

Morphologie: Theorien der Flexion:
Distribuierte Morphologie 4
Erweiterte Exponenz:
Eine Alternative zu kontextuellen Merkmalen

Gereon Müller

Institut für Linguistik
Universität Leipzig

WiSe 2007/2008

www.uni-leipzig.de/~muellerg

Extended Exponence by Enrichment:
Aspects of Argument Encoding in German, Archi, Timucua, and Sierra Popoluca

Background (Matthews (1972, 82), Matthews (1974, 149)):

Extended (multiple) exponence in Greek verb inflection, English verb inflection, etc.

Extended exponence:

Cases of morphological realization where a single morpho-syntactic property seems to be expressed by more than one exponent (i.e., inflection marker, in the cases to be considered here).

Claim:

Extended exponence can be accounted for in Distributed Morphology by assuming **enrichment** rules, which are complementary to well-established **impoverishment** rules, and without resort to a notion like **secondary exponence** (Noyer (1992), Wunderlich (1996), Frampton (2002)).

Empirical domain:

Interaction of argument encoding and number/person marking in:

- German (case-marking on nouns, number marking)
- Archi (case-marking on nouns, number marking)
- Timucua (agreement morphology on verbs, person marking)
- Sierra Popoluca (agreement morphology on verbs, person marking)

Also addressed:

- Tamazight Berber (verb inflection)
- Swahili (verb inflection)

Observation:

Plural can be marked twice on nouns in dative (dat) contexts in German (Eisenberg (2000), Wiese (2000)). Note: **n** must be a dat plural marker rather than a simple dat marker because it does not show up in the singular.

(1) Extended exponence in German nouns:

- | | | | | |
|----|-----------------|----|-----------------|----------|
| a. | Kind-er-n | b. | *Kind-n | (German) |
| | child-pl-dat.pl | | child.sg-dat.pl | |
| c. | Tisch-e-n | d. | *Tisch-n | |
| | table-pl-dat.pl | | table.sg-dat.pl | |

Observation:

The same phenomenon exists in the Daghestanian language Archi (Kibrik (1991, 2003), Mel'čuk (1999), Plank (1999)). Archi exhibits an ergative-absolutive (erg-abs) pattern of argument encoding. For a stem like **gel** ('cup'), the erg plural is created by adding the plural marker **um** and the erg plural marker **čaj** (in that order); for a stem like **qlin** ('bridge'), the erg plural is derived by adding the plural marker **or** and, again, the erg plural marker **čaj**; see (2-ac). As before, it is clear that **čaj** must be a marker of both case (erg) and number (plural): This marker cannot be used in the singular, where the case markers **li**, **i** are used for marking erg instead.

Extended exponence in Archi nouns:

- | | | | | |
|----|------------------|----|---------------|---------|
| a. | gel-um-čaj | b. | gel-li | (Archi) |
| | cup-pl-erg.pl | | cup.sg-erg | |
| c. | qlinn-or-čaj | d. | qlonn-i | |
| | bridge-pl-erg.pl | | bridge.sg-erg | |

Observation:

A similar phenomenon can be found in the domain of verb inflection in Timucua, an extinct language isolate from Florida (Mithun (1999, 520); the discussion here is based on Granberry (1990)). Arguments are encoded by head-marking, i.e., case-sensitive agreement morphology on the verb; the pattern is a nominative-accusative one (nom-acc). (Assumption: case-assignment depends on Agree operations involving matching features (in the sense of Chomsky (2001)), so structural case (like nom) is present both on the case-marked DP and the case-marking head; see, e.g., Bobaljik & Wurmbrand (2003)).)

(3) Prefix markers:

- a. The internal argument of a transitive verb is encoded by an “object”, i.e., acc prefix.
- b. Other primary arguments, including the external argument of a transitive verb, are encoded by a “subject”, i.e., nom prefix.
- c. A nom prefix precedes a acc prefix in transitive contexts; the two markers occupy positions no. 1 and 2 in the template identified by Granberry.
- d. These prefixes encode person (but not number) in addition to case:
 - (i) two 1.nom markers **ho-** and **ni-** (which “occur with approximately equal frequency”; Granberry (1990, 86))
 - (ii) a 2.nom marker **ci-**
 - (iii) a zero 3.nom marker \emptyset -.

(4) Suffix markers:

- a. Many more types of affixes show up on the inflected Timucua verb, but they are all suffixes.
- b. Among these: number markers indicating plural (in 7th position in Granberry's template):
- c. Crucially, these plural markers also involve case (nom) and person (local vs. 3) information and thus qualify as combined pers.number.nom markers (not too unlike typical subject agreement markers in Indo-European languages like German or Icelandic).
- d. The markers are **-bo** (for 1./2.pl.nom arguments) and **-ma** (for 3.pl.nom arguments).

(5) Extended exponence in Timucua verbs:

- | | | | |
|----|---|----|--------------------------------------|
| a. | <u>ho</u> -ini-ta-la | b. | |
| | 1.nom-be-asp-loc | | |
| | <u>ni</u> -huba-so-si- <u>bo</u> -te-la | | (Timucua) |
| | 1.nom-love-tr-rec-1/2.nom.pl-asp-loc | | |
| | 'I am.' | | 'We love each other.' |
| c. | <u>ci</u> -huba-so-te-le | d. | <u>ci</u> -huba-so- <u>bo</u> -te-le |
| | 2.nom-love-tr-asp-loc | | 2.nom-love-tr-1/2.nom.pl-asp-loc |
| | 'You _{sg} love (someone).' | | 'You _{pl} love (someone).' |
| e. | ano <u>∅</u> -hewa-na-no | f. | <u>∅</u> -ini- <u>ma</u> -bi-la |
| | man 3.nom-speak-asp-loc | | 3.nom-be-3.nom.pl-asp-loc |
| | 'The man is speaking.' | | 'They are just now.' |

Note:

- (5-ace) involve singular subjects (1., 2., 3. person), with a prefix encoding person and case.
- (5-bdf) are corresponding examples with plural subjects (1., 2., 3. person) that exhibit extended exponence of case and person marking in Timucua. (Other markers, irrelevant here: asp (aspect, here: durative or bounded action), loc (or tense: proximate vs. distant time), tr (transitivity), and rec (reciprocity); also note that **te/ta**, **le/la** are variants.)

Observation:

Sierra Popoluca (Mixe-Zoque, Mexico) employs a head-marking system of argument encoding that follows an ergative-absolutive pattern (erg-abs) (Elson (1960a, 29-30), Elson (1960b, 207-208)). As in Timucua, person can be marked twice on the verb.

(6) Extended exponence in Sierra Popoluca verbs, intransitive contexts:

- a. A-nik-pa (Sierra
1.abs-go-inc
Popoluca)

'I am going.' (Marlett (1986, 364))
- b. A-pi:šiñ
1.abs-man
'I am a man.'
- c. Ta-ho:y-pa
1.incl.abs-take.a.walk-inc
'You and I take a walk.' (Elson (1960b, 208))

(7) Extended exponence in Sierra Popoluca verbs, transitive contexts:

- a. A-Ø-ko[?]c-pa
 1.abs-3.erg-hit-inc
 Popoluca)

(Sierra

'He hits me.'

- b. Ø-Aŋ-ko[?]c-pa
 3.abs-1.erg-hit-inc
 'I hit him.'

- c. Ø-Taŋ-ko[?]c-pa
 3.abs-1.incl.erg-hit-inc
 'You and I hit him.'

(Elson (1960b, 208))

(8) Order of verbal affixes in Sierra Popoluca:

pers.abs – pers.erg – V – num – pass – asp

Note:

Number, passive, and aspect markers are ignored here.

(9) Apparent fusional case/person markers in Sierra Popoluca:

	abs	erg
1.	a	an
1.incl	ta	tan
2.	mi	iñ
3.	∅	i

	abs ← erg
1 → 2	man
2 → 1	an

Note:

This time, the evidence is not quite as direct, but it is there under an analysis that provides internal structure for the markers in (9), via subanalysis based on a decomposition of person features as in (10). The simplest analysis (that accounts for all instances of syncretism) will have to postulate that **a** is [+1], and that **t** is then marked [+1,+2] (Müller (2006)). If so, there is extended exponence of [+1] in Sierra Popoluca.

(10) Decomposition of person features (Frampton (2002)):

- [+1,-2] = 1. pers.
- [-1,+2] = 2. pers.
- [-1,-2] = 3. pers.
- [+1,+2] = 1. pers. incl.

Conclusion so far:

Extended exponence exists in the argument encoding systems of German, Archi, Timucua, and Sierra Popoluca.

Note:

That said, there are several cases where extended exponence has been argued to show up that may not be fully convincing upon closer inspection. For instance, Matthews (1974) argues for extended exponence on the basis of German plural formation per se, based on the fact that plural may be realized by a combination of segmental plural marker (like **er**) and Umlaut of the stem vowel, as in **Buch** ('book') vs. **Büch-er** ('books'). However, this evidence for extended exponence loses its force if we assume that Umlaut is encoded on plural markers as an abstract ('floating') feature; cf., e.g., Wiese (1996). Similar conclusions may be drawn in the case of deverbal noun formation in Kujamaat Jóola discussed in Aronoff & Fudeman (2005, 154), where a class marker change is accompanied by vowel tensing.

Question:

For which kinds of approach does extended exponence pose a problem?

(i) **Lexical-incremental approaches** (e.g., Wunderlich (1996)):

Extended exponence is *prima facie* unexpected.

(ii) **Inferential-realizational approaches** (e.g., Matthews (1972), Anderson (1992), Aronoff (1994), Stump (2001)):

Extended exponence is expected.

(iii) **Lexical-realizational approaches:**

Distributed morphology → next section.

(11) Late vocabulary insertion:

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

(12) Vocabulary insertion into functional (F) morphemes:

- a. $[_F \ V \ F]$
- b. $[_F \ N \ F]$

(13) Subset Principle (Halle (1997)):

A vocabulary item **V** is inserted into a functional morpheme **M** iff (i) and (ii) hold:

- (i) The morpho-syntactic features of **V** are a subset of the morpho-syntactic features of **M**.
- (ii) **V** is the most specific vocabulary item that satisfies (i).

- (14) **Specificity of vocabulary items** (Lumsden (1992), Noyer (1992), Wiese (1999)):

A vocabulary item V_i is more specific than a vocabulary item V_j iff there is a class of features \mathbb{F} such that (i) and (ii) hold.

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

- (15) **Feature hierarchies:**
- a. Verbal domain: Tense > Person > Number > Gender
 - b. Nominal domain: Number > Class > Case
- (16) **Impoverishment** (Bonet (1991), Halle & Marantz (1993, 1994), Trommer (1999), Bobaljik (2002), Frampton (2002), Nevins (2003), Müller (2005)): Morpho-syntactic features can be deleted post-syntactically before vocabulary insertion takes place; this effects a “retreat to the general case”.

Note:

As it stands, the Subset Principle ensures that only one vocabulary item can be inserted into a given functional morpheme. This is not the case when a further post-syntactic operation has applied, viz., fission.

- (17) **Fission** (Noyer (1992), Frampton (2002), **not** Halle & Marantz (1993)): If insertion of a vocabulary item V with the morpho-syntactic features β takes place into a fissioned morpheme M with the morpho-syntactic features α , then α is split up into β and $\alpha-\beta$, such that (a) and (b) hold:
- a. $\alpha-\beta$ is available for further vocabulary insertion.
 - b. β is not available for further vocabulary insertion.

Assumption:

The functional morphemes in this talk are subject to fission. (Background: Assuming that there are no semantically empty functional categories (Chomsky (2001)), fissioned morphemes will be far from exceptional.)

Consequence:

Vocabulary insertion into fissioned morphemes **discharges** morpho-syntactic features. This property makes it difficult to account for extended exponence.

(18) Prefix Conjugation in Tamazight Berber (Noyer (1992, 145-149)):

dawa ('cure')	Sg	Pl
1	dawa-y	n-dawa
2 masc	<u>t</u> -dawa- <u>d</u>	<u>t</u> -dawa- <u>m</u>
2 fem	<u>t</u> -dawa- <u>d</u>	t-dawa-n-t
3 masc	i-dawa	dawa-n
3 fem	t-dawa	dawa-n-t

Observation:

2. person can be expressed twice in a single verb form.

Assumption:

To reconcile extended exponence with the feature discharge in fissioned morphemes, Noyer introduces the concept of **secondary exponence** of morpho-syntactic features: A vocabulary item may presuppose that some feature (like [2]) has already been discharged prior to its insertion. This is formally encoded by adding the secondary feature(s) in brackets (also see Wunderlich (1996), Frampton (2002)).

- (19) **Feature hierarchy:** Person > Number > Gender
- (20) **An impoverishment rule that applies to (V-)F in Tamazight Berber:**
 $[\pm\text{fem}] \rightarrow \emptyset / [2, -\text{pl}] ___$
- (21) **Vocabulary Items:**
- $/n-/ \leftrightarrow [1], [+pl]$
 - $/-y/ \leftrightarrow [1]$
 - $/t-/ \leftrightarrow [2]$
 - $/-m/ \leftrightarrow [+pl], [-\text{fem}] ([2])$
 - $/i-/ \leftrightarrow [-pl], [-\text{fem}]$
 - $/t-/ \leftrightarrow [-pl], [+fem]$
 - $/-d/ \leftrightarrow [-pl] ([2])$
 - $/-n/ \leftrightarrow [+pl]$
 - $/-t/ \leftrightarrow [+fem]$

Properties of the system:

- Discontinuous bleeding (follows from fission)
- Extended exponence (follows from secondary exponence)

Assumption:

Secondary exponence may be conceptually problematic since it threatens to undermine the notion of discharge. It may also raise problems for determining specificity. (Do secondary features count for the purposes of specificity?)

Suggestion:

Given that there is **impoverishment**, there is every reason to assume that the complementary operation also exists: **enrichment**.

(22) Enrichment:

Morpho-syntactic features can be added post-syntactically before vocabulary insertion takes place.

Potter's problem:

- Deletion applied to some structure can only affect material that is part of the structure; but with insertion/epenthesis, things are more complicated because it is a priori unclear exactly what kind of material can or must be inserted into a given structure.
- Prof. McGonagall: 'So ... today we are starting **Vanishing Spells**. These are easier than **Conjuring Spells**, which you would not usually attempt until NEWT level, but they are still among the most difficult magic you will be tested on in your OWL.' She was quite right; Harry found the Vanishing Spells horribly difficult." (J.K. Rowling, Harry Potter and the Order of the Phoenix. London: Bloomsbury, 2003, p. 232.)

Assumption:

Enrichment can only insert features into a given structure that are already present: enrichment is **doubling**.

Differences to other approaches that involve adding material:

- Enrichment differs from **dissociation** (Embick (1998) and Embick & Noyer (2001)): Dissociation is a post-syntactic operation that introduces **new** features as part of **new**, 'dissociated' morphemes; also see Arregi & Nevins (2006) for the operation of 'obliteration', which differs from impoverishment in roughly the way that dissociation differs from enrichment.
- The impoverishment/enrichment dichotomy parallels the Max/Dep constraint dichotomy in **optimality theory** (Prince & Smolensky (2004)), used in inflectional morphology by Wunderlich (2004): An optimal violation of some Max constraint can effect a non-realization of input features (which produces impoverishment effects); and an optimal violation of some Dep constraint can trigger a realization of features in the morphological output that are not present in the input.

Observation:

Both these approaches can introduce **new** material (morphemes, features).

Note:

Here and in what follows, standard person feature decomposition as in (10) is assumed ((20) then has [2] replaced with $[-1,+2]$).

(23) An enrichment rule that applies to (V-)F in Tamazight Berber:

$\emptyset \rightarrow [-1,+2]/[-1,+2] ___$

(24) Vocabulary Items:

a. /-m/ \leftrightarrow [-1,+2],[+pl],[-fem]

b. /n-/ \leftrightarrow [+1,-2],[+p]

c. /-d/ \leftrightarrow [-1,+2],[-pl]

d. /-ʒ/ \leftrightarrow [+1,-2]

e. /t-/ \leftrightarrow [-1,+2]

f. /t-/ \leftrightarrow [-pl],[+fem]

g. /i-/ \leftrightarrow [-pl],[-fem]

h. /-n/ \leftrightarrow [+pl]

i. /-t/ \leftrightarrow [+fem]

Observation (Stump (2001, 162-163)):

Noyer's concept of secondary exponence is empirically problematic since there are cases where one and the same inflection marker must act as a primary exponent of a morpho-syntactic property in one context, and as a secondary exponent of the same morpho-syntactic property in another context.

(25) **Past tense and negation in Swahili 1. plural contexts:**

- a. tu-li-taka (positive)
1.pl-past-want
'We wanted'
- b. ha-tu-ku-taka (negative)
neg-1.pl-neg.past-want
'We did not want'

(26) **Future tense and negation in Swahili 1. plural contexts:**

- a. tu-ta-taka (positive)
1.pl-fut-want
'We will want'
- b. ha-tu-ta-taka (negative)
neg-1.pl-fut-want
'We will not want'

(27) **Vocabulary items** (past tense, partial list):

- a. /ku/ ↔ [past,neg]
- b. /li/ ↔ [past]
- c. /tu/ ↔ [+1,-2],[+pl]
- d. /ha/ ↔ [∅] ([neg])

(28) **Vocabulary items** (future tense, partial list):

- a. /ta/ ↔ [future]
- b. /tu/ ↔ [+1,-2],[+pl]
- c. /ha/ ↔ [neg]

Note:

This problem does not show up under an enrichment analysis (assuming for the purposes of the argument that all the inflection markers in Swahili verb inflection are inserted into a single functional morpheme F).

(29) **An enrichment rule that applies to F(-V) in Swahili:**

$\emptyset \rightarrow [\text{neg}]/[\text{neg,past}]_$

(30) **Vocabulary items** (past tense, partial list; revised):

- a. /ku/ \leftrightarrow [past,neg]
- b. /li/ \leftrightarrow [past]
- c. /tu/ \leftrightarrow [+1,-2],[+pl]
- d. /ha/ \leftrightarrow [neg]

(31) **Extended exponence in German nouns:**

- | | | | | |
|----|-----------------|----|-----------------|----------|
| a. | Kind-er-n | b. | *Kind-n | (German) |
| | child-pl-dat.pl | | child.sg-dat.pl | |
| c. | Tisch-e-n | d. | *Tisch-n | |
| | table-pl-dat.pl | | table.sg-dat.pl | |

Brute force solution (Alexiadou & Müller (2005)):

The extended exponence problem in dat plural contexts is denied by treating **ern**, **en** in **Kind-er-n**, **Tisch-e-n** as primitive markers.

Assumption:

A single F (Kase/Number) head accompanies an N stem in the syntax in German.

(32) **An enrichment rule that applies to (N-)F in German:**

$$\emptyset \rightarrow [+pl]/[+pl],[dat] _$$

Restrictions on dative plural /n/:

The additional **n** marker that signals extended exponence in dat plural contexts shows up only in a proper subset of the inflection classes in German declension: It occurs with inflection classes that have /-e/ or /-er/ as the plural marker, but it does not occur with inflection classes that have /-n/ or /-s/ as the plural marker (cf. the dat plural forms **Mensch-en** vs. ***Mensch-en-(e)n**, **Auto-s** vs.

***Auto-s-(e)n**).

Possible analyses:

- The inflection classes that give rise to extended exponence form a natural class characterized by a primitive inflection class feature (like [+ δ]); see Alexiadou & Müller (2005). The enrichment rule in (32) would then be confined to [+ δ], so that the dat plural marker /n/ could be radically underspecified with respect to inflection class, and still only be inserted in the proper contexts.
- Enrichment applies throughout, with the vocabulary item /-n/ confined to [+ δ] environments.

What remains unaccounted for under these views:

- All inflection classes that have a general plural marker /-e/ or /-er/ permit a dat plural marker /-n/.
- All inflection classes that have /-n/ or /-s/ as a general plural marker disallow an additional dat plural marker /-n/ (there is more than one class at least in the cases of /-e/ and /-n/, based on differences in the singular, and with respect to Umlaut).

Conclusion:

Both the enrichment rule in (32) and the feature specification associated with the dat plural marker /-n/ are not restricted to certain inflection classes; rather, the illegitimate combinations are excluded on phonological or morpho-phonological grounds (Eisenberg (2000, 161)).

(33) (Simplified) Vocabulary items:

- a. /-er/ \leftrightarrow [+pl],[+ α ,+ β ,+ γ]
- b. /-e/ \leftrightarrow [+pl],[− β ,+ γ]
- c. /-n/ \leftrightarrow [+pl],[dat]

Note:

Primitive class features (like [$\pm\alpha$], [$\pm\beta$], [$\pm\gamma$]) that encode natural classes of inflection classes (Oltra Massuet (1999), Alexiadou & Müller (2005), Trommer (2005)) outrank case features on the hierarchy of features. Thus, /-er/, /-e/ are inserted into fissioned (N-)F morphemes before /-n/ is.

(34) Extended exponence in Archi nouns:

- | | | | | |
|----|------------------|----|---------------|---------|
| a. | gel-um-čaj | b. | gel-li | (Archi) |
| | cup-pl-erg.pl | | cup.sg-erg | |
| c. | qlinn-or-čaj | d. | qlonn-i | |
| | bridge-pl-erg.pl | | bridge.sg-erg | |

(35) An enrichment rule that applies to (N-)F in Archi:

$$\emptyset \rightarrow [+pl]/[+pl],[erg] __$$

(36) Vocabulary items:

- | | | | |
|----|--------|-------------------|---------------------|
| a. | /-um/ | \leftrightarrow | [+pl],[+ α] |
| b. | /-or/ | \leftrightarrow | [+pl],[- α] |
| c. | /-čaj/ | \leftrightarrow | [+pl],[erg] |

Note:

Oblique case forms are generated on the basis of the ergative form: parasitic (Priscianic) formations (Matthews (1972); Mel'čuk (1999, 8)). These forms are unproblematic if case features are also decomposed (see Bierwisch (1967), Franks (1995), Wiese (1999); and Kibrik (2003, 60-61) for an approach along these lines).

(37) Paradigms of cases for 'gel' ('cup'), 'qlin' ('bridge'):

	sg	pl
absolute	gel	gel-um
ergative	gel-li	gel-um-čaj
genitive	gel-li-n	gel-um-če-n
dative	gel-li-s	gel-um-če-s
comparative	gel-li-Xur	gel-um-če-Xur
comitative	gel-li-ɬu	gel-um-če-ɬu
permutative	gel-li-L'ana	gel-um-če-L'ana

...

qlin ('Brücke')	sg	pl
absolute	qlin-∅	qlonn-or
ergative	qlinn-i	qlonn-or-čaj
genitive	qlinn-i-n	qlonn-or-če-n
dative	qlinn-i-s	qlonn-or-če-s

...

(38) Extended exponence in Timucua verbs:

- | | | | |
|----|---|----|--------------------------------------|
| a. | <u>ho</u> -ini-ta-la | b. | |
| | 1.nom-be-asp-loc | | |
| | <u>ni</u> -huba-so-si- <u>bo</u> -te-la | | (Timucua) |
| | 1.nom-love-tr-rec-1/2.nom.pl-asp-loc | | |
| | 'I am.' | | 'We love each other.' |
| c. | <u>ci</u> -huba-so-te-le | d. | <u>ci</u> -huba-so- <u>bo</u> -te-le |
| | 2.nom-love-tr-asp-loc | | 2.nom-love-tr-1/2.nom.pl-asp-loc |
| | 'You _{sg} love (someone).' | | 'You _{pl} love (someone).' |
| e. | ano <u>Ø</u> -hewa-na-no | f. | <u>Ø</u> -ini- <u>ma</u> -bi-la |
| | man 3.nom-speak-asp-loc | | 3.nom-be-3.nom.pl-asp-loc |
| | 'The man is speaking.' | | 'They are just now.' |

(39) An enrichment rule that applies to (V-)F in Timucua:

$$\emptyset \rightarrow [\mu 1, \nu 2], [\text{nom}] / [\mu 1, \nu 2], [\text{nom}] _$$

Note 1:

μ, ν are variables over feature values (+, -) (see Chomsky (1965, 175 & 233), Chomsky & Halle (1968, 83), Halle (1992, 39), Noyer (1992), Alexiadou & Müller (2005), Baerman (2006); and Harley (1994), Johnston (1996) for critical evaluation).

Note 2:

The case, person, and number features in (V-)F can be realized both by prefixation and by suffixation, as argued by Noyer (1992) for Tamazight Berber.

(40) Vocabulary items:

- a. /ho-/ (/ni-/) \leftrightarrow [+1,-2],[nom]
- b. /ci-/ \leftrightarrow [-1,+2],[nom]
- c. / \emptyset -/ \leftrightarrow [-1,-2],[nom]
- d. /-bo/ \leftrightarrow [nom],[+pl]
- e. /-ma/ \leftrightarrow [-1,-2],[nom],[pl]

Note:

- /-bo/ is the elsewhere marker for nom plural; it is blocked in 3. person contexts by the more specific nom plural marker /-ma/.
- As it stands, the feature hierarchy predicts suffixation to precede prefixation, except with underspecified /-bo/, where the order is reversed. This consequence is empirically unproblematic; but it can be avoided by assigning to /-bo/ the person specification $[\mu 1,-\mu 2]$.

(41) Apparent fusional case/person markers in Sierra Popoluca:

	abs	erg
1.	a	an
1.incl	ta	tan
2.	mi	iñ
3.	∅	i

	abs ← erg
1 → 2	man
2 → 1	an

(42) Impoverishment rules

a. $[\alpha\text{erg}] \rightarrow \emptyset / [-\alpha 1, -\alpha 2] ___$

b. $[-1] \rightarrow \emptyset / [-2, -\text{erg}] ___$

(global)

(43) An enrichment rule that applies to F(-V) in Sierra Popoluca:

$\emptyset \rightarrow [+1] / [+1, +2] ___$

On this basis, the analysis of the argument encoding system of Sierra Popoluca in Müller (2006) can dispense with secondary features.

(44) Vocabulary items:

- a. /n/ ↔ [+erg]
- b. /t/ ↔ [+1,+2]
- c. /a/ ↔ [+1]
- d. /i/ ↔ [-1]
- e. /m/ ↔ [+2],[-erg]

Note:

The vocabulary items /t/ and /m/ are now more specific than in the analysis in the earlier approach (assuming that secondary features do not count for specificity), and this may create problems for marker order. Assuming erg to be ranked high on the verbal hierarchy, and abs low, and assuming a ranking $[\pm 1] > [\pm 2]$ (as in the earlier approach in Müller (2006)), all of the order facts follow, except for one: /t/ insertion is predicted to precede /a/ insertion. The fact that the order is nevertheless /t/-/a/-(/n/)-V can plausibly be linked to the fact that /t/ and /a/ realize the same feature (and to autonomous morphological structure).

- 1 The existence of post-syntactic enrichment in Distributed Morphology is expected for reasons of symmetry alone (given post-syntactic impoverishment); and by assuming enrichment, extended exponence can be accounted for without secondary features.
- 2 The present analysis differs from one in terms of secondary features in an important respect: Just as system-wide, non-accidental patterns of syncretism can be better accounted for by impoverishment than by accidental feature specifications of individual vocabulary items (Bobaljik (2002)), only enrichment (and not an approach in terms of secondary features) makes it possible to treat extended exponence as a system-wide property. For instance, the fact that case and person can be realized twice on verbs in Timucua can be expressed as such by an enrichment rule, and is thus more than an accidental by-product of individual marker specifications.
- 3 An enrichment-based approach does not imply that extended exponence is a completely unmarked phenomenon that comes for free (as in Stump (2001), Anderson (2005)). Rather, it always takes a specific post-syntactic operation to bring it about: In the unmarked case, a single morpho-syntactic feature is not realized by more than one exponent (cf. Wurzel (1984)).

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