

Distributed Morphology: Global Impoverishment in Sierra Popoluca

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Introduction

Goal:

An analysis of verbal argument encoding morphology in Sierra Popoluca on the basis of Distributed Morphology that is maximally economical and accounts for all instances of syncretism (marker homonymy).

Main claims:

- 1 Morphological underspecification is needed.
- 2 Person features and case features must be decomposed into smaller units ($[\pm 1, \pm 2]$; $[\pm \text{gov}]$).
- 3 Impoverishment is needed.
- 4 Impoverishment is brought about by deletion rules (Halle & Marantz (1993, 1994)), not by the interaction of feature co-occurrence restrictions and feature hierarchies (Noyer (1992)).
- 5 The local domain of impoverishment can be larger than the functional morpheme (Q-morpheme).
- 6 Post-syntactic vocabulary insertion can be replaced by pre-syntactic probe-driven Agree (Alexiadou & Müller (2005), based on Chomsky (2000, 2001)); post-syntactic impoverishment can be reformulated as a pre-syntactic operation.

The Syntax of Argument Encoding in Sierra Popoluca

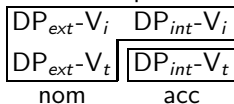
Sierra Popoluca:

A Mixe-Zoque language spoken in Mexico (Isthmus of Tehuantepec, Veracruz, Soteapan: 'Soteapan Zoque'); speakers < 30.000.

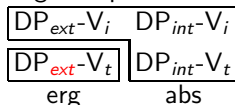
Lit.: Elson (1960a,b), Elson & Pickett (1964), Lind (1964), Marlett (1986).

Table 1: Accusative vs. ergative pattern of argument encoding (Plank (1995))

accusative pattern



ergative pattern



Absolutive Markers

(1) Absolutive markers in intransitive contexts:

- a. A-nik-pa
1.ABS-go-INC
'I am going.'
- 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.'
- d. Ø-Wiʔk-pa
3.ABS-eat-INC
'He eats.'
- e. Ø-Nik-pa šiwan
3.ABS-go-INC John
'John is going.'
- f. Ø-Koʔc-ta:-p šiwan
3.ABS-hit-PASS-INC John
'John is being hit.'

(Marlett (1986, 364))

Ergative Markers

(2) Absolute and ergative markers in transitive contexts:

a. A-∅-koʔc-pa

1.ABS-3.ERG-hit-INC

'He hits me.'

b. ∅-Aŋ-koʔc-pa

3.ABS-1.ERG-hit-INC

'I hit him.'

c. M-aŋ-koʔc-pa

2.ABS-1.ERG-hit-INC

'I hit you.'

d. ∅-l-koʔc-pa

3.ABS-3.ERG-hit-INC

'He hits him.'

(Elson (1960b, 208))

e. ∅-l-koʔc-yah-pa

3.ABS-3.ERG-hit-3.PL-INC

'They hit him.'/'He hits them.'/'They hit them.' (Elson (1960b, 209))

Further Contexts for Ergative Markers

(3) Ergative markers as possessive markers:

a. an-tik

1.ERG-house

'my house'

b. M-an-ha:tuj

2.ABS-1.ERG-father

'You are my father.'

(Elson (1960b, 208))

(4) Ergative markers in adjunct clauses:

mu an-nik

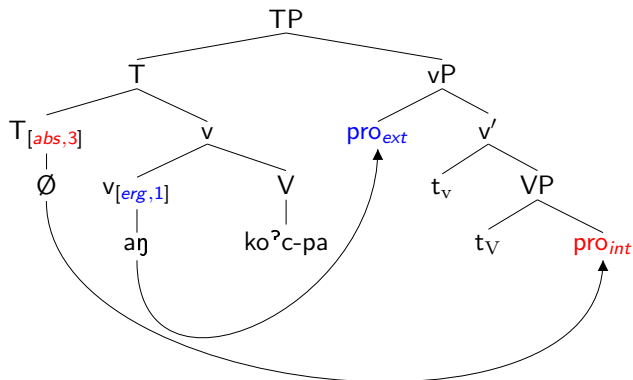
when 1.ERG-go

'when I went'

(Elson (1960b, 208), Marlett (1986, 364))

Syntactic Structure

- (5) Syntactic structure of ergative/absolutive marking (for (2-b), simplified):



- (6) Order of verbal affixes in Sierra Popoluca:
PERS.ABS – PERS.ERG – V – NUM – PASS – ASP

Morphology of Argument Encoding in Sierra Popoluca

Table 2: 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

(7) **Marker clash in Sierra Popoluca:**

- If local person (1./2.) and 3. person co-occur, only the marker for local person shows up, irrespective of its status as ABS or ERG.
- If 1. and 2. person co-occur, complex markers arise via /i/ deletion; the order is ABS-ERG:
 - 2.ABS ← 1.ERG = mi-an > man
 - 1.ABS ← 2.ERG = a-iñ > an

(8) **An optimality-theoretic analysis:**

PARSE-1./2. \gg ALIGN(PERS)-LEFT \gg PARSE-3, PARSE-CASE

A Distributed Morphology Approach: Background Assumptions

- (9) **Late vocabulary insertion:**
- a. Functional morphemes like *v* and *T* 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.

Subset Principle

(10) **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).

(11) **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}' .

Impoverishment and Fission

- (12) **Impoverishment** (Bonet (1991), Halle & Marantz (1993, 1994), Bobaljik (2002), Frampton (2002)):
Morpho-syntactic features can be deleted post-syntactically before vocabulary insertion takes place; this effects a “retreat to the general case”.
- (13) **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:
- $\alpha-\beta$ is available for further vocabulary insertion.
 - β is not available for further vocabulary insertion.

Case and Person Features

(14) **Case** (Bierwisch (1967)):

- a. ERG = [+gov]
- b. ABS = [-gov]

(15) **Person** (Noyer (1992), Wiese (1994), Frampton (2002)):

- a. 1 = [+1,-2]
- b. 1_{incl} = [+1,+2]
- c. 2 = [-1,+2]
- d. 3 = [-1,-2]

Natural Classes of Persons in Icelandic Verbal Inflection

(16)

[A] Weak conjugation, class 1:
krefja ('demand')

	present	past
1.Sg.	kref	krafdhi
2.Sg.	krefur	krafdhir
3.Sg.	krefur	krafdhi
1.Pl.	krefjum	kröfdhum
2. Pl.	krefjidh	kröfdhudh
3. Pl.	krefja	kröfdhu

[B] Strong conjugation, class 3:
sleppa ('slip')

	present	past
1.Sg.	slepp	slapp
2.Sg.	sleppur	slappst
3.Sg.	sleppur	slapp
1.Pl.	sleppum	sluppum
2.Pl.	sleppidh	sluppuhdh
3.Pl.	sleppa	sluppu

(i) In past singular contexts, $[\pm 1]$ is deleted, and 1. and 3. person become indistinguishable: $[-2]$ (Frampton (2002), also see Wiese (1994)).

(ii) In present singular contexts, $[\pm 2]$ is deleted, and 2. and 3. person become indistinguishable: $[-1]$.

- (17) **Feature hierarchy** (for determining specificity):
[±gov] ≫ [±1] ≫ [±2]

Subanalysis of Sierra Popoluca Argument Encoding Morphology

(18) Vocabulary items:

- a. /n/ ↔ [+gov]
- b. /a/ ↔ [+1]
- c. /i/ ↔ [-1]
- d. /m/ ↔ [+2] ([-gov])
- e. /t/ ↔ [+2] ([+1])

(19) Impoverishment rule [A] (local):

$[\mathcal{N}\text{gov}] \rightarrow \emptyset / [-\mathcal{N}1, -\mathcal{N}2] ___ \Rightarrow$

(i) [+gov] → ∅ / [-1, -2] ___

(ii) [-gov] → ∅ / [+1, +2] ___

(20) Impoverishment rule [B] (global):

$[-1, -2] \rightarrow \emptyset / [-\text{gov}] ___$

Results of Cyclic Vocabulary Insertion

- (21) a. ABS:
- (i) [+1,-2,-gov] → /a/
 - (ii) [+1,+2,~~-gov~~] → /t-a/
 - (iii) [-1,+2,-gov] → /m-i/
 - (iv) [~~-1,-2,-gov~~] → /∅/
- b. ERG:
- (i) [+1,-2,+gov] → /a-n/
 - (ii) [+1,+2,+gov] → /t-a-n/
 - (iii) [-1,+2,+gov] → /i-n/
 - (iv) [-1,-2,~~+gov~~] → /i/
- c. ABS-ERG
- (i) [+1,~~-2~~, -gov] [~~-1~~, +2, +gov] (2 → 1) /a-n/
 - (ii) [~~-1~~, +2, -gov] [+1, ~~-2~~, +gov] (1 → 2) /m-a-n/
 - (iii) [~~-1,-2~~, -gov] [-1, -2, ~~+gov~~] (3 → 3) /i/
 - (iv) [~~-1,-2~~, -gov] [+1, -2, +gov] (1 → 3) /a-n/
 - (v) [~~-1,-2~~, -gov] [-1, +2, +gov] (2 → 3) /i-n/
 - (vi) [+1, -2, -gov] [~~-1,-2~~, +gov] (3 → 1) /a/
 - (vii) [-1, +2, -gov] [~~-1,-2~~, +gov] (3 → 2) /m-i/

Effects of the Rules

Effects of rule [A]:

- 1 Occurrence of /t/ instead of /m/ in the context 1_{incl}.ABS.
- 2 Absence of /n/ in the context 3.ERG.

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- 1 Occurrence of /t/ instead of /m/ in the context 1_{incl}.ABS.
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Effects of rule [B]:

- 1 Absence of a marker in a simple context 3.ABS.
- 2 Absence of a marker for 3. person if the other argument is also 3. person.
- 3 Absence of a marker for 3. person if the other argument is 1. or 2. person.
- 4 Absence of /i/ in the transitive contexts $1 \rightarrow 2$, $2 \rightarrow 1$. (This is where the global nature of the impoverishment rule is crucial.)

A Pre-Syntactic Alternative

- (22) [Components of Grammar](#) (Alexiadou & Müller (2005)):
Lexicon → Morphology → Syntax → PF, LF

[Question:](#)

Can a pre-syntactic approach to inflection handle fission and impoverishment?

Pre-Syntactic Impoverishment

Impoverishment:

Impoverishment can be viewed as a pre-syntactic operation, provided that the features that are affected are invisible for morphology, but not for subsequent syntactic operations. On this view, impoverishment of T applies in the morphological component after its features have been added, but before the Agree operation with (matching features of) an inflection marker is carried out. Impoverishment **marks** features as morphologically inaccessible, but it does not **delete** them (cf. Chomsky's (1995) difference between deletion and erasure).

Pre-Syntactic Fission

Fission:

Suppose that the defining property of fission is that a class feature probe that has triggered an Agree operation (Alexiadou & Müller (2005)) does not delete immediately, but may trigger further Agree operations, and only deletes when no further Agree operation is possible anymore. I.e., a “fissioned morpheme” emerges as a certain kind of class feature probe (in a morpheme).

Note:

Sierra Popoluca does not have different inflection classes for verbs. The inflection class feature triggering inflection in Sierra Popoluca must therefore be trivial. See Aronoff' (1994) definition of inflection classes:

(23) **Inflectional Class:**

An inflectional class is a set of lexemes whose members each select the same set of inflectional realizations.

Aronoff (1994, 182): “Strictly speaking, a language whose major lexical categories each have only one inflectional class will still have inflectional classes.”

Independent Evidence from Syntax

A similar approach suggests itself for multiple *wh*-movement in Bulgarian (assuming that such multiple movement is a homogenous phenomenon, but cf. Bošković (2002)): The *wh*-probe feature on C does not delete after checking the first *wh*-phrase; it deletes when there is no further *wh*-phrase left.

(24) Multiple *wh*-movement in Bulgarian:

[_{CP} Koj₁ kogo₂ kakvo₃ C [_{TP} t₁ e pital t₂ t₃]] ?
who whom what asked

An Example

(25) (2-b) again:

a. Select $ko^?c-pa$ ('hit') from the lexicon.

b. Add fully specified case and person features (plus, irrelevantly, others):

$ko^?c-pa: \{[-1, -2, -gov], [+1, -2, +gov]\}$ ('I hit him')

c. Apply impoverishment rule [A] (once per feature bundle, vacuously).

d. Apply impoverishment rule [B] (once per feature set):

$ko^?c-pa: \{[\underline{-1}, \underline{-2}, -gov], [+1, -2, +gov]\}$

e. Merge /n/ according to Subset Principle:

$ko^?c-pa: \{[\underline{-1}, \underline{-2}, -gov], [+1, -2, +gov]\} + /n/: \{[+gov]\} \rightarrow$

$n-ko^?c-pa: \{[\underline{-1}, \underline{-2}, -gov], [+1, -2, \underline{+gov}]\}$

f. Merge /a/ according to Subset Principle:

$n-ko^?c-pa: \{[\underline{-1}, \underline{-2}, -gov], [+1, -2, \underline{+gov}]\} + /a/: \{[+1]\} \rightarrow$

$a-n-ko^?c-pa: \{[\underline{-1}, \underline{-2}, -gov], [\underline{+1}, -2, \underline{+gov}]\}$

g. The inflected verb form enters syntax, with all morpho-syntactic features (whether affected by impoverishment, affected by Agree, or not affected at all) accessible to syntactic operations.

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