c-command. We call these features *Münchausen features*.[12] The system is outlined in detail in the next two sections.

3.2. Architecture of the System

We presuppose a version of derivational syntax according to which all syntactic operations are triggered by features; in particular, we assume that features trigger both Agree operations and structure-building operations (internal and external Merge).[13] Thus, suppose that exter-

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[11]Haider (2006) does not address the issue in exactly these terms, though, because he envisages a representational system in which head movement by reprojection is modelled in terms of multi-membered head chains.

[12]Baron Münchhausen is both a historical and a literary character. He shows up in various German tall tales; in one of them, he escapes from a swamp (where he is trapped on the back of his horse) by pulling himself up by his tuft. As far as we can tell, the use of the name 'Münchhausen' in syntactic theory goes back to Sternefeld's (1991) characterization of an operation employed in Chomsky's (1986) theory of barriers: Here, VP is a barrier, but a V moved to I can belatedly justify its own (originally impossible) movement across the VP barrier by L-marking VP and removing barrierhood – clearly a case of pulling oneself up by one's own hair. Fanselow (2003) applies the concept to reprojection movement ('Münchhausen-style head movement'); we follow him in this respect (although his approach otherwise bears little resemblance to ours).

[13]The basic system is laid out in more detail in Heck & Müller (2007) and Müller (2007). For the assumption that all structure-building operations (including external

nal Merge is triggered by *subcategorization* features, and that internal Merge (movement) is triggered by movement-type specific edge features. These two kinds of features can be subsumed under one type: *structure-building* features. We render structure-building features in a [•F•] notation. We further assume that linking is brought about by mapping hierarchies of Θ-roles onto hierarchies of subcategorization features on a predicate in reverse order; thus, subcategorization features show up on stacks (and only the topmost item is accessible at any given point, as with pushdown automata; see below).[14] On this view, multiple specifiers come into existence by successively discharging structure-building features of a lexical item. To ensure that all instances of subcategorization-driven structure-building precede all instances of movement (in the domain of a given lexical item), we assume that movement-inducing structure-building features always show up below subcategorization features in [•F•] feature stacks of heads.

In addition to structure-building ([•F•]) features, there are probe features, as in Chomsky (2000, 2001). Probe features (which we note as [∗F∗]) must find a matching goal under Agree; the Agree operation in turn requires c-command. Since such a c-command requirement does not hold for structure-building features (almost by definition, since they must be able to create specifiers), there is an interesting asymmetry between [•F•] checking and [∗F∗] checking; and it is this asymmetry that we will exploit in our approach to reprojection developed below. For now, we may confine ourselves to assuming that probe features and structure-building features are located on different feature stacks of lexical items (whether probe features are also ordered or not is irrelevant for what follows).

Next, we adopt the version of the Strict Cycle Condition (see Chomsky (1973, 1995)) in (13).[15]

Merge) are triggered by features, see, among others, Svenonius (1994), Stabler (1996, 1997, 1998), Collins (2003), Adger (2003), Heck & Müller (2007), Kobele (2006), Sternefeld (2006), Lahne (2006), and Pesetsky & Torrego (2006); this view is not compatible with Chomsky (2007), though.

[14]Such an approach has a long tradition going back to categorial grammar; see, e.g., Lewis (1972). Also cf. Pollard & Sag (1994), Wunderlich (1997), and Lechner (2004), among many others, for implementations in different theoretical frameworks.

[15]Two remarks. First, note that the Strict Cycle Condition in (13) not only derives cyclicity of rule application (in interaction with Last Resort as defined below); it also

(13) *Strict Cycle Condition:*
Only the head of the present root can have features that trigger operations ([•F•] or [∗F∗]).

A Last Resort requirement ensures that all syntactic operations must be triggered by features, and that only those (structure-building or probe) features are accessible at any given step that are located on top of a feature stack; see (14).

(14) *Last Resort*:
a. A syntactic operation must discharge (and delete) [•F•] or [∗F∗].
b. Only [•F•] or [∗F∗] features that are on top of a feature stack are accessible.

Given that there are two feature stacks, indeterminacies in rule application may arise. They are resolved in a principled way by the constraint in (15) (which is modelled on Chomsky's (1995) Merge over Move).

(15) *Agree over Merge*:
If both [•F•] and [∗F∗] can be discharged, [∗F∗] is given preference.

Let us illustrate the basic structure-building system with an NP, adopting the NP-over-DP hypothesis.[16] Consider the derivation in (16).

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ensures that all operation-inducing features must be checked (and discharged, i.e., deleted). Given the specific formulation in (13), the constraint is strictly speaking incompatible with the idea of feature valuation of probes. Indeed, throughout this paper, we presuppose a checking (rather than valuation) approach, but a minimal modification of (13) would make it compatible with valuation: Essentially, stripping away ∗ on probes would suffice. See Richards (2007) for discussion of some of the (mainly spell-out related) issues that are involved here. Second, as it stands, (13) requires a start symbol E:{[•C•]} in order to guarantee that there are no completed derivations with unchecked features (alternatively, the relevant derivations might be assumed to crash at an interface).

[16]N differs from V in that all subcategorization of arguments is optional; similarly, AP modifiers are optional; and (notwithstanding Longobardi's analysis of Italian) perhaps DP subcategorization is not entirely general either, but may be suppressed in certain environments, or in certain languages. For concreteness, we assume that optional subcategorization is captured by optionally deleting structure-building features when an item has entered the numeration; this operation applies freely with N, and is severely restricted with V. Of course, many other approaches are possible.

(16) a. N:{[•A•] ≻ [•n•] ≻ [•D•]} (initial features on N; lexicon)
b. N:{[•A•] ≻ [•D•]} (optional deletion; numeration)
c. Merge(N:{[•A•] ≻ [•D•]}, AP) ⇒ [$_{N'}$ AP N:{[•D•]}]
d. Merge([$_{N'}$ AP N:{[•D•]}], DP) ⇒ [$_{NP}$ DP [$_{N'}$ AP N:{–}]]
e. Merge(X:{[•N•] ≻ ... }, NP) ⇒ [$_{X'}$ X:{...} NP] etc.

Thus, suppose that a phrase is to be generated in which the head N takes a prenominal adjective and a demonstrative. According to the feature hierarchy on N in (16-a), the subcategorization features for A and D are ordered on N in the numeration as in (16-b). Consequently, [•A•] has to be discharged before [•D•] is discharged. This is shown in (16-c), where AP merges with N, yielding N′; and in (16-d), where DP is merged with N′ (triggered by N's remaining subcategorization feature), which yields NP (the constituent qualifies as a full XP if we assume that a projection is an XP iff its head does not have any structure-building or probe features). Finally, this NP may then undergo Merge with some other head, triggered by a structure-building feature of that head (see (16-e)).

So far, nothing is said about linearization. We make the standard assumption that Merge operations are independent of linear order. The linearization of complements and specifiers is regulated by language-specific (and also category-specific) linearitzation rules that affect the tree directly after each Merge operation.

Against this background (which we take to be fairly standard, no more than one of the several possibilities to implement structure-building and Agree operations in a derivational syntax based on certain minimalist assumptions), we can now turn to the role of Münchhausen features in inducing reprojection.

3.3. Münchhausen Features

A Münchhausen feature is nothing special: It is simply a probe feature with a category label as its content that accompanies a structure-building feature with the same category label; this way, it brings about a special identification of subcategorized items. Thus, if a feature [•F•] on a lexical item co-occurs with a corresponding feature [∗F∗], the latter is a Münchhausen feature. Agree over Merge demands that probe features are checked before structure-building features where possible, but of course, discharge of [∗F∗] (with F a category label) requires the presense of a category labelled F in the c-command domain of the head

to be applicable. Two cases can be distinguished. First, [•F•] may be topmost on the initial stack, in which case it creates a complement with label F. In this case, [∗F∗] can (and, given Agree over Merge: must) be discharged immediately afterwards, which creates no discernible effect. Alternatively, [•F•] may not be topmost on an initial stack on a lexical item; i.e., it generates a specifier. In that case, the probe feature [∗F∗] accompanying it has an interesting effect. Being a probe feature, it must be checked under c-command. However, a head does not c-command its specifier. Therefore, the Münchhausen feature cannot be checked with a specifier if the head stays in situ.[17]

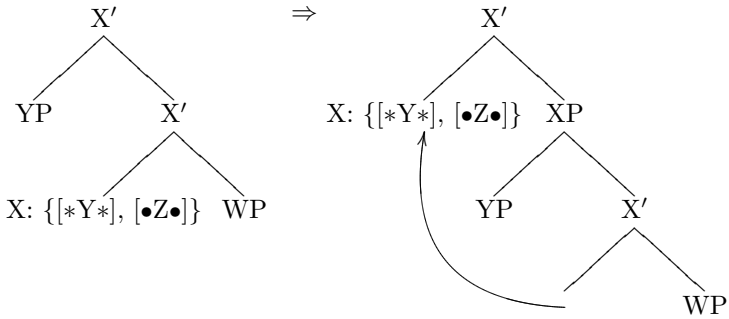
There is one way out of this dilemma: The lexical item bearing the Münchhausen probe feature that cannot be discharged with the specifier moves out of its projection and remerges with it, projecting anew. After this movement step, Agree becomes possible because the probe feature on the moved head c-commands the specifier of the projection that it was originally the head of. Since the head bearing at least one operation-inducing feature (viz., the Münchhausen feature – possibly there are still others left on it) has been moved out of its projection, this projection qualifies as an XP in the sense of the Strict Cycle Condition (see (13)): As soon as the head moves out, there are no probe or structure-building features left in its original projection.[18] All this is

[17]This reasoning presupposes that operation-inducing features are not projected from a lexical item X to its X′ projections – otherwise, X′ could discharge a probe feature by Agree with a specifier. Indeed, it seems to us that such a feature projection should be rejected on conceptual grounds if possible: Either, an additional projection mechanism must be postulated that shares certain properties with movement, or the problem will arise that (unchecked) operation-inducing features are duplicated with each structure-building operation (and should therefore trigger many more operations than desired) – something that is unproblematic with features that do not trigger operations, like, e.g., the category label. (That said, nothing in what follows is incompatible with the idea that category labels are not projected either. See Collins (2003) for relevant discussion.) However, it should be noted that we will eventually invoke a projection of certain probe (not structure-building) features in section 4 (for one specific purpose: pied piping).

[18]The assumption that the base position of movement is inert in this sense is unavoidable if counter-cyclic operations (e.g., checking of identical features in the landing site and in the base position) are to be avoided. There are various ways to derive this. One is to assume that movement leaves traces (t), and traces lack operation-inducing features by definition. Another one is to assume that movement leaves copies; in that case, something extra needs to be (and can be) said so as to ensure that feature discharge may not accidentally leave unchecked features on the

shown schematically in (17), where the moved head X reprojects an X′ category and discharges its probe feature with the specifier of its original projection – note that X still has a structure-building feature in this derivation which will yield a ZP specifier in the derived projection in a subsequent movement step that is not depicted here.

(17)



The lexical head X must move immediately if it is possible to check its feature [∗F∗] afterwards, because probe features have to be deleted before subcategorization features (the Agree over Merge constraint; see (15)). Reprojection movement is not directly feature-driven and therefore violates Last Resort (see (14)); it is legitimated by feature checking of [∗Y∗], which becomes possible only *after* its application. Thus, we conclude that Last Resort must be minimally violable in favour of the Strict Cycle Condition in (13) (which implies that operation-inducing features must be discharged, among other things). This in effect amounts to an optimization procedure in syntax (see Prince & Smolensky (2004)), albeit of a fairly local type. More specifically, the local domain that serves as the domain for optimization cannot be the derivational step (as assumed in Heck & Müller (2007)); rather, it must be something that is a little bigger – either the completed phrase (see

lower copy (see Nunes (2004)). A third possibility relies on the idea that movement gives rise to multidominance configurations (see Gärtner (2002), among many others); this option would seem to be incompatible with the present approach unless further assumptions are made. Finally, inertness of the base position of movement follows straightforwardly if movement does not leave anything behind – neither traces, nor copies (see, e.g., Epstein et al. (1998), Müller (1998)). For the sake of concreteness, we will adopt the last option in what follows; but nothing really depends on this choice.

Heck & Müller (2003), or at least the completed projection (i.e., the result of a structure-building operation, together with all Agree operations carried out in the new structure). For concreteness, we assume the latter (and this is also the domain in which Agree over Merge holds). The reason is that the present system requires minimal *look-ahead*: Movement of a lexical item bearing a Münchhausen feature (which cannot be checked when the lexical item is in situ, because of a failure of c-command) violates Last Resort, but this Last Resort violation is possible if the Münchhausen feature can be discharged in the next step, as a consequence of the movement.[19]

3.4. Reprojection within VP

With the basic system of reprojection movement in place, let us return to Haider's (2006) analysis of VPs in SVO languages, and see how it can be implemented in the present analysis. Consider a ditransitive English VP such as (18).

(18) Mary gave it to John

Suppose that what characterizes SVO systems like the English one is that all subcategorization features of V are invariably accompanied by corresponding Münchhausen probe features demanding Agree operations with the subcategorized arguments, i.e., requiring special identification of arguments.[20] The derivation of (18) then looks as in (19). By

---

[19]A viable alternative to assuming violability of Last Resort (in favour of the requirement that probe features must be checked) would consist in reformulating Last Resort in such a way that minimal look-ahead is permitted (say, by replacing "must discharge" by "must result in discharge in a subsequent (essentially: the next but one) movement step"). Such a version of Last Resort is in fact adopted in Surányi (2005), in the context of his discussion of reprojection movement. The two options instantiate a well-known trade-off between simplicity of constraint formulation (the optimality-theoretic perspective) and avoidance of constraint ranking (the non-optimality-theoretic perspective). This issue is orthogonal to our main concerns here.

[20]This leaves open the possibility that Münchhausen features could also be involved in the generation of VP shells in SOV languages (which, e.g., might underlie the different behaviour of preverbal argument NPs in German and Dutch with respect to issues like scrambling and anaphoric binding). In addition, nothing so far excludes systems with right-peripheral specifiers that asymmetrically c-command

assumption, there is a categorial probe feature for each subcategorization feature on V (see (19-a)); and there are three such subcategorization features for the ditransitive verb *give* that are derived by reversing the order of Θ-roles.[21] [•P•] (which corresponds to the Θ-role GOAL in V's Θ-grid) is topmost on the subcategorization feature stack, so it is discharged first, making PP V's complement; see (19-b). After this, the PP argument is (vacuously) identified by the categorial probe feature [∗P∗], under c-command (see (19-c)). In the next step, the THEME NP_2 is merged and becomes a specifier (see (19-d)); however, this time the Münchhausen feature [∗N∗] on V cannot be discharged immediately because NP_2 is not c-commanded by V in situ. Consequently, V movement and reprojection applies (as in (19-e)), and NP_2 in the specifier position can be identified by [∗N∗] discharge in the next step (cf. (19-f)). In the final three steps, the pattern is repeated: The remaining subcategorization feature [•N•] (which encodes the AGENT Θ-role) is discharged, creating an NP_1 specifier that the V head cannot agree with ((19-g)); movement and reprojection apply, in minimal violation of Last Resort (see (19-h)); and finally, the external argument NP_1 is identified by Agree involving [∗N∗] and the argument's category label. (see (19-i)).

(19)
a. V's feature set:{[•P•] ≻ [•N•] ≻ [•N•], [∗P∗], [∗N∗], [∗N∗]} (*gave*)
b. Merge(V:{[•P•] ≻ [•N•] ≻ [•N•]}, PP) ⇒
[$_{V'}$ V:{[•N•] ≻ [•N•], [∗P∗], [∗N∗], [∗N∗]} PP] (*gave to John*)
c. Agree([∗P∗], PP) ⇒ [$_{V'}$ V:{[•N•] ≻ [•N•], [∗N∗], [∗N∗]} PP]
d. Merge([$_{V'}$ V:{[•N•] ≻ [•N•], [∗N∗], [∗N∗]} PP], NP_2) ⇒
[$_{V'}$ NP_2 [$_{V'}$ V:{[•N•], [∗N∗], [∗N∗]} PP]] (*it gave to John*)
e. Move(V:{[•N•], [∗N∗], [∗N∗]} [$_{VP}$ NP_2 [$_{V'}$ V PP]]) ⇒
[$_{V'}$ V:{[•N•], [∗N∗], [∗N∗]} [$_{VP}$ NP_2 [$_{V'}$ – PP]]
(*gave it to John*)
f. Agree([∗N∗], NP_2) ⇒ [$_{V'}$ V:{[•N•], [∗N∗]} [$_{VP}$ NP_2 [$_{V'}$ – PP]]

---

complements (and other specifiers merged earlier). We take this consequence to be empirically supported.

[21] External arguments are subcategorized by V on this view. However, nothing of what we have to say here would be radically changed if we were to assume that external arguments are not subcategorized by V but introduced by a designated functional category.

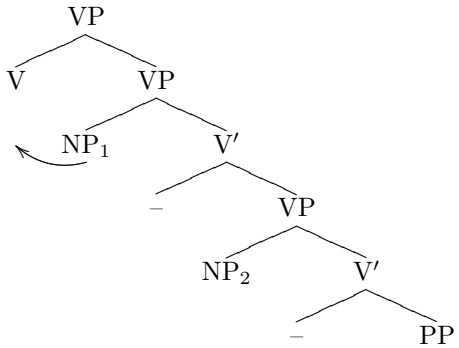
g. Merge([$_{V'}$ V:{[•N•], [∗N∗]} [$_{VP}$ NP$_2$ [$_{V'}$ – PP]]], NP$_1$) ⇒
[$_{V'}$ NP$_1$ [$_{V'}$ V [$_{VP}$ NP$_2$ [$_{V'}$ – PP]]]] (*Mary gave it to John*)

h. Move(V:{[∗N∗]}, [$_{VP}$ NP$_1$ [$_{V'}$ V [$_{VP}$ NP$_2$ [$_{V'}$ – PP]]]]) ⇒
[$_{V'}$ V:{[∗N∗]} [$_{VP}$ NP$_1$ [$_{V'}$ – [$_{VP}$ NP$_2$ [$_{V'}$ – PP]]]]]
(*gave Mary it to John*)

i. Agree([∗N∗], NP$_1$) ⇒ [$_{VP}$ V:{} [$_{VP}$ NP$_1$ [$_{V'}$ – [$_{VP}$ NP$_2$ [$_{V'}$ – PP]]]]]

The resulting structure is shown in (20): It is a complete VP (it does not have any operation-inducing feature anymore) that can then be merged with some other head. The external argument NP is moved to the subject position (SpecT) in a subsequent movement step, yielding SVO order (rather than the VSO order that is the output of (19)).[22]

(20)



4. Noun Phrase Structure by Reprojection

So far we have seen that a reprojection approach to head movement in terms of Münchhausen features is both conceptually (Surányi (2005)) and empirically motivated (Haider (2000, 2005, 2006)). In this sec-

[22]Note that the system does not necessarily have to predict VSO orders (although it seems to us that this consequence is innocuous, by and large). If external arguments are not subcategorized (see the previous footnote), this would be avoided. Alternatively, one might stipulate that all subcategorization features *except for the most deeply embedded one* are accompanied by a Münchhausen feature. This would exempt the external argument from special identification by V, and thus capture the idea that this is what is special about external arguments (see, e.g., Williams's (1981) externalization convention).

tion, we will show that assuming reprojection to also apply within NPs counters all arguments against NP as the highest projection of nominal projections that are based on movement of N.[23] We will in turn analyze the Italian data, the Modern Hebrew data, and the typological restrictions on word order in nominal projections presented in section 2 by making use the system outlined in the previous section.

4.1. Reprojection of N in Italian

Recall that Longobardi (1994) basically presupposes that there are two types of phonologically null D in Italian: Null D either receives a specific semantic interpretation as indefinite, or it has to be identified by N (the case of proper names). Longobardi suggests that an empty D can be identified by moving N to D; such an analysis is not available for principled reasons if DP is a specifier of N. Thus, we would like to suggest that D identification by N is accomplished in another way, viz., by a designated categorial probe feature [∗D∗] that accompanies the subcategorization feature [•D•] on N. Just as in Longobardi's analysis, it must be assumed that this option is only available with proper names, and if D needs to be identified by N in the first place (i.e., if D is not lexically filled). For the sake of concreteness, let us assume that N obligatorily has a subcategorization feature [•D•] in Italian; and if N is a proper name, and the specific determiner that is selected is phonologically null, N must also be equipped with [∗D∗] in addition.[24]

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[23]NP shell analyses have been advanced in order to accomodate c-command relations between arguments of N in languages like, e.g., English and German, where precedence implies c-command (as seen in the previous section for VPs in English); see Haider (2000) (based on nominal projections like (i-a) in German) and Adger (2003) (based on nominal projections like (i-b) in English), among others.

(i) a. Die Wut des Mannes$_1$ auf sich$_1$
the anger of the man on himself
b. the consul's gift of the gladiator$_1$ to himself$_1$

Of course, this can be implemented in the present approach in exactly the way that we have just seen with VPs. In contrast, in this section we focus on prenominal categories that are not arguments of N (but rather modifiers or quantifiers).

[24]The question arises of how the dependence of [∗D∗] on phonologically null D can be expressed. One possible answer is that Münchhausen features are (generally)

It turns out that nothing more needs to be said to derive the pattern in (3).

As a case in point, consider the derivation of an NP like *Gianni mio* (= (3-e)). By assumption, N always has a [•D•] feature. Since N is a proper name and D is empty, [∗D∗] is also present on N. Furthermore, N has a subcategorization feature [•A•]. [•A•] is always higher on N's stack of structure-building features than [•D•]. The ensuing derivation is shown in (21).

(21) a. N's feature set: {[•A•] ≻ [•D•], [∗D∗]}
b. Merge(N:{[•A•] ≻ [•D•], [∗D∗]}, AP) ⇒
$[_{N'}$ AP N:{ [•D•], [∗D∗]}] (*mio Gianni*)
c. Merge($[_{N'}$ AP N:{ [•D•], [∗D∗]}], DP) ⇒
$[_{N'}$ DP $[_{N'}$ AP N:{[∗D∗]}]] (*D mio Gianni*)
d. Move(N:{[∗D∗]}, $[_{NP}$ DP $[_{N'}$ AP N]]) ⇒
$[_{N'}$ N:{[∗D∗]} $[_{NP}$ DP $[_{N'}$ AP –]]] (*Gianni D mio*)
e. Agree([∗D∗],DP) ⇒ $[_{NP}$ N:{–} $[_{NP}$ DP $[_{N'}$ AP –]]]

First, N is merged with AP (discharging [•A•]), then with DP (discharging [•D•]); empty D is a non-projecting (trivial) phrase (see (21-bc)). This leaves the categorial probe feature [∗D∗] on N to be checked. Discharge is impossible with N in situ (due to a lack of c-command), so N moves and reprojects (see (21-d)), which makes checking [∗D∗] possible (see (21-e)). Thus, if there is an AP complement present in the structure, N remerges in order to c-command its specifier DP and to check [∗D∗]; it then appears to the left of the adjective. If there is no [•A•] to begin with (hence, no AP complement), N must still discharge its Münchhausen feature [∗D∗]. However, this time, no movement is forced (and therefore, it is blocked by Last Resort) because c-command obtains with N in situ.

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inserted in the numeration or lexical subarray (but before the derivation proper starts, in accordance with Inclusiveness Condition; see Chomsky (2000, 2001)); and in the case of proper names and D in Italian, [∗D∗] is only inserted if D is null (and therefore requires special identification). Alternatively, one might distinguish between two types of [•D•] features; and [∗D∗] only shows up on proper name N if one of these two [•D•] is present (viz., the one that selects an empty determiner).

4.2. Reprojection of N in Modern Hebrew

Assuming the approach to construct state nominals developed in Ritter (1988) to be essentially correct (see footnote 5), let us address the question of how it can be implentend in the present analysis. First, suppose that N has a categorial probe feature [∗D∗] in addition to its subcategorization feature [•D•] in the presence of a genitive possessor, i.e., in the context for construct state.[25]

(22) Feature set of N in construct state contexts:
N:{[•N•] ≻ [•D•], [∗D∗]}

The probe feature [∗D∗] triggers movement of N in construct state environments because [∗D∗] cannot be checked in situ as N does not c-command its specifier DP. Therefore, reprojection movement of N is called for; and this produces the N-initial word order. This is shown in (23) (the analysis here is simplified for the sake of exposition; e.g., the issue of genitive assignment to the possessor is ignored).

(23) $[_{NP}\ [_{N_1}$ beyt $]\ [_{NP}\ [_{DP}$ ha- $[_{N'}\ [_{NP_2}$ mora $]$ – $]]]]$
house DEF- teacher
'the house of the teacher'

Note that this analysis makes an interesting prediction without further ado: D and the genitive possessor automatically form a constitutent. Recall that to derive this, Ritter (1988) had to postulate a further post-syntactic operation ensuring that the the definiteness marker *ha*- attaches to the possessor.

4.3. Deriving the Constraints on Word Order Variation

Finally, we show how Cinque's (2005) and Abels & Neeleman's (2006) analyses of the constraints on word order variation within nominal projections can be implemented in the present approach. The following four assumptions are crucial in Abels & Neeleman's reconstruction of

[25]See footnote 24 on how to express this correlation formally. In general, either it suffices that the relevant information is provided in the numeration, or we have to envisage a more fine-grained subcategorization feature than just [•N•] – for instance, [•N_{poss}•].

Cinque's proposal, and it remains to be shown that the reprojection approach can derive the restrictions on this basis.

(24) a. External Merge respects the hierarchical order D $\succ$ n $\succ$ A $\succ$ N.
b. Movement ends in a c-commanding position.
c. Movement is leftward.
d. Movement in the nominal projection must involve a subtree containing N.

(25) is a faithful adaptation of Abels & Neeleman's (24-a) to the present proposal, and (24-bc) can be adopted unchanged.[26]

(25) The hierarchy [•A•] $\succ$ [•n•] $\succ$ [•D•] must be respected on N.

Of the four assumptions in (24), (25-d) is the most stipulative one: (24-bc) are very general constraints on movement (and (24-b) follows from the Strict Cycle Condition if Move is internal Merge); and (24-a) (or (25)) is simply a fact about language that any theory must encode in some way. However, the constraint in (24-d) is peculiar; in our view, it is the only conceptual blemish in Abels & Neeleman's (2006) reconstruction of Cinque's (2005) approach. To the extent that it is true, it should be derived from more basic assumptions.

As it turns out, (24-d) does not have to be stipulated in the present analysis; it follows as a theorem. Here is why: If N is the head of the nominal projection, all movements within this projection are either triggered by structure-building (movement-type specific) edge features on N, or they are triggered by the need to get rid of probe features in the next but one step (reprojection movement). The latter option can only be relevant for the head N itself (given the Strict Cycle Condition, non-heads cannot have operation-inducing features). The former option does not help in the case of A, n, and D. Suppose for the sake of the argument that N bears some feature [•F•] in addition to its subcategorization features for (say) A, n, and D that could in principle trigger movement ([•F•] must then be embedded below subcategorization features in the stack of structure-building features); and that one of these categories

[26]Note that (25) is formulated in such a way as to ensure that not all of the subcategorization features do in fact have to be show up on N all the time; cf. footnote 16. Note also that arguments of N will be introduced by other subcategorization features that are higher on the hierarchy; so the hierarchy in (25) is only partial.

(e.g., n) can actually provide a goal [F] for [•F•]. [•F•] could still not trigger movement of nP across DP to an outer specifier of N (thereby giving rise to an unattested order) because the resulting configuration is structurally identical to the pre-movement configuration: If nP can check N's [•F•] feature in a derived specifier position, it can just as well check the same feature in situ (roughly, [•F•] on X is interpreted as 'X wants to see F in its projection'). Consequently, movement is blocked by Last Resort in this case: When [•F•] becomes accessible on the stack of structure-building features, it can immediately be discharged, without any need for a syntactic movement operation, because the structural configuration required for discharge of [•F•] features is present in situ.[27]

Having laid out these premisses, let us consider again the possible and impossible orders in nominal projections from the present perspective; (7) is repeated here as (26) (with roman numbers added in Ib for reasons that will become clear immediately).

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[27]Note in passing that this reasoning is more or less the same as the one that Abels (2003) gives in his account of Anti-Locality effects – extremely local movement is blocked because it does not create a new configuration for feature checking. Furthermore, it is worth pointing out that the same reasoning will also block arguments of N from movement in the nominal projection. For those cases where it may at first sight look as if this restriction is too strong (like, e.g., the NP-internal topicalization construction (i) in German), and, more generally, for cases where it has been argued that some of the impossible patterns in (7) are possible after all – but only if certain information structure-related conditions are met –, one might assume that in these cases, nominal projections have discourse-based functional heads on top of them that attract categories in an anti-local way. As far as we can see, the only potential incompatibility would arise if the strict assumption is made that subcategorization of nominal projections by verbs is categorially uniform. That said, Lindauer (1995) has argued that the distribution of nominal projections of the type in (i) in German is much more restricted than that of ordinary nominal arguments that do not exhibit internal XP preposing.

(i) $[_{\alpha}\ [_{PP_1}$ von Peter $]\ [_{NP}\ [_{DP}$ das $]\ [_{N'}$ Buch $t_1\ ]]$
of Peter the book

(26) *Possible and impossible orders in nominal projections*:

Ia	D	n	A	N
	D	n	N	A
	D	A	N	n
	D	N	A	n
	N	A	n	D
	A	N	n	D
	n	A	N	D
	n	N	A	D

Ib	(i)	D	N	n	A
	(ii)	N	n	A	D
	(iii)	N	D	n	A
	(iv)	N	D	A	n
	(v)	N	A	D	n
	(vi)	A	N	D	n

II	*	D	A	n	N
	*	A	D	n	N
	*	n	A	D	N
	*	A	n	D	N
	*	A	D	N	n
	*	n	D	A	N
	*	n	D	N	A
	*	A	n	N	D
	*	n	N	D	A
	*	N	n	D	A

As in Abels & Neeleman's (2006) analysis, the orders in Ia can be base-generated. Moreover, it can easily be verified (given the statements in (24)/(25)) that the orders in II cannot be generated. To give just one example: The order D–A–n–N in II cannot be base-generated (A and N are not adjacent). Movement of N to the right periphery of the NP is impossible since all movement is leftward; and movement of A alone to the left is impossible because any feature that could trigger such a movement on N could be discharged with A remaining in situ. Similar conclusions apply in the case of all the other illegitimate orders in II.

The orders in Ib are the most interesting ones from the present perspective. They cannot be base-generated, and it therefore remains to be shown that they can be derived by (reprojection) movement. Three cases can be distinguished. First, consider the two orders (i) and (ii) in Ib. These orders can be derived if N has a Münchhausen feature [∗n∗] requiring special identification of its second argument; since nP is a specifier of N (and thus not c-commanded by N), N undergoes reprojection movement in these cases to make Agree possible and discharge [∗n∗] (as soon as possible, given Agree over Merge). After reprojection, D is regularly merged. This is shown in (27) (the base order of AP and N is irrelevant).

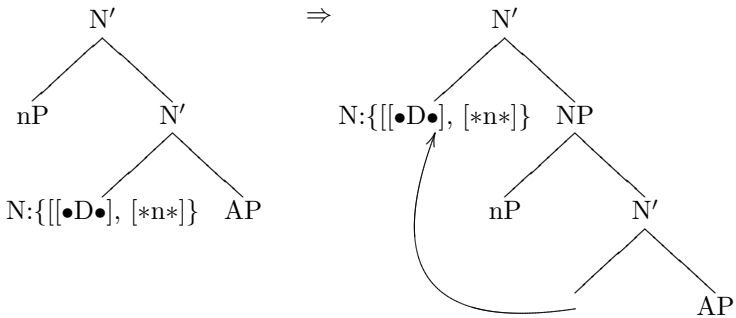
(27) *Orders (i), (ii)*:

(i) D N n A → N moves in front of n
N:{[•A•] ≻ [•n•] ≻ [•D•], [∗n∗]} initial specification
$[_{NP}$ DP $[_{N'}$ N_1 $[_{NP}$ nP $[_{N'}$ – AP]]]] derivation

(ii) N n A D → N moves in front of n
N:{[•A•] ≻ [•n•] ≻ [•D•], [∗n∗]} initial specification
$[_{NP}$ $[_{N'}$ N_1 $[_{NP}$ nP $[_{N'}$ – AP]]] DP] derivation

The relevant step of the derivation of order (i) is illustrated in (28).

(28)



Let us turn next to a second pair, (iii) and (iv) in Ib. These orders come into existence when N is equipped with a categorial probe feature [∗D∗] (rather than [∗n∗], as in the previous case). Now N must remerge and reproject after being merged with DP; see (29).

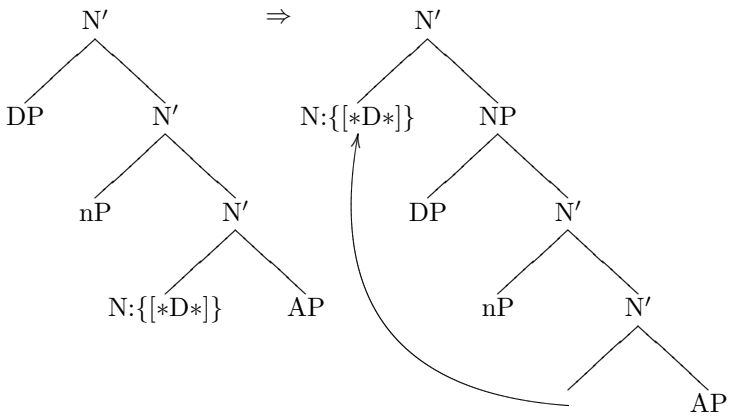
(29) *Orders (iii), (iv)*:

(iii) N D n A → N moves in front of D
N:{[•A•] ≻ [•n•] ≻ [•D•], [∗D∗]} initial specification
$[_{NP}\ N_1\ [_{NP}\ DP\ [_{N'}\ nP\ [_{N'}\ -\ AP\ ]]]]$ derivation

(iv) N D A n → N moves in front of D
N:{[•A•] ≻ [•n•] ≻ [•D•], [∗D∗]} initial specification
$[_{NP}\ N_1\ [_{NP}\ DP\ [_{N'}\ [_{N'}\ -\ A\ ]\ nP\ ]]]$ derivation

The crucial step of reprojection movement in the derivation of order (iii) is shown in (30).

(30)



Finally, the orders in (v) and (vi) in Ib need to be derived. This time, the derivation is a bit more complex because no movement of a single N will be able to yield the surface strings where not only N, but also A shows up outside of D and n. These two cases require pied piping: N pied-pipes A when it moves by reprojection. The question is how pied piping can be effected in the present approach. We will adopt a standard analysis here according to which pied piping involves feature percolation.[28] Thus, suppose that a Münchhausen feature may in principle percolate to the immediately dominating category (in which case it is deleted on its original host).[29] In the case at hand, this means that a feature like [∗D∗] may percolate from N to $[_{N'}$ N AP] (or $[_{N'}$ A NP]). In languages that permit this operation, N′ effectively behaves as if it were a single head after percolation: It moves and reprojects in order to discharge [∗D∗] under c-command. As shown in (31), pied piping of this type gives rise to the orders in (v) and (vi).

[28] Arguably, feature percolation is an additional mechanism that should be avoided if possible; see Heck (2004, 2007) for arguments and an alternative. However, for present purposes, assuming feature percolation may suffice.

[29] Recall that we have explicitly excluded this option in the case of structure-building features.

(31) *Orders (v), (vi)*:

(v) N A D n → N+A moves in front of D
N:{[•A•] ≻ [•n•] ≻ [•D•], [∗D∗]}
initial specification; [∗D∗] percolates
[$_{\text{NP}}$ [$_{\text{N}'}$ N AP] [$_{\text{NP}}$ DP [$_{\text{N}'}$ nP –]]] derivation

(vi) A N D n → A+N moves in front of D
N:{[•A•] ≻ [•n•] ≻ [•D•], [∗D∗]}
initial specification; [∗D∗] percolates
[$_{\text{NP}}$ [$_{\text{N}'}$ AP N] [$_{\text{NP}}$ DP [$_{\text{N}'}$ nP –]]] derivation

Note that percolation does not give rise to unwanted orders – still, only items that contain N can undergo movement, so all the orders in II remain excluded.[30]

To end this section, note that our analysis differs from Abels & Neeleman's approach to word order restrictions in nominal projections in another interesting respect. Whereas derivational ambiguities can arise in their system, a given legitimate string involving D, n, A, and N can only have one possible source in the present framework: It is either derived by reprojection movement (Ib), or it is base-generated (Ia) – a derivation of the strings in (Ia) via movement turns out to be impossible under present assumptions (the relevant movements would all be too local).

5. Conclusion

To sum up, we have sketched an approach to reprojection that relies on what we call Münchhausen features, i.e., categorial probe features that target arguments that have just been merged (as a consequence of discharge of a structure-building feature). We have argued that there is good reason to assume reprojection movement of N in the nominal domain: If we do so, one of the strongest type of argument in support

[30]Suppose that an [∗n∗] feature (as it is required to generate the orders in (i) and (ii) could also percolate. This would pose no particular problem (in the sense that unattested orders are generated), but it would not have any interesting consequence either – percolation of [∗n∗] cancels the effect that the Münchhausen feature is designed to have because reprojection movement would then be avoided. In this regard, a percolating [∗n∗] feature is just like a regular [∗A∗] feature (if the latter generates a complement, i.e., if there is no argumental complement of N present).

of a DP-over-NP approach (the DP hypothesis) loses its force (viz., that there is good evidence for movement of N, and that D is needed to provide a landing site), and an NP-over-DP approach can in principle be entertained. We have also shown that assuming an NP-over-DP approach with reprojection movement of N driven by categorial probe features makes it possible to independently derive the one of the four assumptions in Abels & Neeleman's reconstruction of Cinque's approach to word order variation in nominal projections (see (24)) that looks stipulative (viz., that movement in the nominal projection must involve a subtree containing N; (24-d)). In our view, this is the most important result of the present paper, and to the extent that (24-d) must resist a principled explanation in DP-over-NP approaches, it presents a strong argument for NP-over-DP approaches.

Needless to say, if NP-over-DP approaches are to qualify as viable alternatives to standard DP-over-NP approaches, many more arguments for the DP hypothesis that have been brought forward in the literature must be addressed. Many of the original arguments given in support of the DP hypthesis center around data where more than one item precedes N (cf. Abney (1987), Haider (1988), and Szabolcsi (1994), among many others). As noted at the outset, these arguments lose their force if a multiple specifier approach is adopted – under this assumption, NPs with more than one prenominal category can receive essentially the same structural analysis that they did in Jackendoff (1977). Certain other arguments may not have been particularly convincing from the very beginning; among them is Abney's argument based on gerunds (where V movement to D can easily be reinterpreted as V movement to N; see von Stechow (1992)). Furthermore, agreement phenomena in nominal projections (in languages like Hungarian, Turkish, Yupik, and Tzutujil) have been assumed to provide arguments for the DP hypothesis (cf. Abney (1987) and subsequent work based on it), but again, it seems to us that they do not presuppose the existence of a functional head that mediates this agreement, and that closer scrutiny in fact reveals that they pose more problems than they solve (particularly if one adopts an Agree-based approach, where the concept of "mediation" is difficult to make sense of). Of course, there are many other arguments for the DP hypothesis that need to be tackled to prove the competing (and traditional) approach viable (see, e.g., Alexiadou et al. (2007)).

Then again, there have always been arguments against the DP hypothesis that, in our view, have not yet been convincingly rejected. For instance, facts about selection would seem to initially support the view

that V embeds N rather than D in the unmarked case (see Grimshaw (2000)). Similarly, facts about incorporation would seem to support an NP-over-DP approach (see Baker (1988, 1996) and Rosen (1990)): Incorporation of N into V may strand D in the nominal projection. Given that incorporation is head movement, this is unexpected under the DP hypothesis (since a Head Movement Constraint violation should occur) but entirely unproblematic if the DP hypothesis is abandoned.

However, addressing further evidence for or against the DP hypothesis is clearly beyond the scope of the present paper; here we have confined ourselves to showing that generating NP structure by reprojection of N offers a viable alternative to N movement to D (and other functional projections) – an alternative that makes it possible to derive an otherwise stipulative statement needed in Abels & Neeleman's and Cinque's approaches to word order variation in nominal projections.

Bibliography

Abels, Klaus (2003): Successive Cyclicity, Anti-Locality, and Adposition Stranding. PhD thesis, University of Connecticut, Storrs, Connecticut.

Abels, Klaus & Ad Neeleman (2006): Universal 20 Without the LCA. Ms., University of Tromsø and University College London.

Abney, Steven (1987): The English Noun Phrase in Its Sentential Aspect. PhD thesis, MIT, Cambridge, Mass.

Ackema, Peter, Ad Neeleman & Fred Weerman (1993): Deriving Functional Projections. In: *Proceedings of NELS*. Vol. 23, Amherst: GSLA, pp. 17–31.

Adger, David (2003): *Core Syntax*. Oxford University Press, Oxford, New York.

Alexiadou, Artemis, Liliane Haegeman & Melita Stavrou (2007): *Noun Phrase in the Generative Perspective*. De Gruyter, Berlin, New York.

Baker, Mark (1988): *Incorporation. A Theory of Grammatical Function Changing*. University of Chicago Press, Chicago.

Baker, Mark (1996): *The Polysynthesis Parameter*. Oxford University Press, New York and Oxford.

Bayer, Josef & Ellen Brandner (2007): On Wh-Head-Movement and the Doubly-Filled-Comp Filter. Ms., Universität Konstanz. (Paper presented at West Coast Conference on Formal Linguistics 26, Berkeley).

Bhatt, Rajesh (2002): The Raising Analysis of Relative Clauses, *Natural Language Semantics* 10, 43–90.

Borer, Hagit (1999): Deconstructing the Construct. In: K. Johnson & I. Roberts, eds., *Beyond Principles and Parameters*. Kluwer, Dordrecht, pp. 43–90.

Brody, Michael (2001): Some Aspects of Elegant Syntax. Ms., University College London.

Bury, Dirk (2003): Phrase Structure and Derived Heads. PhD thesis, University College London.

Chomsky, Noam (1973): Conditions on Transformations. In: S. Anderson & P. Kiparsky, eds., *A Festschrift for Morris Halle*. Academic Press, New York, pp. 232–286.

Chomsky, Noam (1986): *Barriers*. MIT Press, Cambridge, Mass.

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

Chomsky, Noam (2000): Minimalist Inquiries: The Framework. In: R. Martin, D. Michaels & J. Uriagereka, eds., *Step by Step*. MIT Press, Cambridge, Mass., pp. 89–155.

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

Chomsky, Noam (2005): Three Factors in Language Design, *Linguistic Inquiry* 36, 1–22.

Chomsky, Noam (2007): Approaching UG from Below. In: *Interfaces + Recursion = Language?*. Mouton de Gruyter, Berlin, pp. 1–31.

Cinque, Guglielmo (2005): Deriving Greenberg's Universal 20 and Its Exceptions, *Linguistic Inquiry* 36, 315–323.

Collins, Chris (2003): Eliminating Labels. In: S. D. Epstein & T. D. Seely, eds., *Derivation and Explanation in the Minimalist Program*. Blackwell, Oxford, pp. 42–64.

Epstein, Sam, Erich Groat, Ruriko Kawashima & Hisatsugu Kitahara (1998): *A Derivational Approach to Syntactic Relations*. Oxford University Press, Oxford and New York.

Fanselow, Gisbert (2003): Münchhausen-Style Head Movement and the Analysis of Verb-Second. In: A. Mahajan, ed., *Head Movement and Syntactic Theory*. Vol. 3 of *Syntax at Sunset*, UCLA & Universität Potsdam Working Papers in Linguistics, Los Angeles & Potsdam, pp. 40–76.

Franks, Steven & Asya Pereltsvaig (2004): Functional Categories in the Nominal Domain. In: O. Arnaudova, W. Browne, M. L. Rivero &

D. Stojanovic, eds., *Proceedings of FASL 12*. University of Ottawa, pp. 109–128.

Gärtner, Hans-Martin (2002): *Generalized Transformations and Beyond*. Akademie-Verlag, Berlin.

Grimshaw, Jane (2000): Extended Projection and Locality. In: P. Coopmans, M. Everaert & J. Grimshaw, eds., *Lexical Specification and Insertion*. Benjamins, Amsterdam, pp. 115–133.

Haider, Hubert (1988): Zur Struktur der deutschen Nominalphrase, *Zeitschrift für Sprachwissenschaft* 7, 32–59.

Haider, Hubert (2000): Branching and Discharge. In: P. Coopmans, M. Everaert & J. Grimshaw, eds., *Lexical Specification and Insertion*. Benjamins, Amsterdam, pp. 135–164.

Haider, Hubert (2005): How to Turn German into Icelandic – and Derive the OV/VO Contrasts, *Journal of Comparative Germanic Linguistics* 8, 1–53.

Haider, Hubert (2006): Zufall und Notwendigkeit bei der germanischen VO/OV-Spaltung. Ms., Universität Salzburg.

Harley, Heidi (1995): Subjects, Events, and Licensing. PhD thesis, MIT.

Heck, Fabian (2004): A Theory of Pied Piping. PhD thesis, Universität Tübingen.

Heck, Fabian (2007): One Some Properties of Pied Piping. Ms., Universität Leipzig. To appear in *Linguistic Inquiry*.

Heck, Fabian & Gereon Müller (2003): Derivational Optimization of Wh-Movement, *Linguistic Analysis* 33, 97–148.

Heck, Fabian & Gereon Müller (2007): Extremely Local Optimization. Proceedings of WECOL 2006. California State University, Fresno.

Holmberg, Anders (1991): Head Scrambling. Handout of talk; GLOW 1991 (Leiden).

Hornstein, Norbert & Juan Uriagereka (2002): Reprojections. In: S. D. Epstein & D. Seely, eds., *Derivation and Explanation in the Minimalist Program*. Blackwell, London, pp. 106–132.

Jackendoff, Ray (1977): *X-bar Syntax. A Study of Phrase Structure*. MIT Press, Cambridge, Mass.

Kayne, Richard (1994): *The Antisymmetry of Syntax*. MIT Press, Cambridge, Mass.

Kobele, Greg (2006): Generating Copies. PhD thesis, UCLA, Los Angeles.

Koeneman, Olaf (2000): The Flexible Nature of Verb Movement. PhD thesis, Utrecht University.

Kratzer, Angelika (1996): Severing the External Argument from its

Verb. In: J. Rooryck & L. Zaring, eds., *Phrase Structure and the Lexicon*. Kluwer, Dordrecht.

Lahne, Antje (2006): A CP Approach to Left Peripheral Architecture. Ms., Universität Leipzig.

Larson, Richard (1988): On the Double Object Construction, *Linguistic Inquiry* 19, 335–391.

Larson, Richard (2004): The Projection of DP. Ms., Stony Brook University.

Lechner, Winfried (2004): Extending and Reducing the MLC. In: A. Stepanov, G. Fanselow & R. Vogel, eds., *Minimality Effects in Syntax*. Mouton de Gruyter, Berlin, pp. 205–240.

Lewis, David (1972): General Semantics. In: D. Davidson & G. Harman, eds., *Semantics of Natural Language*. Reidel, Dordrecht, pp. 169–218.

Lindauer, Thomas (1995): *Genitivattribute: Eine morphosyntaktische Untersuchung zum deutschen DP/NP-System*. Niemeyer, Tübingen.

Longobardi, Giuseppe (1994): Reference and Proper Names: A Theory of N-Movement in Syntax and Logical Form, *Linguistic Inquiry* 25, 609–665.

Mahajan, Anoop (2001): Word Order and Remnant VP Movement. UCLAO, Ms.

Matushansky, Ora (2006): Head-Movement in Linguistic Theory, *Linguistic Inquiry* 37.1(69-109).

Müller, Gereon (1998): *Incomplete Category Fronting*. Kluwer, Dordrecht.

Müller, Gereon (2004): Verb-Second as vP-First, *Journal of Comparative Germanic Linguistics* 7, 179–234.

Müller, Gereon (2007): On Deriving CED Effects from the PIC. Talk at GLOW, Tromsø. Ms., Universität Leipzig.

Nunes, Jairo (2004): *Linearization of Chains and Sideward Movement*. MIT Press, Cambridge, Mass.

Pereltsvaig, Asya (2006): Small Nominals, *Natural Language and Linguistic Theory* 24, 433–500.

Pesetsky, David (1985): Morphology and Logical Form, *Linguistic Inquiry* 16, 193–246.

Pesetsky, David & Esther Torrego (2006): Probes, Goals and Syntactic Categories. Ms., MIT. Lingbuzz/000321.

Pollard, Carl J. & Ivan A. Sag (1994): *Head-Driven Phrase Structure Grammar*. University of Chicago Press, Chicago.

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

Richards, Marc (2007): On Feature Inheritance, *Linguistic Inquiry* 38, 563–572.

Ritter, Elizabeth (1988): A Head Movement Approach to Construct State Noun Phrases, *Linguistics* 26, 909–929.

Roberts, Ian (1991): Excorporation and Minimality, *Linguistic Inquiry* 22, 209–218.

Roberts, Ian (2001): Head Movement. In: M. Baltin & C. Collins, eds., *The Handbook of Contemporary Syntactic Theory*. Blackwell, Oxford, pp. 113–147.

Rosen, Carol (1990): Rethinking Southern Tiwa: The Geometry of a Triple Agreement Language, *Language* 66, 669–731.

Schäfer, Florian (2007): On the Nature of Anticausative Morphology. PhD thesis, Universität Stuttgart.

Stabler, Edward (1996): Acquiring and Parsing Languages with Movement. Book ms., UCLA.

Stabler, Edward (1997): Derivational Minimalism. In: C. Retoré, ed., *Logical Aspects of Computational Linguistics*. Springer, Heidelberg, pp. 68–95.

Stabler, Edward (1998): Acquiring Languages with Movement, *Syntax* 1, 72–97.

Sternefeld, Wolfgang (1991): *Syntaktische Grenzen. Chomskys Barrierentheorie und ihre Weiterentwicklungen*. Westdeutscher Verlag, Opladen.

Sternefeld, Wolfgang (2006): *Syntax*. Stauffenburg, Tübingen. Two volumes.

Surányi, Balázs (2005): Head Movement and Reprojection, *Annales Universitatis Scientiarum Budapestinensis de Rolando Eötvös Nominatae. Sectio Linguistica. ELTE* Tomus XXVI, 313–342.

Svenonius, Peter (1994): C-Selection as Feature-Checking, *Studia Linguistica* 48, 133–155.

Szabolcsi, Anna (1994): The Noun Phrase. In: F. Kiefer, ed., *Syntax and Semantics, vol 27: The Structure of Hungarian*. Academic Press, San Diego, pp. 179–274.

Travis, Lisa (1984): Parameters and Effects of Word Order Variation. PhD thesis, MIT, Cambridge, Mass.

von Stechow, Arnim (1992): Kompositionsprinzipien und grammatische Struktur. In: P. Suchsland, ed., *Biologische und soziale Grundlagen der Sprache*. Niemeyer, pp. 175–248.

von Stechow, Arnim & Wolfgang Sternefeld (1988): *Bausteine syntaktischen Wissens*. Westdeutscher Verlag, Opladen.

Williams, Edwin (1981): Argument Structure and Morphology, *The Linguistic Review* 1, 81–114.

Wunderlich, Dieter (1997): Cause and the Structure of Verbs, *Linguistic Inquiry* 27, 27–68.

A Correspondence-theoretic Account of Fixed Segmentism Reduplication

Eva Zimmermann & Jochen Trommer

Abstract

In fixed segmentism reduplication (FSR), reduplication is accompanied by addition of an affix which partially overwrites the reduplicant (the FSR affix). Nevins (2005) claims that the correspondence-theoretic analysis of FSR proposed by Alderete et al. (1999) faces three serious problems: *First*, it predicts the existence of unattested FSR systems where the FSR affix is backcopied to the base. *Second*, it predicts unattested FSR systems where the realization of the FSR affix depends on its relative size with respect to the portion of the reduplicant it strives to overwrite. *Third*, it cannot account for cases where overwriting replaces parts of the reduplicant even though concatenation of the FSR affix and the reduplicant would result in a phonologically licit structure. In this paper, we show that the first problem is empirically flawed since FSR copying is attested, and argue that the second and third problem find a straightforward solution in the independently motivated parametrization of optimality-theoretic constraints.

1. Alderete et al. (1999) on Fixed Segmentism Reduplication

Alderete et al. (1999) distinguish phonological and morphological FSR. In the former, a default segment is phonologically motivated whereas in the latter the fixed segmentism is a kind of affix. An example for phonological FSR is diminutive reduplication in Lushootseed. According to Urbanczyk (1996), the fixed segmentism **í** appears in reduplicants which would otherwise contain marked structure such as stressed schwa (the reduplicative prefix is stress-attracting) or a long vowel (1-a,b), but not with other roots (1-c,d):

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(1) *Reduplication in Lushootseed* (Urbanczyk, 1996)

a. təláw-il	'run'	t**í**-təlaw'-il	'jog'
b. s-du:k^{w}	'knife'	s-d**í**-du:k^{w}	'small knife'
c. čáləs	'go ahead'	čá-čaləs	'go ahead a bit'
d. s-duk^{w}	'bad'	s-dú-ʔ-du:k^{w}	'riff-raff'

These cases are analyzed by Alderete et al. (1999) as phonological *Emergence of the Unmarked* and are irrelevant for our argument. A notorious example for morphological FSR is English **schm**-reduplication which expresses roughly derision or irony. In **schm**-reduplication, the base is copied and **schm** is realized as the onset of the first syllable of the reduplicant, replacing the original onset of the base if necessary:

(2) *English **Schm**-reduplication*

a. table	table-schmable
b. plan	plan-schman
c. string	string-schming
d. apple	apple-schmapple

In contrast to cases of phonological FSR, the appearance of **schm** cannot be analyzed as a result of phonological optimization since this consonant combination is highly marked in English. In the correspondence-theoretic analysis proposed in Alderete et al. (1999), **schm** is simply taken to be an affix which is attached to the base concomitantly to reduplication. Hence the English case is parallel to the Bambara reduplication pattern in (3) where base and reduplicant are linked by the affixal element **o** :

(3) *Reduplication in Bambara* (Culy, 1985; Dumestre, 2003)

a. wulu	'dog'	wulu-o-wulu	'whichever dog'
b. malo	'uncooked rice'	malo-o-malo	'whatever uncooked rice'
c. muso	'woman'	muso-o-muso	'whatever woman'

Whereas affixation of **o** generally leads to phonologically wellformed structures in Bambara, only (2-d), based on the vowel-initial base **apple**, is phonotactically licit in English without further modification. Combining **schm** and consonant-initial bases (2-a-c) would lead to clusters such as ***ʃmt** which are excluded in English by high-ranked markedness constraints. Assuming that epenthesis is not possible, either **schm** or the onset of the reduplicant must be deleted, and hence compete for realization – a competition which is resolved by the two

faithfulness constraints MAX-IO and MAX-BR, where the former demands realization of all input material in the output, and the latter requires that all segments of the base also appear in the reduplicant.

Reduplication is triggered by the abstract formant RED which consists of no phonological material of its own but whose "content [...] is determined by the base" (Nelson, 2002:321).[1] Thus the input for the OT-grammar consists of the root, the affix **schm** and RED. The correct English pattern is derived by ranking MAX-IO over MAX-BR as illustrated in table (4)[2].

(4) *Analysis:* MAX-IO ≫ MAX-BR

$t_1a_2b_3l_4e_5$-sch_6m_7-RED	MAX-IO	MAX-BR
☞ a. $t_1a_2b_3l_4e_5$-$sch_6m_7a_2b_3l_4e_5$		*
b. $sch_6m_7a_2b_3l_4e_5$-$sch_6m_7a_2b_3l_4e_5$	*!	
c. $sch_6m_7a_2b_3l_4e_5$-$t_1a_2b_3l_4e_5$		*!*
d. $t_1a_2b_3l_4e_5$-$t_1a_2b_3l_4e_5$	*!*	

Nevins' critique of Alderete et al. (1999) does not directly attack this simple and conceptually attractive analysis of the English data, but identifies two problems with the typological predictions of the assumed constraint set and claims that the correspondence-theoretic analysis is inadequate for a similar FSR pattern in Hindi. We will address all three problems in the following sections. Section 2 and 4 discuss the typological problems with backcopying and size-dependent FSR. The Hindi case is addressed in section 5. Section 3 provides an analysis for related problems in the root-and-pattern morphology of Hebrew. We will show that all alleged complications for a correspondence-theoretic analysis are either empirically untenable or are obliterated by the independently motivated parametrization of optimality-theoretic constraints. In sec-

[1]Strictly speaking, there might be different RED morphemes in a single language resulting in different reduplication patterns (Urbanczyk, 1999). Each distinct RED, i.e. each morpheme which has the RED property, establishes a distinct correspondence relation and is governed by distinct BR faithfulness constraints defined with respect to this relation, which in turn trigger copying. Since we are only dealing with single reduplication processes for any given language, we will skip over these subtleties.

[2]Cf. Alderete et al. (1999:356).

tion 6 we discuss the alternative approach to FSR advocated by Nevins, and in section 7 we present our conclusions.

2. Morphological Backcopying

Because correspondence-theoretic OT allows candidates exhibiting any conceivable modification to the input, one of the possible outcomes in (4) is (4-b), where the FSR affix "backcopies" from the reduplicant to the base. As Nevins correctly points out, this candidate becomes optimal if the ranking of MAX-IO and MAX-BR is reversed:

(5) *Analysis:* MAX-BR ≫ MAX-IO

$t_1a_2b_3l_4e_5$-sch_6m_7-RED	MAX-BR	MAX-IO
a. $t_1a_2b_3l_4e_5$-$sch_6m_7a_2b_3l_4e_5$	*!	
☞ b. $sch_6m_7a_2b_3l_4e_5$-$sch_6m_7a_2b_3l_4e_5$		*
c. $sch_6m_7a_2b_3l_4e_5$-$t_1a_2b_3l_4e_5$	*!*	
d. $t_1a_2b_3l_4e_5$-$t_1a_2b_3l_4e_5$		*!*

Since it is one of the foundational tenets of Optimality Theory that – apart from systematic restrictions on possible rankings – constraints can be freely reranked, this combination of FSR and backcopying should be attested in some language. Hence we expect to find a language English' with the backcopying FSR construction in (5). Nevins (2005) classifies this pattern as typologically not attested and takes this alleged gap as evidence for a morphological approach to reduplication as in Raimy (2000) which he claims to be uncapable to derive fixed segmentism backcopying. We will discuss the differences between the correspondence-theoretic and the representational approach in section 6. Here, we show that backcopying of morphological material is indeed attested in the languages of the world and Nevins' argument is empirically problematic.

First, FSR involving backcopying is found in Siroi, a non-Austronesian language of Papua New Guinea (Wells, 1979; Inkelas and Zoll, 2005). In Siroi, adjectives are reduplicated to express plural formation. In addition to reduplication, the fixed segmentism **g** replaces the onset of the second syllable in disyllabic words (6-a,b) and is infixed

in monosyllabic words (6-c). Crucially, **g** does not only appear in the reduplicant but also in the base:[3]

(6) *Reduplication in Siroi* (Wells, 1979)

a.	maye	ma**g**e-ma**g**e	'good'
b.	sungo	su**g**o-su**g**o	'big'
c.	kuen	ku**g**en-ku**g**en	'tall'

A slightly different case of morphological backcopying can be observed in Seereer-Siin, an Atlantic language analyzed in detail by Mc Laughlin (2000). In Seerer, the first consonant of a noun stem undergoes mutation after specific noun class prefixes. Two patterns of mutation are found, voicing mutation (changing a voiced into a voiceless stop (7-a,b)) and continuancy mutation (changing a continuant into a stop, (7-c,d)). In (7), these mutation processes are triggered by the singular class prefix **o-** while the plural forms show the underlying root-initial consonant:

(7) *Consonant Mutation in Seerer-Siin* (Mc Laughlin, 2000)

	Sg	Pl		
a.	o-**c**ir	**ɟ**ir	'sick person'	*Voicing mutation*
b.	o-**k**awul	**g**awul	'griot'	
c.	o-**p**aɗ	**f**aɗ	'slave'	*Continuancy mutation*
d.	o-**t**ew	**r**ew	'woman'	

Consonant mutation interacts with a second process, derivation of agent nouns through reduplication where the reduplicative prefix is truncated to a CV: template (8). The patterns of interest here are the ones in (8-d-g): In contrast to voicing mutation (8-a-c), continuancy mutation affects the initial consonant of the root and applies optionally also to the reduplicant:

[3]Interestingly Siroi also violates the claim of McCarthy and Prince (1999) that there is no backcopying of prosodic templates (the "Kager-Hamilton problem"). Independent evidence for prosodic backcopying is found in Guarijio (Caballero, 2006).

(8) *Reduplication and Mutation in Seerer-Siin* (Mc Laughlin, 2000)

Voicing Mutation: No Featural Transfer				
a. bind	'write'	o-pii-bind		'writer'
b. dap	'launder'	o-taa-dap		'launderer'
c. gim	'sing'	o-kii-gim		'singer'
Continuancy Mutation: Optional Featural Transfer				
d. xoox	'cultivate'	o-qoo-xoox	o-qoo-**q**oox	'farmer'
e. fec	'dance'	o-pee-fec	o-pee-**p**ec	'dancer'
f. war	'kill'	o-baa-war	o-baa-**b**ar	'killer'
g. riw	'weave'	o-tii-riw	o-tii-**t**iw	'weaver'

Following Mc Laughlin (2000) we assume that mutation in Seerer is featural affixation of the features [–cont] and [–voice]. Under this analysis, backcopying in Seerer, although not FSR in the strict sense, is completely parallel to the situation in Siroi: A (featural) affix can only be realized by overwriting a feature specification of the reduplicant ([–cont] replaces [+cont] of the initial consonant) and this change is copied back to the base. Note that a derivational account of these patterns is problematic: One could assume that for the backcopying options in (8), mutation applies first to the base followed by reduplication. But morphologically mutation in these cases applies to nouns, not to verbs, hence the morphological structure of **o-baa-bar** is as in (9) which implies exactly the opposite ordering of phonological operations: **o** triggers mutation in the noun derived previously by reduplication:

(9) $[\text{o}_{\text{Class}}\ [\text{Red}_{\text{N}}\ [\text{bar}]_{\text{V}}]_{\text{N}}]_{\text{Class}}$

Moreover, the fact that there is no featural transfer for the voicing mutation which can be straightforwardly derived in Correspondence theory by the different ranking of base-reduplicant faithfulness constraints for voicing and continuancy, appears to be a mistery under a derivational account.

We conclude that morphological backcopying in FSR and more generally is empirically attested lending support to the correspondence-theoretic approach to FSR which naturally predicts this type of phenomena.[4]

[4] Another possible example of morphological backcopying outside of FSR is found in Chumash:

3. Segment-counting Root-and-Pattern Morphology

Nevins extends his attack against a correspondence-theoretic account of FSR to Semitic root-and-pattern morphology based on the analysis of Hebrew denominal verb formation in Ussishkin (1999). Since the Hebrew case offers some essential insights which are important for the analysis of FSR we develop in the following sections, we will discuss this case even though we are not primarily concerned with morphological formations outside of reduplication. In a significant subgroup of Hebrew denominal verb formation, base vowels are overwritten by the vowel melody **i** − **e** and extended to the size of a bisyllabic minimal word by doubling the second root consonant:

(10) *Hebrew Denominal Verb Formation* (Ussishkin, 1999)

a. dam	'blood'	dimem	'to bleed'
b. xam	'hot'	ximem	'to heat'
c. xad	'sharp'	xided	'to sharpen'
d. cad	'side'	cided	'to side with'

Intuitively Ussishkin captures this pattern by the assumption that affixal vowels have to be realized inside the base, but since the size of the resulting structure is restricted to bisyllabicity, not all vowels can be parsed. Preference for the realization of affixal vowels is implemented by two separate faithfulness constraints for stem and affix vowels, Max-Vowel-Af and Max-Vowel-Stem, ranked in this order. MinWd abbreviates a set of constraints which jointly require that the prosodic word is a bisyllabic foot with a final consonant. Integrity penalizes the doubling of segments:

(i) *Reduplication in Chumash* (Frampton, 2004)

a. s-kitwon	skit-kitwon	'it is coming out'
b. s-ikuk	sik-sikuk	'he is chopping, hacking'
c. s-iš-expeč	sisex-sexpeč	'they two are singing'

McCarthy and Prince (1995) assign the morphological structure s-RED-Root to these forms (where **s-** is an independent prefix), and argue that the segmental prefix is backcopied to the base with vowel-initial roots to satisfy the requirement that the reduplicant should be a heavy syllable (cf. **sik.si.kuk** vs. ***si.ki.kuk** without backcopying). However Inkelas and Zoll (2005) and Frampton (2004) argue against this analysis for Chumash.

(11) *Denominal Verb from Biconsonantal Base* (Ussishkin, 1999)

$d_1a_2m_3 + i_4 - e_5$	MinWd	Max-V-Af	Max-V-Stem	Integrity
a. $d_1a_2m_3e_5m_3$		*!		*
b. $d_1i_4m_3a_2m_3$		*!		*
c. $d_1a_2m_3i_4m_3e_5$	*!			*
☞ d. $d_1i_4m_3e_5m_3$			*	*

For roots with a high vowel, there is an alternative which allows to maintain base *and* affix vowels. The base vowel can be employed as the featurally equivalent glide **j** in the onset position of the second syllable:

(12) *Denominal Verb from Glide-medial Base* (Ussishkin, 1999)

$t_1i_2k_3 + i_4 - e_5$	MinWd	Max-V-Af	Max-V-Stem	Integrity
a. $t_1i_2i_4e_5k_3$	*!			
b. $t_1i_4k_3e_5k_3$			*!	*
☞ c. $t_1i_4j_2e_5k_3$				

According to Nevins, a fatal flaw of this move is that it predicts the wrong result for **dam**. The **i** of the affix melody could also be used as a glide resulting in **dajem** (in the following ☞ indicates candidates which are empirically correct, but do not become optimal under the given ranking):

(13) *Problematic Candidate with Biconsonantal Base* (Nevins, 2005)

$d_1a_2m_3 + i_4 - e_5$	MinWd	Max-V-Af	Max-V-Stem	Integrity
a. $d_1a_2m_3e_5m_3$		*!		*
b. $d_1i_4m_3a_2m_3$		*!		*
c. $d_1a_2m_3i_4m_3e_5$	*!			*
☛ d. $d_1i_4m_3e_5m_3$			*!	*
☞ e. $d_1a_2j_4e_5m_3$				

Nevins attributes this problem to a fundamental problem with Correspondence Theory, namely the implementation of overwriting through constraint evaluation. However, we think that (13-d) is excluded by constraints and techniques which are fairly standard in OT. Note first that although **i** and **j** have the same distinctive features, they are not completely identical: **i** is dominated by a mora while **j** is not, hence

replacing the former by the latter violates faithfulness since it implies deletion of a mora penalized by the constraint MAX-μ:

(14) MAX-μ: Input moras should have correspondent moras in the output.

Moreover, we assume that faithfulness constraints are parametrized in a way which is standard in the optimality-theoretic literature, namely the parametrization of faithfulness constraints to the domains affix and stem, which goes back to the original formulation of Correspondence Theory in McCarthy and Prince (1995):

> "It must be, then, that correspondence constraints are tied not only to specific dimensions (B-R, I-O, [...]), but also, in some cases at least, to specific morphemes or morpheme classes. Thus, the full schema for a faithfulness constraint may include such specifics as these: [...] the morphological domain (root, affix, or even specific morpheme) to which the constraint is relevant". (McCarthy and Prince, 1995:17)

In Ussishkin's analysis the parametrization of faithfulness constraints to stems and affixes is applied to the constraint MAX-V giving two MAX constraints which are ranked differently. We apply the same strategy to all faithfulness constraints, namely MAX-μ resulting in the subconstraints MAX-$\mu_{\text{Af(fix)}}$ and MAX-$\mu_{\text{S(tem)}}$, again with different ranking potential, and in the same way to INTEGRITY. Under the assumption that the vowel melody **i** – **e** contains true, i.e. moraic vowels, this gives straightforwardly the correct results. In (15), the stem vowel can be recycled as a glide since MAX-μ_{S} is ranked below all other constraints, but in (16) MAX-μ_{Af} which is ranked above INTEGRITY$_{\text{S}}$ blocks turning **i** into a glide by deleting its mora:

(15) *Glide-medial Base under Constraint Parametrization*

$t_1i_2k_3$ + i_4 - e_5	MAX-V$_{\text{Af}}$	INT$_{\text{Af}}$	MAX-μ_{Af}	MAX-V$_{\text{S}}$	INT$_{\text{S}}$	MAX-μ_{S}
a. $t_1i_4e_5k_3$				*!		*
b. $t_1i_4k_3e_5k_3$					*!	
☞ c. $t_1i_4j_2e_5k_3$						*

(16) *Biconsonantal Base under Constraint Parametrization*

$d_1a_2m_3$ + i_4 - e_5	MAX-V_{Af}	INT$_{Af}$	MAX-μ_{Af}	MAX-V_S	INT$_S$	MAX-μ_S
a. $d_1a_2m_3e_5m_3$	*!		*		*	
b. $d_1i_4m_3a_2m_3$	*!		*		*	
☞ c. $d_1i_4m_3e_5m_3$				*	*	*
d. $d_1a_2j_4e_5m_3$			*!			

There are two important points to note: First, this analysis systematically violates a metacondition McCarthy and Prince (1995) have proposed for morphologically parametrized faithfulness constraints, the *Root-Affix Faithfulness Metaconstraint*:

(17) *Root-Affix Faithfulness Metaconstraint, RAFM*
RootFaith ≫ AffixFaith (McCarthy and Prince, 1995)

The RAFM is based on the observation that in many harmony processes affixes systematically take over harmonic features from roots, e.g. in root-controlled vowel harmony in Turkish or Finnish. The RAFM is also inspired by the observation that the distribution of marked phonological structure in roots and affixes seems to differ: Affixes generally tend to be less marked than roots and it is "not uncommon to find languages where affixes have no complex onsets, consonant clusters, long vowels, or geminates, even if such structures do appear in roots" (Ussishkin, 1999:72). This is consistent with the assumption that faithfulness constraints for affixes are systematically lower-ranked than the corresponding constraints for roots.

However, there are a number of cases where the RAFM is systematically violated. Thus according to Krämer (2002), in Pulaar it is the suffix which controls vowel harmony for advanced tongue root, as can be seen in (18).[5] The root appears in a [+ATR] and a [–ATR] version according to the [ATR] feature of the suffix (**-du, -u** and **-ru** are allomorphs of the singular class marker, **-ɔ** is the diminutive singular class marker):

[5]Cf. also similar facts in Turkana (Noske, 2001).

(18) *Affix-controlled Vowel Harmony in Pulaar* (Paradis, 1992:87)

[+ATR] Affix	[–ATR] Affix	
a. ser-du	sɛr-ɔn	'rifle butt'
b. ^{m}beel-u	^{m}bɛɛl-ɔn	'shadow'
c. dog-oo-ru	dɔg-ɔ-w-ɔn	'runner'
d. lot-oo-ru	lɔt-ɔ-w-ɔn	'washer'

Also the observation that affixes are generally less marked than roots is problematic. For example, the English inflectional affixes of the shape **-z** and **-d** are probably unmarked with respect to their place of articulation (coronal), but marked in the sense that they are subminimal, i.e. form neither a minimal word nor a minimal syllable. Probably a better way to think about characteristic shapes of affixes is that they are systematically smaller and contain less phonological structure by avoiding branching in the form of complex onsets, codas, etc. See Downing (2006) for a recent discussion of evidence for the general tendency that the morphological status of linguistic expression correlates in a systematic way with phonological size.

There is a second interesting point about the analysis of Hebrew sketched above: The MAX constraints relativized to specific morphological domains seem to be ranked "in blocks". All constraints relativized to affix material are ranked above the corresponding constraints relativized to stems. This is crucial for the constraints MAX-V and MAX-μ which suggests that the RAFM might be replaced by the metacondition on the ranking of faithfulness constraints formulated in (19):

(19) MAX-DEP *Adjacency:*
Let α and β be different morphological domains
(e.g root, affix, base-reduplicant),
and $\{C_1, \ldots, C_n\}$ the set of MAX and DEP constraints,
then either $\{C_1\alpha \ldots C_n\alpha\} \gg \{C_1\beta \ldots C_n\beta\}$ or
$\{C_1\beta \ldots C_n\beta\} \gg \{C_1\alpha \ldots C_n\alpha\}$.

(19) licenses the ranking in (15) and (16) summarized schematically in (20-a), but also the ranking in (20-b), where the constraints relativized to stems and affixes are systematically flipped. What is systematically excluded are rankings as in (20-c,d), where stem and affix MAX constraints alternate in their ranking:

(20)

a. $\textsc{Max-V}_{\text{Af}} \gg \ldots \gg \textsc{Max-}\mu_{\text{Af}} \gg \ldots \gg \textsc{Max-V}_{\text{S}} \gg \ldots \gg \textsc{Max-}\mu_{\text{S}}$
b. $\textsc{Max-V}_{\text{S}} \gg \ldots \gg \textsc{Max-}\mu_{\text{S}} \gg \ldots \gg \textsc{Max-V}_{\text{Af}} \gg \ldots \gg \textsc{Max-}\mu_{\text{Af}}$
c. $\textsc{Max-V}_{\text{Af}} \gg \ldots \gg \textsc{Max-}\mu_{\text{S}} \gg \ldots \gg \textsc{Max-V}_{\text{S}} \gg \ldots \gg \textsc{Max-}\mu_{\text{Af}}$
d. $\textsc{Max-V}_{\text{S}} \gg \ldots \gg \textsc{Max-}\mu_{\text{Af}} \gg \ldots \gg \textsc{Max-V}_{\text{Af}} \gg \ldots \gg \textsc{Max-}\mu_{\text{S}}$

The generalization expressed by Max-Dep Adjacency does not extend to Ident constraints since morphological backcopying in Seerer-Siin crucially depends on ranking Ident-BR higher (or on par) than Ident-IO for continuancy, but lower for voicing. However, (19) covers also Dep constraints. For example for the constraints $\textsc{Max}_{\text{S}}$, $\textsc{Dep}_{\text{S}}$, $\textsc{Max}_{\text{Af}}$, and $\textsc{Dep}_{\text{Af}}$ only the rankings subsumed by (21-a) and (21-b) are licit according to (20), excluding other conceivable rankings such as (21-c) and (21-d):

(21)

a. $\{\textsc{Max}_{\text{S}}, \textsc{Dep}_{\text{S}}\} \gg \{\textsc{Max}_{\text{Af}}, \textsc{Dep}_{\text{Af}}\}$
b. $\{\textsc{Max}_{\text{Af}}, \textsc{Dep}_{\text{Af}}\} \gg \{\textsc{Max}_{\text{S}}, \textsc{Dep}_{\text{S}}\}$
c. $\textsc{Max}_{\text{Af}} \gg \textsc{Max}_{\text{S}} \gg \textsc{Dep}_{\text{Af}} \gg \textsc{Dep}_{\text{S}}$
d. $\textsc{Max}_{\text{Af}} \gg \textsc{Dep}_{\text{S}} \gg \textsc{Dep}_{\text{Af}} \gg \textsc{Max}_{\text{S}}$

The consequences of Max-Dep Adjacency for Dep constraints will play a crucial role for our analysis of segment-counting FSR in section 4.

4. Segment-counting Fixed Segmentism Reduplication

Since Alderete et al. (1999) derive overwriting in English FSR through a faithfulness constraint which effectively compares whether the root onset or the FSR affix are longer – Max-IO prefers realization of more input segments – one can easily imagine scenarios, in which varying the size of the root onset should yield different FSR patterns. As Nevins (2005) formulates it:

> "Faithfulness constraints that are evaluated on the basis of segment counting predict a typology of languages in which ... optimization dictates that the relative *size* of the affixal material determines whether it will win out and 'overwrite' the base ..." (Nevins, 2005:275)

In the tableaus (22) and (23), we show that the analysis of Alderete et al. (1999) predicts precisely those inconsistent patterns depending on the size of the base onset. (22) illustrates the English ranking for a root without onset. Backcopying of the FSR affix (22-b) comes "for free" (without the necessity to overwrite and to violate MAX-IO) and fares equally well as the correct candidate (22-a):

(22) *Wrong Prediction for Vowel-initial Base* (Nevins, 1995)

$a_1pp_2l_3e_4$-sch_5m_6-RED	MAX-IO	MAX-BR
☞ a. $a_1pp_2l_3e_4$-$sch_5m_6a_1pp_2l_3e_4$		
☞ b. $sch_5m_6a_1pp_2l_3e_4$-$sch_5m_6a_1pp_2l_3e_4$		
c. $sch_5m_6a_1pp_2l_3e_4$-$a_1pp_2l_3e_4$		*!*
d. $a_1pp_2l_3e_4$-$a_1pp_2l_3e_4$	*!*	

In (23) **schm**-reduplication for the English' ranking is shown for lexemes with different onset lengths. Straightforward backcopying only occurs with bases of onset length 1. With onset-less bases and bases starting with two consonants we get optionality. With a base whose onset contains three consonants, the FSR affix is suppressed:

(23) *Inconsistent FSR in English'*

	MAX-BR	MAX-IO
1: $a_1pp_2l_3e_4$-sch_5m_6-RED		
☞ a. $a_1pp_2l_3e_4$-$sch_5m_6a_1pp_2l_3e_4$		
☞ b. $sch_5m_6a_1pp_2l_3e_4$-$sch_5m_6a_1pp_2l_3e_4$		
c. $a_1pp_2l_3e_4$-$a_1pp_2l_3e_4$		*!*
2: $t_1a_2b_3l_4e_5$-sch_6m_7-RED		
a. $t_1a_2b_3l_4e_5$-$sch_6m_7a_2b_3l_4e_5$	*!	
☞ b. $sch_6m_7a_2b_3l_4e_5$-$sch_6m_7a_2b_3l_4e_5$		*
c. $t_1a_2b_3l_4e_5$-$t_1a_2b_3l_4e_5$		**!
3: $p_1l_2a_3n_4$-sch_5m_6-RED		
a. $p_1l_2a_3n_4$-$sch_5m_6a_3n_4$	*!*	
☞ b. $sch_5m_6a_3n_4$-$sch_5m_6a_3n_4$		**
☞ c. $p_1l_2a_3n_4$-$p_1l_2a_3n_4$		**
4: $s_1t_2r_3i_4ng_5$-sch_6m_7-RED		
a. $s_1t_2r_3i_4ng_5$-$sch_6m_7i_4ng_5$	*!**	
b. $sch_6m_7i_4ng_5$-$sch_6m_7i_4ng_5$		***!
☞ c. $s_1t_2r_3i_4ng_5$-$s_1t_2r_3i_4ng_5$		**

As Nevins argues, there are no attested cases of FSR where the realization of the FSR affix depends on the number of segments in the base, hence the factorial typology of the correspondence-theoretic analysis seems to make a wrong prediction. This problem cannot be solved by simply adding more constraints. Assuming a ranking where MAX-BR and MAX-IO, ranked in this order, are ranked highest, at least the outputs for **table** and **string** will be just as in (23), no matter what other constraints are ranked lower. Hence inconsistent FSR triggered by segment counting would still be part of the factorial typology.

We accept Nevins' conclusion that the analysis of Alderete et al. (1999) is seriously flawed by this misprediction, but we don't think that it points to any fundamental problem of OT or Correspondence Theory. Instead we argue that patterns as in (23) are excluded by standard means of parametrizing faithfulness constraints to the domains affix and stem which we have introduced in section 3. Restricting ourselves

to MAX and DEP constraints the following faithfulness constraints are relevant for FSR:[6]

(24) a. MAX-S: Every segment of the stem in the input has a correspondent in the base in the output.
b. DEP-S: Every segment of the base in the output has a correspondent in the stem in the input.
c. MAX-AF: Every segment of an affix in the input has a correspondent in an affix in the output.
d. DEP-AF: Every segment of an affix in the output has a correspondent in an affix in the input
e. MAX-BR: Every segment in the base has a correspondent in the reduplicant.
f. DEP-BR: Every segment in the reduplicant has a correspondent in the base.

According to the MAX-DEP Adjacency Condition stated in (19), MAX and DEP constraints relativized to a specific morphological domain are effectively organized in blocks which are ranked uniformly with respect to MAX and DEP constraints relativized to other morphological domains. This allows to represent possible rankings of the constraints in (24) as concisely as in (25) to (27) where the corresponding pairs of MAX and DEP violations are summarized as FAITH-S, FAITH-AF, and FAITH-BR, while the single MAX and DEP violations are indicated by "m" and "d" respectively in the single cells. If stem and affix-faithfulness constraints are undominated, we get the English pattern:[7]

[6]Contra McCarthy and Prince (1993) we take it for granted that epenthetic segments are morphologically affiliated to stems or affixes depending on the consequences of their affiliation for the constraint ranking. The claim of McCarthy and Prince that epenthetic segments are without any morphological affiliation makes a unified parametrization of faithfulness constraints impossible since constraint such as DEP-IO$_{\text{Affix}}$ and Dep-IO$_{\text{Stem}}$ would never be violated.

[7]Although the abstract morpheme RED is often characterized as an affix, we take it to be invisible for input-output faithfulness constraints, and more specifically for faithfulness constraints relativized to affixes. This hypothesis should be uncontroversial for MAX and IDENT constraints: Since RED morphemes do not have any input segments there are no segments which could be deleted or modified in the output. We assume that RED is also "invisible" for input-output DEP constraints.

(25) *Possible Rankings for English*

	FAITH-S	FAITH-AF	...
1: $a_1pp_2l_3e_4$-sch_5m_6-RED			
☞ a. $a_1pp_2l_3e_4$-$sch_5m_6a_1pp_2l_3e_4$			
b. $sch_5m_6a_1pp_2l_3e_4$-$sch_5m_6a_1pp_2l_3e_4$	dd!		
c. $a_1pp_2l_3e_4$-$a_1pp_2l_3e_4$		mm!	
2: $t_1a_2b_3l_4e_5$-sch_6m_7-RED			
☞ a. $t_1a_2b_3l_4e_5$-$sch_6m_7a_2b_3l_4e_5$			
b. $sch_6m_7a_2b_3l_4e_5$-$sch_6m_7a_2b_3l_4e_5$	mdd!		
c. $t_1a_2b_3l_4e_5$-$t_1a_2b_3l_4e_5$		mm!	
3: $p_1l_2a_3n_4$-sch_5m_6-RED			
☞ a. $p_1l_2a_3n_4$-$sch_5m_6a_3n_4$			
b. $sch_5m_6a_3n_4$-$sch_5m_6a_3n_4$	mmdd!		
c. $p_1l_2a_3n_4$-$p_1l_2a_3n_4$		mm!	
4: $s_1t_2r_3i_4ng_5$-sch_6m_7-RED			
☞ a. $s_1t_2r_3i_4ng_5$-$sch_6m_7i_4ng_5$			
b. $sch_6m_7i_4ng_5$-$sch_6m_7i_4ng_5$	mmmdd!		
c. $s_1t_2r_3i_4ng_5$-$s_1t_2r_3i_4ng_5$		mm!	

Backcopying results if affix and base-reduplicant faithfulness constraints are ranked highest:

(26) *Backcopying Rankings*

	FAITH-AF	FAITH-BR	...
$a_1pp_2l_3e_4$-sch_5m_6-RED			
a. $a_1pp_2l_3e_4$-$sch_5m_6a_1pp_2l_3e_4$		dd!	
☞ b. $sch_5m_6a_1pp_2l_3e_4$-$sch_5m_6a_1pp_2l_3e_4$			
c. $a_1pp_2l_3e_4$-$a_1pp_2l_3e_4$	dd!		
$t_1a_2b_3l_4e_5$-sch_6m_7-RED			
a. $t_1a_2b_3l_4e_5$-$sch_6m_7a_2b_3l_4e_5$		mdd!	
☞ b. $sch_6m_7a_2b_3l_4e_5$-$sch_6m_7a_2b_3l_4e_5$			
c. $t_1a_2b_3l_4e_5$-$t_1a_2b_3l_4e_5$	mm!		
$p_1l_2a_3n_4$-sch_5m_6-RED			
a. $p_1l_2a_3n_4$-$sch_5m_6a_3n_4$		mmdd!	
☞ b. $sch_5m_6a_3n_4$-$sch_5m_6a_3n_4$			
c. $p_1l_2a_3n_4$-$p_1l_2a_3n_4$	mm!		
$s_1t_2r_3i_4ng_5$-sch_6m_7-RED			
a. $s_1t_2r_3i_4ng_5$-$sch_6m_7i_4ng_5$		mmmdd!	
☞ b. $sch_6m_7i_4ng_5$-$sch_6m_7i_4ng_5$			
c. $s_1t_2r_3i_4ng_5$-$s_1t_2r_3i_4ng_5$	mm!		

Finally we get complete suppression of the FSR affix if stem and base-reduplicant faithfulness constraints are undominated. Under this ranking, FSR can not be distinguished from reduplication without fixed segmentism in the input:

(27) *Suppression of the FSR Affix*

	FAITH-S	FAITH-BR	...
$a_1pp_2l_3e_4$-sch_5m_6-RED			
a. $a_1pp_2l_3e_4$-$sch_5m_6a_1pp_2l_3e_4$		dd!	
b. $sch_5m_6a_1pp_2l_3e_4$-$sch_5m_6a_1pp_2l_3e_4$	dd!		
☞ c. $a_1pp_2l_3e_4$-$a_1pp_2l_3e_4$			
$t_1a_2b_3l_4e_5$-sch_6m_7-RED			
a. $t_1a_2b_3l_4e_5$-$sch_6m_7a_2b_3l_4e_5$		mdd!	
b. $sch_6m_7a_2b_3l_4e_5$-$sch_6m_7a_2b_3l_4e_5$	mdd!		
☞ c. $t_1a_2b_3l_4e_5$-$t_1a_2b_3l_4e_5$			
$p_1l_2a_3n_4$-sch_5m_6-RED			
a. $p_1l_2a_3n_4$-$sch_5m_6a_3n_4$		mmdd!	
b. $sch_5m_6a_3n_4$-$sch_5m_6a_3n_4$	mmdd!		
☞ c. $p_1l_2a_3n_4$-$p_1l_2a_3n_4$			
$s_1t_2r_3i_4ng_5$-sch_6m_7-RED			
a. $s_1t_2r_3i_4ng_5$-$sch_6m_7i_4ng_5$		mmmdd!	
b. $sch_6m_7i_4ng_5$-$sch_6m_7i_4ng_5$	mmmdd!		
☞ c. $s_1t_2r_3i_4ng_5$-$s_1t_2r_3i_4ng_5$			

Since (25) to (27) exhaust all ranking possibilities, it is easy to see that the constraint system in (24) systematically excludes segment-counting FSR, i.e. FSR where realization and backcopying of the FSR affix varies with the phonological size of the base. To see that the MAX-DEP Adjacency condition is crucial to exclude this kind of patterning consider just one ranking where it is not obeyed. Thus in (28), MAX-AF $\gg$ MAX-S $\gg$ DEP-BR dominate all other faithfulness constraints, and we get backcopying of **schm** with vowel-initial bases, but not with consonant-initial ones:

(28) *Inconsistent FSR Backcopying*

	MAX-AF	MAX-S	DEP-BR	...
1: $a_1pp_2l_3e_4$-sch_5m_6-RED				
a. $a_1pp_2l_3e_4$-$sch_5m_6a_1pp_2l_3e_4$			*!*	
☞ b. $sch_5m_6a_1pp_2l_3e_4$-$sch_5m_6a_1pp_2l_3e_4$				
c. $a_1pp_2l_3e_4$-$a_1pp_2l_3e_4$	*!*			
2: $t_1a_2b_3l_4e_5$-sch_6m_7-RED				
☞ a. $t_1a_2b_3l_4e_5$-$sch_6m_7a_2b_3l_4e_5$			**	
b. $sch_6m_7a_2b_3l_4e_5$-$sch_6m_7a_2b_3l_4e_5$		*!		
c. $t_1a_2b_3l_4e_5$-$t_1a_2b_3l_4e_5$	*!*			
3: $p_1l_2a_3n_4$-sch_5m_6-RED				
☞ a. $p_1l_2a_3n_4$-$sch_5m_6a_3n_4$			**	
b. $sch_5m_6a_3n_4$-$sch_5m_6a_3n_4$		*!*		
c. $p_1l_2a_3n_4$-$p_1l_2a_3n_4$	*!*			
4: $s_1t_2r_3i_4ng_5$-sch_6m_7-RED				
☞ a. $s_1t_2r_3i_4ng_5$-$sch_6m_7i_4ng_5$			**	
b. $sch_6m_7i_4ng_5$-$sch_6m_7i_4ng_5$		*!**		
c. $s_1t_2r_3i_4ng_5$-$s_1t_2r_3i_4ng_5$	*!*			

5. Phonologically Unmotivated Overwriting in Hindi

In our discussion of English, we have systematically neglected a candidate like ***schmtable-schmtable** which does not violate any faithfulness constraint: no root material is deleted or inserted, the affix is realized and base and reduplicant are maximally faithful to each other. By assumption, such a candidate is ruled out by high-ranked markedness constraints banning onsets like **schmt** in English. The final problem Nevins addresses in his paper is an FSR formation in Hindi where overwriting happens even though non-overwriting would result in a phonotactically licit sound sequence of the language. In the relevant reduplication pattern, **v** systematically overwrites the first consonant of the root, as can be seen in (29):[8]

[8]We abstract away from the fact that in cases, where the root onset is already **v**, the allomorph **ʃ** appears in the reduplicant instead of **v**.

(29) *FSR in Hindi* (Nevins, 2005:280)

a. roti roti-voti ‘bread and the like’
b. mez mez-vez ‘tables and the like’
c. tras tras-vras ‘grief and the like’
d. aam aam-vaam ‘mangoes and the like’

If **v** is simply an affix we would incorrectly expect ***roti-vroti** for (29-a). The markedness constraint in (30) banning a consonant cluster like **vr** cannot be ranked high in Hindi since this very same onset can be found in the reduplicated form **tras-vras**.

(30) $*[_{\sigma}$CC: Onsets are simple. (Kager, 1999)

The dilemma of ranking $*[_{\sigma}$CC high enough to rule out **roti-vroti** and low enough to allow **tras-vras** is sketched in (31) and (32). If $*[_{\sigma}$CC is ranked above FAITH-BR (31), we get the correct output for the input **roti** (29-a), but incorrect overwriting for **vras** (29-c). The opposite ranking (32) makes the right prediction for **tras**, but leads incorrectly to non-overwriting for the onset of **roti**:

(31) *FSR in Hindi with* $*[_{\sigma}$CC *Dominating* FAITH-BR

	FAITH-AF	FAITH-S	$*[_{\sigma}$CC	FAITH-BR
$r_1o_2t_3i_4$-v_5-RED				
☞ a. $r_1o_2t_3i_4$-$v_5o_2t_3i_4$				md
b. $v_5o_2t_3i_4$-$v_5o_2t_3i_4$		md!		
c. $r_1o_2t_3i_4$-$r_1o_2t_3i_4$	m!			
d. $r_1o_2t_3i_4$-$v_5r_1o_2t_3i_4$			*!	d
e. $v_5r_1o_2t_3i_4$-$v_5r_1o_2t_3i_4$		d!	**	
$t_1r_2a_3s_4$-v_5-RED				
☛ a. $t_1r_2a_3s_4$-$v_5r_2a_3s_4$			*!*	md
b. $v_5a_3s_4$-$v_5a_3s_4$		mmd!		
☞ c. $t_1r_2a_3s_4$-$v_5a_3s_4$			*	mmd
d. $t_1r_2a_3s_4$-$t_1r_2a_3s_4$	m!		**	

(32) *FSR in Hindi with* FAITH-BR *Dominating* $*[_{\sigma}CC$

	FAITH-AF	FAITH-S	FAITH-BR	$*[_{\sigma}CC$
$r_1o_2t_3i_4$-v_5-RED				
☛ a. $r_1o_2t_3i_4$-$v_5o_2t_3i_4$			md!	
b. $v_5o_2t_3i_4$-$v_5o_2t_3i_4$		md!		
c. $r_1o_2t_3i_4$-$r_1o_2t_3i_4$	m!			
☞ d. $r_1o_2t_3i_4$-$v_5r_1o_2t_3i_4$			d	*
e. $v_5r_1o_2t_3i_4$-$v_5r_1o_2t_3i_4$		d!		**
$t_1r_2a_3s_4$-v_5-RED				
☞ a. $t_1r_2a_3s_4$-$v_5r_2a_3s_4$			md	**
b. $v_5a_3s_4$-$v_5a_3s_4$		mmd!		
c. $t_1r_2a_3s_4$-$v_5a_3s_4$			mmd!	*
d. $t_1r_2a_3s_4$-$t_1r_2a_3s_4$	m!			**

As before we will show that the insufficiency of a simple OT-analysis does not reveal any general problem with correspondence-theoretic OT, but can be straightforwardly resolved by a finer-grained analysis invoking constraint parametrization.

The crucial observation is now that Hindi does not prohibit complex onsets in general but a complex onset in the reduplicant not being present in the base. Whether the reduplicant violates a markedness constraint is not decided in isolation but in comparison with the violations of the base. This is highly reminiscent of a state of affairs captured in McCarthy (2003) by "Comparative Markedness". We will first sketch McCarthy's theory and then show that a natural generalization of his approach accounts naturally for the Hindi data.

In Comparative Markedness Theory, markedness constraints are parametrized with respect to the "fully faithful candidate" (FFC), the candidate for a given constraint evaluation which is maximally faithful to the input structure. Consequently every standard markedness constraint M is replaced by two constraints ${}_OM$ and ${}_NM$, where ${}_O$M assigns violation-marks to "old" marked structures, i.e. those being present in the FFC, and ${}_N$M penalizes "new" marked structures, i.e. those not being present in the FFC So ${}_N$M compares candidates in the output assigning violation marks only if it has not assigned a violation mark to one designated candidate. A typical example of a comparative markedness effect is voicing assimilation in Mekkan Arabic (McCarthy, 2003; Abu-Mansour, 1996; Bakalla, 1973), where voicing of underlying obstruents is generally retained in the output (33-a), but voiced

coda obstruents assimilate in voicing to a following voiceless obstruent (33-b). However, a voiceless coda obstruent does not assimilate to a following voiced obstruent (33-c):

(33) *Mekkan Arabic Voicing Assimilation*
(Abu-Mansour, 1996; Bakalla, 1973)

a. /ʔibnu/ ʔibnu 'his son'
b. /ʔagsam/ ʔaksam 'he swore an oath'
c. /ʔakbar/ ʔakbar 'older'

Crucially, the markedness constraint NoVoicedObstruent (NoVcdOb) is obeyed in blocking a *new* voiced obstruent through assimilation (***agbar**), but can be violated by an *old* voiced obstruent, i.e. one which is already present in the input. The tableaus in (34) show how parametrization of (NoVcdOb) allows to derive this ambiguous behavior of the markedness constraint:

(34) *Mekkan Arabic Voicing Assimilation* (McCarthy, 2003)

	$_{N}$NoVcdOb	Agr(voice)	Id(voice)	$_{O}$NoVcdOb
$ʔ_1a_2g_3s_4a_5m_6$				
☞ a. $ʔ_1a_2k_3s_4a_5m_6$			*	
b. $ʔ_1a_2g_3s_4a_5m_6$		*!		
$ʔ_1a_2k_3b_4a_5r_6$				
☞ a. $ʔ_1a_2k_3b_4a_5r_6$		*		
b. $ʔ_1a_2g_3b_4a_5r_6$	*!		*	*
$ʔ_1i_2b_3n_4u_5$				
☞ a. $ʔ_1i_2b_3n_4u_5$				*
b. $ʔ_1i_2p_3n_4u_5$			*!	

As McCarthy notes, Comparative Markedness naturally extends from input-output correspondence to other types of correspondence. Thus in a derived-environment effect such as Korean palatalization, palatalization of **t** only applies if it is triggered by a following **i** across a morpheme boundary.

(35) *Korean Palatalization* (Ahn, 1998)

a. /pat^h-i/ → pac^{h}i 'field-COP'
/mat-i/ → maci 'eldest-NOM'
/put^h-i/ → puc^{h}i 'to stick to-CAUS'
/tot-i/ → toci 'rise-NOM'
b. /mati/ → mati 'knot'
/kac^{h}i/ → kac^{h}i 'value'

This pattern can be captured by splitting the markedness constraint PAL, which penalizes instances of coronal consonants followed by **i**, relativizing it to Comparative Markedness in output-output (OO) correspondence. Thus OO-$_O$PAL targets **ti**-sequences which are already present in the (output of the) morphological base of the evaluated form, while OO-$_N$PAL targets violations which are new in the sense that they appear in the output of the derived (in this case affixed) form, but not in the (unaffixed) morphological base. Assuming that only the latter constraint is ranked above the relevant faithfulness constraints it follows that the forms in (35-a) undergo palatalization, but not the ones in (35-b).

We expect that the same extension as for output-output correspondence also applies to base-reduplicant correspondence, and in fact this is what happens in the Hindi FSR case. Hence *[$_\sigma$CC is replaced by the constraints in (36):

(36) a. BR$_N$*[$_\sigma$CC: Avoid complex onsets in the reduplicant which do not have a counterpart in the base.
b. BR$_O$*[$_\sigma$CC: Avoid complex onsets in the reduplicant which have a counterpart in the base.

By ranking BR$_N$*[$_\sigma$CC over FAITH-BR over BR$_O$*[$_\sigma$CC, the correct candidate **roti-voti** becomes optimal since **roti-vroti** creates a "new" complex onset not corresponding to a complex onset in the base and therefore violates BR$_N$*[$_\sigma$CC. This complex onset can be prohibited without causing any problem for **tras-vras**. The latter only violates the deeper ranked BR$_O$*[$_\sigma$CC, and not the high-ranked BR$_N$*[$_\sigma$CC since the complex onset **vr** in the reduplicant corresponds to the complex onset **tr** in the base. The tableaus in (37) illustrates the derivation of the correct FSR-pattern in Hindi. As can be seen, the low-ranked BR$_O$*[$_\sigma$CC does not decide optimality in any competition (FAITH is abbreviated as F).

(37) *Hindi FSR with Comparative Markedness Constraints*

	F-A$_F$	F-S	BR$_N$*[$_\sigma$CC	F-BR	BR$_O$*[$_\sigma$CC
$r_1o_2t_3i_4$-v_5-RED					
☞ a. $r_1o_2t_3i_4$-$v_5o_2t_3i_4$				md	
b. $v_5o_2t_3i_4$-$v_1o_2t_3i_4$		md!			
c. $r_1o_2t_3i_4$-$r_1o_2t_3i_4$	m!				
d. $r_1o_2t_3i_4$-$v_5r_1o_2t_3i_4$			*!	d	
e. $v_5r_1o_2t_3i_4$-$v_5r_1o_2t_3i_4$		d!			*
$t_1r_2a_3s_4$-v_5-RED					
☞ a. $t_1r_2a_3s_4$-$v_5r_2a_3s_4$				md	*
b. $v_5a_3s_4$-$v_5a_3s_4$		mmd!			
c. $t_1r_2a_3s_4$-$v_5a_3s_4$				mmd!	
d. $t_1r_2a_3s_4$-$t_1r_2a_3s_4$	m!			md	*

6. Fixed Segmentism Reduplication and Readjustment

As an alternative to the correspondence-theoretic FSR, Nevins advocates the approach of Raimy (2000) who also provides an analysis of English **schm**-reduplication.[9] In Raimy's approach precedence relations between the segments of a string are explicit represented by links depicted as arrows. For example, Raimy encodes the word **table** as in (38), where "#" represents the beginning and "%" the end of the string:

(38) # → t → a → b → l → e → %

Reduplication is then analyzed as the effect of readjustment rules, morphosyntactically conditioned phonological rules familiar from Distributed Morphology (Halle and Marantz, 1993). While readjustment rules are generally a rather unrestrictive device, the rules assumed by Raimy for **schm**-reduplication just introduce additional precedence links for **schm** linking the last base consonant to the beginning of **schm** and looping back from the end of **schm** to the first vowel of the base:

[9]We will abstract away from technical differences between Raimy's framework and different formalizations in the work of Nevins. Cf. e.g. Nevins (2002, 2006).

(39) # → t → a → b → l → e → %

∫ → m

Since Raimy assumes that looping representations cannot be pronounced, they are repaired at linearization resulting in phonetic doubling of the looping material as in (40):

(40) #→ t → a → b → l → e → ∫→ m → a → b → l → e → %

In the same vein, Nevins provides an explicit analysis of FSR in Hindi assuming the two readjustment rules paraphrased in (41):

(41) *Readjustment Rules for Hindi*

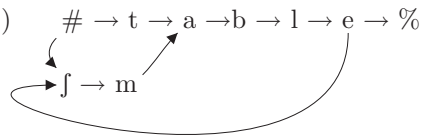
a. If the base starts with a consonant, add precedence links from the last segment of the base to **v**, and from **v** to the second segment of the base.

b. Add a precedence link from the last segment of the base to **v**, and from **v** to the first segment of the base.

In effect, (41-a) reduplicates the base of consonant-initial bases and replaces the initial consonant in the reduplicant with **v**. Under the assumption that (41-a) and (41-b) are disjunctively ordered according to the Elsewhere Principle, (41-b) is restricted to vowel-initial bases, and modifies them by reduplication and prefixing **v** to the reduplicant. In the following paragraphs we will discuss how the readjustment approach fares for the problems Nevins raises for the correspondence-theoretic account:

Backcopying: Unfortunately, it is not entirely clear what typological predictions the readjustment approach to FSR makes. Consider first backcopying in general. The crucial question is whether a single readjustment rule or an ordered sequence of readjustment rules could effect a change from (38) to (42) which would amount to replacing the onset

of the base by **schm** and applying total reduplication to the resulting form:[10]

(42) 

Since non-reduplicative readjustment rules seem to be capable to perform quite radical segmental changes,[11] and full reduplication is a standard operation in Raimy's model, we suppose that overwriting and concomitative reduplicative backcopying might well be in the formal range of the framework.

Segment-counting Fixed Segmentism Reduplication: Nevins' formalism is clearly capable to capture specific types of segment-counting FSR. Thus imagine a language Hindi' which replaces (41) by the following rules:[12]

(43) *Readjustment Rules for Hindi'*

a. If the base starts with two consonants, add a precedence link from the last segment of the base to the first segment of the base.

b. If the base starts with a consonant, add precedence links from the last segment of the base to **v**, and from **v** to the second segment of the base.

c. Add a precedence link from the last segment of the base to **v**, and from **v** to the first segment of the base.

---

[10] Linearization brings about that **t** in (42) is not pronounced since it resides on a dead branch of the precedence relation. See Nevins and Guimarães (2006) for technical details.

[11] For example, Halle and Marantz (1993:128) suggest a readjustment rule which replaces the rime of the verbs **shall**, **will**, **can** and **stand** by **u** in past finite forms.

[12] One might argue that (43-a) is not a licit readjustment rule because grammatical processes are not allowed to "count" segments. However, also Nevins' rules clearly target the second base consonants, and for phenomena such as syllable weight and foot construction it seems to be indispensable to check whether there are at least two instances of specific phonological entities (e.g. moras and syllables) in a given domain.

In Hindi' **v** appears only if the base is onset-less (**aam** → **aam-vaam**) or starts with a single consonant (**roti** → **roti-voti**), but for base forms with complex onsets, no overwriting happens (**tras** → **tras-tras**). If we allow a single readjustment rule to cause backcopying (cf. the discussion above), we can capture an even more familiar pattern (Hindi'') where **v**-attachment and backcopying obtain for bases starting with vowels or single consonants (**aam** → **vaam-vaam**, **roti** → **voti-voti**), while overwriting fails again for bases starting with more consonants (**tras** → **tras-tras**):

(44) *Readjustment Rules for Hindi''*

a. If the base starts with two consonants, add a precedence link from the last segment of the base to the first segment of the base.
b. If the base starts with a consonant, add precedence links from the start symbol to **v**, from **v** to the second segment of the base, and from the last segment of the base to **v**.
c. Add precedence links from the start symbol to **v**, from **v** to the first segment of the base, and from the last segment of the base to **v**.

(44) is a system which, apart from the optionality there, is very similar to the segment-counting version of English' sketched in (23): Backcopying happens if the FSR affix is as long or longer than the onset of the base, otherwise the FSR affix is suppressed. Still another system which might be derived (Hindi''') is one where consonant-initial bases exhibit reduplication and overwriting by **v** in the reduplicant (**roti** → **roti-voti**, **tras** → **tras-vras**), while vowel-initial bases undergo full reduplication without a fixed segment (**aam** → **aam-aam**).

(45) *Readjustment Rules for Hindi'''*

a. If the base starts with a consonant, add precedence links from the last segment of the base to **v**, and from **v** to the second segment of the base.
b. Add a precedence link from the last segment of the base to the first segment of the base.

Hindi''' exemplifies a kind of "anti-competition" pattern. The FSR appears only if it can overwrite, but not where it would form the onset of the reduplicant without competition. It is unclear to us whether Hindi', Hindi'', or Hindi''' are possible FSR patterns. They are impossible un-

der the correspondence-theoretic analysis developed in this paper since they fall outside the factorial typology introduced in section 4, and are clearly not motivated by Comparative Markedness constraints (cf. section 5). Since none of the FSR types deriving from (43) to (45) seems to be attested, we conclude that the readjustment-based approach is overly powerful. Ironically it runs into roughly the same kind of problems which Nevins attested to the analysis of Alderete et al. (1999).

Fixed Segmentism Reduplication in Hindi: Although Nevins' formalism is capable to capture the Hindi data, it does so at the cost of duplicating crucial morphological information: Two distinct rules specify the same affix (**v**) and cause reduplication under minimally distinct conditions. Nevins counters this objection by stating that "any formulation of a rule or set of constraints for Hindi FSR must say something of the form 'If consonant-initial, do this; otherwise, if vowel-initial, do that,' which, the form of English conditional clauses notwithstanding, represent two distinct processes" (Nevins, 2005:285). However, under the optimality-theoretic analysis sketched in section 5 the different behavior of vowel-initial and consonant-initial bases follows from independently motivated phonological constraints, not from language-specific morphological stipulation. More generally, it is unclear whether morphological rules must have the capability to distinguish syllables with onsets from those without, while this is uncontroversial in the case of phonological constraints, which clearly favors a phonological account of the Hindi data.

7. Conclusion

Fixed segmentism reduplication involving backcopying of the FSR affix to the base is clearly a formal possibility employed in human language, while segment-counting FSR is so far unattested. We have shown that this state of affairs is captured best by a correspondence-theoretic account of reduplication taking full advantage of the independently motivated parametrization for faithfulness constraints, with minimal additional assumptions. The apparently phonologically unmotivated overwriting in the FSR of Hindi has turned out to fill a typological gap in the range of possible Comparative Markedness effects.

References

Abu-Mansour, M. H. (1996). Voice as a privative feature. *Perspectives on Arabic Linguistics VIII: Papers from the Eighth Annual Symposium on Arabic Linguistics*, pages 201–231.

Ahn, S.-C. (1998). *An Introduction to Korean Phonology.* Hanshin, Seoul.

Alderete, J., Beckman, J., Benua, L., Gnanadesikan, A., McCarthy, J., and Urbanczyk, S. (1999). Reduplication with fixed segmentism. *Linguistic Inquiry*, 30:327–364.

Bakalla, M. (1973). The morphology and phonology of Meccan Arabic. Doctoral dissertation, University of London.

Caballero, G. (2006). "Templatic backcopying" in Guarijio abbreviated reduplication. *Morphology*, 16(2):273–289.

Culy, C. (1985). The Complexity of the Vocabulary in Bambara. *Linguistics and Philosophy*, 8:345–351.

Downing, L. J. (2006). *Canonical forms in prosodic morphology.* Oxford, Oxford University Press.

Dumestre, G. (2003). *Grammaire fondamentale du Bambara.* Karthala, Paris.

Frampton, J. (2004). Distributed reduplication. Ms. Northeastern University.

Halle, M. and Marantz, A. (1993). Distributed Morphology and the pieces of inflection. In Hale, K. and Keyser, S. J., editors, *The View from Building 20*, pages 111–176. Cambridge MA: MIT Press.

Inkelas, S. and Zoll, C. (2005). *Reduplication.* Cambridge University Press, Cambridge.

Kager, R. (1999). *Optimality Theory.* Cambridge University Press, Cambridge.

Krämer, M. (2002). The root-affix metaconstraint and its reversal in vowel harmony. Handout of a talk given at the 10th Manchester Phonology Meeting, 23rd-25th May 2002.

Mc Laughlin, F. (2000). Consonant mutation and reduplication in Seereer-Siin. *Phonology 17*, pages 333–363.

McCarthy, J. and Prince, A. (1993). Prosodic Morphology. Constraint Interaction and Satisfaction. ROA 485-1201.

McCarthy, J. and Prince, A. (1995). Faithfulness and reduplicative identity. *University of Massachusetts Occasional Papers in Linguistics*, 18:249–384.

McCarthy, J. and Prince, A. (1999). Faithfulness and identity in prosodic morphology. In *The Prosody Morphology Interface*, pages 218–309. René Kager and Harry van der Hulst and Wim Zonneveld.

McCarthy, J. J. (2003). Comparative markedness. *Theoretical Linguistics*, 29:1–51.

Nelson, N. (2002). The "prefixing" preference in reduplication. *Proceedings of WCCFL*, 21:320–333.

Nevins, A. and Fitzpatrick, J. (2002). Phonological occurrences: Relations and copying. lingBuzz/000051.

Nevins, A. and Guimaraẽs, M. (2006). Opaque nasalization in the Língua do Pê of Salvador, Brazil. lingBuzz/000251.

Nevins, A. I. (2005). Overwriting does not optimize in nonconcatenative morphology. *Linguistic Inquiry 36*, pages 275–287.

Noske, M. (2001). [ATR] Harmony in Turkana. *Natural Language and Linguistic Theory*, 18:771–812.

Paradis, C. (1992). *Lexical Phonology and Morphology: The Nominal Classes in Fula*. Garland, New York, London.

Raimy, E. (2000). *The Phonology and Morphology of Reduplication*. Berlin and New York: Mouton de Gruyter.

Urbanczyk, S. (1996). Morphological templates in reduplication. *Proceedings of NELS*, 26:425–440.

Urbanczyk, S. (1999). Double reduplications in parallel. In Kager, R., van der Hulst, H., and Zonneveld, W., editors, *The Prosody Morphology Interface*, pages 390–428. Cambridge University Press.

Ussishkin, A. (1999). Head dominance in Modern Hebrew prosodic morphology. *Phonology at Santa Cruz*, 6:71–82.

Wells, M. A. (1979). *Siroi grammar*. Pacific Linguistic Series B, Nr.51, Canberra.