Plural Insertion is Constructed Plural

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Abstract
Harbour (2003b) argues for a postsyntactic rule which inserts a non-singular feature in a singular agreement head in the context of other singular agreement heads. In this paper, I argue that 'plural insertion' of this type should be reanalyzed as a specific case of contextual allomorphy based on a minimalist featural representation of number categories, and provide a detailed analysis of a similar case in Nocte. I conclude that postsyntactic morphology can be strictly restricted to one operation, vocabulary insertion (Trommer, 1999, 2003b,c).

1. Introduction

In a number of unrelated languages, (e.g. Classical Ainu, Shibatani, 1990; Kiowa, Harbour, 2003a; Wardaman, Merlan, 1994; Nocte, Gupta, 1971) verbs show plural agreement in specific contexts where the verb agrees with two singular objects. Thus in Nocte transitive forms with a 1st person singular subject and a 2nd person singular object instead of singular agreement markers as in (1-a,b), the agreement affix also used in (transitive and intransitive)1st person plural forms appears (1-c):

(1) **Plural Insertion in Nocte (Gupta, 1971)**

a. hetho-**ang**
teach-I-1
'I will teach him'

b. hetho-h-**o**
teach-INV-2
'he will teach you (sg.)'

c. hetho-**e**
teach-1pl
'we will teach (him)'
or: I will teach you (sg.)'

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Based on similar data from Kiowa, Harbour (2003b) concludes that "plural insertion" of this type is impossible in a version of Distributed Morphology where all morphological operations are feature-deleting (Minimalist Distributed Morphology, MDM; Trommer, 1999, 2003b,c) and hence that such a system is untenable. In this paper, I argue that a minimalist approach to the representation of number features obviates this argument and makes it possible to derive plural insertion without postsyntactic feature insertion.

The paper is organized as follows: In section 2, I introduce several cases of plural insertion and show why the are problematic for MDM. In the following two sections and 5, I discuss two aspects of morphological representation which are crucial to a solution of this problem. Section 3 treats ambiguous exponence, i.e. markers which realize features of a single head in some contexts, but features of two different heads in other contexts. In section 4 I introduce a new, minimalist representation of number features, where the inventory of number features proposed in recent feature-geometric proposals Harley and Ritter (2002); Cowper (2003) is reduced to a single privative feature. In section 5, I show in detail how apparent number insertion in Nocte can be reduced to ambiguous exponence involving this minimal representation of number. Section 6 contains a short summary of the paper.

2. Minimalist Distributed Morphology and Plural Insertion

In this section I introduce MDM, the formal framework I assume throughout the paper (section 2.1) and show why plural insertion seems to be problematic for its highly restrictive inventory of morphological operations. (section 2.2).

2.1. Minimalist Distributed Morphology

In Minimalist Distributed Morphology, as in standard Distributed Morphology (DM, Halle and Marantz (1993)), morphology interprets the output of syntax which itself operates on abstract feature bundles ("heads") without phonological content. As an illustrative example, I take verb subject-verb agreement in Wardaman which follows the basic paradigm in (2) (Merlan, 1994):

(2) **Transitive Agreement Paradigm of Wardaman**

	sig	**non-sig**
1 excl.	nga-	yi-rr-
1 incl.	nga-yi	nga-rr-
2	yi-	nu-
3	Ø-	wu-rr-

At morphological structure (MS), so-called vocabulary items (VIs), pairing underspecified morphosyntactic features with phonological content are inserted into heads. Thus we can assume that the categories in (2) correspond to agreement heads specified as in (3) and spelled out by the VIs in (4). As throughout the paper, I assume three binary person features.[1] Number is represented according to the Iconic Theory of Number, where an occurrence of one 'number element' (•) corresponds to singular, and an occurrence of two number elements (•–•) corresponds to plural. This approach to the representation of number will be developed in detail in section 4.

(3) **Feature Specifications for the Paradigm in (3)**

	sig	**non-sig**
1 excl.	[+1 –2 –3 •]	[+1 –2 –3 •–•]
1 incl.	[+1 +2 –3 •]	[+1 +2 –3 •–•]
2	[–1 +2 –3 •]	[–1+2 –3 •–•]
3	[–1 –2 +3 •]	[–1 –2 +3 •–•]

(4) **VIs for Wardaman Intransitive Agreement**

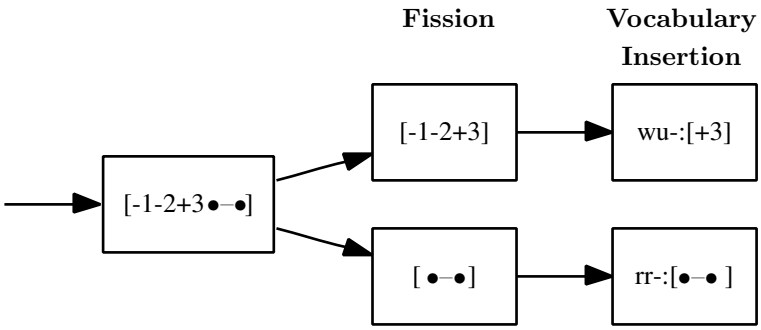
a. nu- ↔ [+2 –3 •–•]
b. nga- ↔ [+1]
c. wu- ↔ [+3] / •-•
d. yi- ↔ [–3]
e. rr- ↔ [•-•]

While standard DM assumes a great wealth of operations which manipulate the output of syntax before vocabulary insertion, in MDM vocabulary insertion is the *only* morphological operation (apart from morphophonology).

[1] See Trommer (2005) and Trommer (2006b) for detailed justification of this system for person features. The binary person feature [+/–3] is also extensively justified in Nevins (2006).

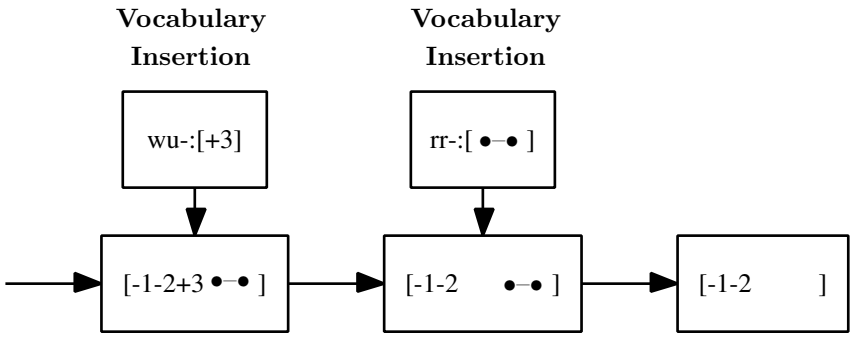
Systematic neutralization and "splitting" of syntactic heads into different affixes (VIs) which require separate rule formats in standard DM are captured as the by-product of vocabulary insertion itself. Formally, vocabulary insertion in MDM involves two conceptually virtually inescapable aspects of spell-out: Syntactic features specified in the VI are deleted from the targeted syntactic head and the phonological representation is concatenated with the corresponding stem. With Halle (1997), I assume that more than one VI can be inserted into one syntactic head as long as the head still has undeleted features. Thus in the 3rd person nonsingular forms of Wardaman, agreement is expressed by one marker for [+3] and a second one for [•–•], and the 1st person inclusive has both a [+1] and a [–3] affix. In classical DM it is assumed that into each syntactic head only one VI can be inserted. Hence data like this are expressed in classical DM by a fission operation which distributes the underlying heads into two partial heads and subsequent vocabulary insertion in the resulting positions:

(5) **Fission and Vocabulary Insertion in Classical DM**



In MDM, fission is superfluous. Insertion of **wu-**:[+3] deletes the 3rd person feature and still allows insertion of **rr-**:[•–•] into the remaining feminine feature. At this point, vocabulary insertion halts since there are no further VIs which specify any of the remaining features:

(6) **Fission and Vocabulary Insertion in Minimalist DM**



Syncretism is captured by insertion of VIs which are phonologically zero. Take as an example the syncretism in the person agreement markers of Wardaman 2sg and 1st person exclusive plural, which is **yi-** in both cases while we would expect **nga-yi** for the latter form. In classical DM, syncretisms of this type are usually captured by impoverishment rules such as (7) which deletes the [+1] feature in the context of non-second person plural agreement. Since impoverishment generally precedes vocabulary insertion, the syntactic feature specification [+1] is invisible to insertion and **nga-**:[+1] is never inserted in these forms:

(7) [+1] ➔ Ø / [___ –2 •–•]

MDM maintains that syncretism results from feature deletion, but denies the existence of a separate rule format to derive it. Instead data of this type are captured by insertion of VIs with zero phonology. The impoverishment rule (7) is thus replaced by the zero VI in (8):

(8) Ø ↔ [+1] / [___ –2 •–•]

Since non-zero VIs also allow context restrictions in (classical and minimalist) DM, it implies no additional machinery to use them for zero VIs. That (8) is inserted before **nga-**:[+1] follows from the general principle that more specific VIs are inserted before less specific ones which is a basic tenet of DM. Note finally that zero vocabulary insertion again allows subsequent insertion of non-zero VIs if this spells out features which have not been

deleted. Hence insertion of **yi-**:[–3] can and actually must follow insertion of (8).

2.2. Why Plural Insertion is Problematic for MDM

Effectively morphology in MDM reduces to phonological realization of morphosyntactic features. This makes the natural prediction that the morphology for a given syntactic structure S should only introduce markers specifying features already present in S. Two serious objections against this claim have been raised in the literature. First, Noyer (1998) uses double neutralization data from Nimboran to argue for an operation of postsyntactic feature insertion. Basically Nimboran shows neutralization of plural to dual morphology in some contexts, but neutralization of dual to plural morphology in other contexts. Harbour (2000) contends explicitly that this pattern is fatal for the version of MDM proposed in Trommer (1999). However in Trommer (2003a,b), I show that the Nimboran data are amenable to a MDM treatment once a feature-geometric approach to number features is adopted where the feature specifications for dual and plural subsume those for singular and for general number, as is true for the Iconic Theory of Number and different versions of feature geometry which are discussed in detail in section 4.

Combining MDM and a feature-geometric representation of number makes the strong prediction that there should be no neutralization from singular to plural, and no plural morphology should occur in contexts involving only singular number. Interestingly, the second objection against the MDM-style exclusion of feature insertion has been raised exactly in this area: Harbour (2003b) argues that Kiowa verb agreement requires the morphological rule in (9) which inserts a non-singular plural feature (covering pural and dual) in the context of singular arguments:

(9) $\emptyset \rightarrow$ [–singular]

Justification of (9) requires considerable depth of analysis since Kiowa combines an extraordinarily complex number system involving singular, dual and plural, and 'inverse number' with a phonologically intricate morphological realization of agreement, where single morphemes correspond to tone, nasality and other subsegmental properties leading to a monosyllabic agreement-prefix-complex which expresses agreement with up to 3 arguments. Roughly Harbour states the following morphological indicators for presence of a non-singular agent or goal in ditransitives: non-nasality of the agreement prefix in the context of dual objects, presence of a coda with

inverse number objects, and usage of **ɔ** as prefix vowel in specific contexts involving singular objects. This is schematically summarized in (10) (Harbour, 2003b:558):

(10) **Diagnostics of Non-singular**

	Object			
Agent or Goal	**sg**	**du**	**pl**	**inv**
neither [–singular]	*ɔ	Nasal		*Coda
either [–singular]	ɔ	*Nasal		Coda

The prefix forms in the first row of (11) illustrate this point by ditransitive forms with a 2nd person goal and an actor which is 1sg or unspecified: The prefix is nasal with a dual object, has a coda with an inverse-number object, and does not have **ɔ** for a singular object. However, in the bottom row which covers ditransitive forms with the same feature specifications for object and goal as in the top row, but specified subjects which are not 1sg, all the indicators for [–singular] can be observed. Thus even when the subject is 3sg and the goal 2sg, we observe **ɔ** with singular, non-nasality with dual, and presence of a coda with inverse number objects:[2]

(11) **Forms with 2sg Goals**

		Object			
Agent	**Goal**	**sg**	**du**	**pl**	**inv**
–/1sg	**2sg**	gyá	nén	yán	gɔ́
other (3sg,1pl,...)	**2sg**	gɔ	dét	gyá	gɔ́**t**

Thus we have morphological reflexes of the feature [–singular] even though there is no single [–singular] argument in the syntax. Hence the source, so Harbour's argument, must be a feature-inserting rule after syntax and before vocabulary insertion.

A similar pattern – plural agreement in a transitive context with only singular arguments - occurs in a number of other languages. Thus in Wardaman basically the same markers already familiar from intransitive agreement are used for subject and object agreement with the addition of an accusative affix **n-** and the object plural marker **-ngu** (generally **rr-** marks plural only for subjects). This is completely transparent in 3sg/3pl ➔ 2pl and in 3pl ➔

[2]Note that [—singular] cannot be generally 'transferred' from the object since **ɔ** appears in a context where all three arguments are singular.

2sg forms, but in 3sg ➔ 2sg forms, the subject is marked as plural even if it (and the object) are singular:

(12) **Wardaman Transitive Agreement Involving Plural Insertion**

		Object	
		2sg	**2pl**
Subject	**3sg**	yi-n-wu-rr	nu-ngu-n-0-
	3pl	yi-n-wu-rr	nu-ngu-n-wu-rr

In Colloquial Ainu (Shibatani, 1990), subject and object agreement is marked transparently by prefixes:

(13) **Transparent Transitive Agreement in Colloquial Ainu**

a. eci-un-kore
2pl-O1p-give
'you (pl.) give us'

b. e-un-kore
2sg-O1p-give
'you (sg.) give us'

However, in all cases, where the subject is 1st and the object 2nd person, only the 2nd person marker **eci-** appears (14). The left column contains the compositional forms that would be expected (**ku-**, Subject 1sg; **ci-**, Subject 1pl; **e-**, 2sg). Besides suppression of person agreement for the subject, we have again the same pattern as in Kiowa and Wardaman: a plural marker (**eci-**) extends to a context with singular arguments only (1sg ➔ 2sg):

(14) **Syncretism in Colloquial Ainu 1 ➔ 2 Forms**

***ku-e-** 'I-you (sg.)' ***ci-e-** 'we-you (sg.)'
***ku-eci-** 'I-you (pl.)' ***ci-eci-** 'we-you (pl.)' ⇒ **eci-**

Finally, an especially simple instance of plural insertion is the Nocte case already mentioned in section 1. (15) shows the intransitive present indicative paradigm, and (16) all transitive forms for singular arguments. Nocte has an inverse marker, and agreement with the argument which iss higher on the person hierarchy 1st ≻ 2nd ≻ 3rd (see section 5 for discussion). What

is of interest here is that the 1pl affix **-e** appears in the 1sg ➔ 2sg form even though neither subject nor object are plural.[3]

(15) **Nocte: Paradigm of *rang* ('to go')**

	Sg	**Pl**
1	rang-ka**-ang**	rang-ka**-e**
2	rang-ka**-o**	rang-ka**-an**
3	rang-ka**-a**	

(16) **Nocte: paradigm of the verb hetho ('to teach')**

	Direct	**Inverse**	
1sg ➔ 2sg	hetho**-e**	hetho**-h**-ang	**2sg ➔ 1sg**
	teach**-1pl**	teach**-Inv**-1sg	
1sg ➔ 3sg	hetho-ang	hetho**-h**-ang	**3sg ➔ 1sg**
	teach-1sg	teach**-Inv**-1sg	
2sg ➔ 3pl	hetho-o	hetho**-h**-o	**3sg ➔ 2sg**
	teach-2sg	teach**-Inv**-2sg	

Thus all four languages, Kiowa, Ainu, Wardaman, and Nocte share the same basic pattern: plural agreement occurs in specific transitive contexts where syntactically only singular arguments are present. This pattern seems to be highly problematic for MDM since neutralization of singular to plural cannot be derived by impoverishment under the assumption that the representation for plural properly includes the one for singular. neither can it be derived by feature insertion since feature inserting rules are generally excluded in MDM. In the following I will take Nocte as a representative example to show that a principled account of 'plural insertion' is possible under the restrictive assumptions of MDM if specific refinements in the representation of number features and VIs are made.

3. Ambiguous Exponents

Virtually all current work in theoretical morphology seems to make the implicit assumption that vocabulary items fall into to classes: those which consistently express features of a single syntactic head and those which

[3] Alternatively Nocte allows to use the special portmanteau marker **-min** in 1 ➔ 2 forms (*hetho-**min***). I will not discuss this variant here.

consistently express features of two heads.[4] For example, Frampton (2003) argues that Old English verb agreement had two vocabulary items spelling out the feature Plural (17) accounting for the allomorphy in (18):

(17) **Plural VIs for Old English**

a. -on ↔ Pl / ___ Past
b. -aþ ↔ Pl

(18) **Plural VIs for Old English**

a.	dēm-d-on	'we deemed'
	deem-Past-Pl	
b.	dēm-aþ	'we sing'
	deem-Pl	

While **-aþ** (17-a) only realizes a feature from the agreement head, **-on** (17-b) is also sensitive to the Past feature of the adjacent Tense head. To have a clear terminology, I will call the features specified in the body of a VI the 'substantive features' of the VI and the features in the context restriction its context features. Note that 'reflecting two syntactic heads' is not synonymous with context sensitivity because in a system with fission or multiple vocabulary insertion into the same head context specifications of VIs might also be sensitive to features of the same syntactic head.[5] Thus Noyer (1992) assumes for the Tamazight Berber agreement paradigm in (19) i.a. the VIs in (20):[6]

(19) **Tamazight Berber Verb Agreement (*dawa*, 'cure')**

	sg	**pl**
3 masc	i-dawa	dawa-n
3 fem	t-dawa	dawa-n-t
2 masc	t-dawa-d	t-dawa-m
2 fem	t-dawa-d	t-dawa-n-t
1	dawa-ɣ	n-dawa

[4] In a Word-and-paradigm approach such as Stump (2001) this translates into 'rules of exponence corresponding to one or two position classes'.

[5] Another possibility to reflect two syntactic heads by one marker is to assume portmanteau affixes which directly spell out two syntactic positions. See Trommer (2003c) for arguments against assuming such representations.

[6] I have adapted Noyer's VI notation to a more SPE-like format.

(20) **VIs for Tamazight Berber**

a. -m ↔ [+pl +masc] / [__ +2]
b. n- ↔ [+1 +pl]
c. -n ↔ [+pl]
d. t- ↔ [+2]

All four VIs realize features of the same head (subject agreement). But while **t-** realizes the feature [+2], **-m** is contextually restricted to this very feature to block its insertion in non-second person contexts. Hence **m-** is context-sensitive, but not reflecting features of two syntactic heads.

In this section, I discuss affixes which are problematic for a clearcut separation between VIs reflecting one head and those reflecting two heads. Consider for example the distribution of the prefix **ka-** in the schematic transitive agreement paradigm from Belhare in (21) (Bickel, 1995):

(21) **Belhare**

S/O	**1sg**	**Excl:NS**	**Inc:NS**	**2sg**	**2du**	**2pl**	**3sg**	**3:NS**
1sg				-na	-na-chi	-nan-i	-u-ŋ	-u-ŋ-chi-ŋ
Excl:Du							-ch-u-ŋa	
Excl:Pl						-na-chi-ŋa	-u-m-ma	-u-m-chi-ma
Incl:Du							-ch-u	
Incl:Pl							-u-m	-u-m-chi-m
2sg	**ka-** -ga	maʔi- -ga					-u-ga	-u-chi-ga
2du	**ka-** -chi-ga	maʔi- -chi-ga					-ch-u-ga	
2pl	**ka-** -i-ga	maʔi- -i-ga					-u-m-ga	-u-m-chi-m-ga
3sg	mai-	maʔi-	**ka-**	N- -ga	N- -chi-ga	N- -i-ga	-u	-u-chi
3du	ma-ŋ- -chi	maʔi- -chi	**ka-ŋ-** -chi				N- -ch-u	
3pl	ma-ŋ-		**ka-ŋ-**				N- -u	N- -u-chi

ka- appears in exactly two environments, when the subject is 2nd and the object 1st person, and when the subject is 3rd and the object 1st person inclusive. Making the standard assumption that 1st person inclusive is [+1+2], we can write the two VIs in (22) to account for this distribution:

(22) **Ambiguous Inclusive in Belhare (Bickel, 1995)**

ka$_1$-	↔	[+Acc +1] / [___ +2]	(incl. obj.)
ka$_2$-	↔	[+Acc +1] /___ [+2]	(2nd person obj.+1st person subj.)

However, assuming two VIs for **ka-** clearly misses a striking generalization: In both cases, **ka-** expresses the same morphosyntactic features ([+Acc, +1]) in the same context (+2). What forces us to stipulate two VIs is the fact that these features are part of the same head in the contexts captured by **ka$_1$**, and distributed among two heads in the cases captured by **ka$_2$**. I will call markers of this type 'ambiguous exponents' since they are 'ambiguous' between a representation involving one head and another one which involves two heads. Below I will develop a representation which allows to capture ambiguous exponents such as **ka-** by a single VI subsuming both types of contexts.

A similar case is found in a second Khiranti language, Dumi (van Driem, 1993). In Dumi, the so-called marked-scenario prefix **a-** occurs in "all scenarios involving a first or second person actant except those with a first person agent or subject." (van Driem, 1993:123). (23) shows schematically the contexts where **a-** appears:

(23) **The Dumi Marked Scenario Affix**

a-	–
2 ➔ 1	1 ➔ 2
3 ➔ 1	1 ➔ 3
3 ➔ 2	3 ➔ 3
2 ➔ 3	1
2	3

Under the system of person features developed in Trommer (2005), this distribution can be accounted for by the two VIs in (24), as shown in (25), all Dumi forms marked by **a-** either have the feature combinations [+Nom –1] and [–3] in the subject agreement head matching (24-a) or the combination [+Nom –1] in the subject and the feature [–3] in the object agreement head matching (24-b). The constellations not marked by **a-** either do not contain all three features or contain them in a combination such that +Nom and –1 are not part of the same feature structure, as in the case of 1 ➔ 2 forms. In

the syntactic heads in (25) the features targeted by the substantive features of **-e** are underlined and those targeted by its context features are shaded:

(24) **VIs for the Marked Scenario Affix**

a. $\mathbf{a_1}$**-** ↔ [+Nom –1] / [___ –3]
b. $\mathbf{a_2}$**-** ↔ [+Nom –1] / ___ [–3]

(25) **The Dumi Marked Scenario Affix**

marked		**unmarked**	
2 ➔ 1	[+Nom –1 –3][+Acc +1 –3]	**1 ➔ 2**	[+Nom +1 –3][+Acc –1 –3]
3 ➔ 1	[+Nom –1 +3][+Acc +1 –3]	**1 ➔ 3**	[+Nom +1 –3][+Acc –1 +3]
3 ➔ 2	[+Nom –1 +3][+Acc –1 –3]	**3 ➔ 3**	[+Nom –1 +3][+Acc –1 +3]
2 ➔ 3	[+Nom –1 –3][+Acc –1 +3]	**1**	[+Nom +1 –3]
2	[+Nom –1 –3]	**3**	[+Nom –1 +3]

Thus again we have to stipulate again two different VIs for contexts characterized by the same features contained in some cases in one head and in others across different heads.

If MDM is right in assuming that impoverishment is zero exponence, we expect that there should also be cases where zero exponence is ambiguous in the same way as overt markers such as **ka-** and **a-**. Indeed Müller (2005) reports a case of impoverishment from Sierra Popoluca which has exactly the same formal properties as the affixes discussed so far. Sierra Popoluca has ergative agreement for crossreferencing possessors on nouns and agreement with subject and object in a standard ergative/absolutive fashion. According to Müller (2005), agreement is expressed by the following (overt) vocabulary items:

(26) **VIs for Sierra Popoluca**

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

In forms with a single agreement head, i.e. possessor agreement and intransitive verbal subject agreement, the [–1] affix **i-** is suppressed in only one context: if the agreement head is 3rd person absolutive (–1 –2 –v).[7]

(27) **Sierra Popoluca Single Agreement Forms**

Absolutive	
[+1–2–v]	a
[+1+2–v]	t-a
[–1+2–v]	m-i
[–1–2–v]	Ø

Ergative	
[+1–2+v]	a-n
[+1+2+v]	t-a-n
[–1+2+v]	i-n
[–1–2–v]	i

Additionally, **i-** and hence [–1] is also suppressed in absolutive agreement heads of transitive verbs if the feature [–2] is present not in the object (absolutive) agreement head itself, but in the adjacent subject (ergative) agreement head:

(28) **Sierra Popoluca Transitive Forms**

Absolutive	Ergative	
[+1–2–v]	[–1+2+v]	a-n-Ø
[–1+2–v]	[+1–2+v]	m-a-n-Ø
[–1–2–v]	[–1–2+v]	i-Ø
[–1–2–v]	[+1–2+v]	a-n-Ø
[–1–2–v]	[+1+2+v]	a-n-Ø
[–1–2–v]	[–1+2+v]	i-n-Ø
[+1–2–v]	[–1–2+v]	a-Ø
[+1+2–v]	[–1–2+v]	a-Ø
[–1+2–v]	[–1–2+v]	m-i-Ø

As in the cases of overt ambiguous exponents, zero realization of [–1] in Sierra Popoluca while clearly systematic in all cases has to be captured by more than one VI under standard notation. The Sierra Popoluca data require even four different VIs since the three involved features can be distributed among two heads in a big variety of ways:[8]

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[7] Müller uses the feature [+/–v] to distinguishes absolutive ([–v]) and ergative case ([+v]) which reflects the assumption that ergative is associated to the little v head.

[8] I will not address the question here why in forms with more than one instance of the feature [–1] only one is deleted and the other surfaces as **i-**. It might be the case

(29) **Zero VIs for Impoverishment in Sierra Popoluca**

a. Ø ↔ [–1] /___ [–2–v]
b. Ø ↔ [–1] /[___ –2–v]
c. Ø ↔ [–1] /[___ –v] [–2]
d. Ø ↔ [–1] /[___ –2] [–v]

In the following, I will develop a new notation for context specifications which allows to capture ambiguous exponents by single VIs, and also involves a more concise characterization of 'standard' cases of context sensitivity. (30) shows the syntax and semantics of a VI which is sensitive to features of a second head. P stands for the phonological features of the VI, $F_1 \dots F_m$ are the features the VI realizes, and $C_1 \dots C_n$ are the context features:

(30) **New Notation for VI Contexts: Sensitivity to Another Head**

$P \leftrightarrow F_1 \dots F_m \ / \ [C_1 \dots C_n]$ — $F_1 \dots F_m$ are realized by P in the context of $C_1 \dots C_n$ where $F_1 \dots F_m$ is in Head H_1, $C_1 \dots C_n$ are in head H_2 and $H_1 \neq H_2$

The notation for VIs exhibiting context sensitivity inside the same head differs only by the omission of square brackets for the context features:

(31) **New Notation for VI Contexts: Sensitivity to the same Head**

$P \leftrightarrow F_1 \dots F_m \ / \ C_1 \dots C_n$ — $F_1 \dots F_m$ are realized by P in the context of $C_1 \dots C_n$ where $F_1 \dots F_m$ is in Head H_1, $C_1 \dots C_n$ are in head H_2 and $H_1 = H_2$

VIs whose context specification is variably sensitive to features of the same head or an adjacent head are written with curly brackets around the context features. Note that the semantic characterization of this notation does not contain any disjunction. It just leaves unspecified whether the head includ-

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that, as Müller (2005) suggests for impoverishment, ambiguous context sensitivity blocks multiple insertion of the same VI in the domain visible to context restrictions, but it is also possible that more general blocking of identical VIs in a local domain, as discussed in Nevins (2006) for phonologically visible elements, is at work here.

ing the features realized by the VI and the context features are part of the same head or not:

(32) **New Notation for VI Contexts: Ambiguous Sensitivity**

$P \leftrightarrow F_1 \ldots F_m \ / \ \{C_1 \ldots C_n\}$ $F_1 \ldots F_m$ are realized by P in the context of $C_1 \ldots C_n$ where $F_1 \ldots F_m$ is in Head H_1, and $C_1 \ldots C_n$ are in head H_2

To avoid the unnatural possibility that the very same features acts as a substantive feature and as a context feature for a single insertion of the same VI, I assume that all notations are subject to the condition in (33), which will become important in section 5:

(33) **General Condition on the Interpretation of Context Specifications:**
$Ref(F_1 \ldots F_m) \not\cap Ref(C_1, \ldots, C_n)$

(34) shows the unified representations for the ambiguous exponents discussed above following the notation defined in (32):

(34) **VIs for Ambiguous Exponents**

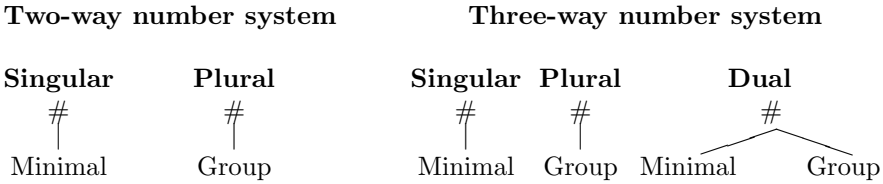
a. **Belhare:** ka- ↔ [+Acc +1] / {+2}
b. **Dumi:** a- ↔ [+Nom –1] / {–3}
c. **Sierra Popoluca:** Ø ↔ [–1] /{–2} {–v}

Note finally a subtle point implicit in the definitions above: For insertion of a VI it is irrelevant whether substantive and contextual features are in the same head, but it is crucial that all substantive features of a VI are in the same head, and the same is true for the contextual features inside a pair of curly brackets. Thus Dumi **a-** cannot be inserted into a [+Nom +1] head even though it is adjacent to a [–1–3] head. On the other hand, Sierra Popoluca **Ø** can be inserted into a head which is [–1 –2 +v] and adjacent to a [+1+2–v] head, since here the two features of the context specification (–2 and –v) are not required to be part of the same feature structure by the context of the VI.

4. The Representation of Number

Harley and Ritter (2002) argue based on a study of over 100 languages for a feature system where number is represented as in (35):

(35) **Representation of Number in Harley & Ritter (2002)**



In this system, there is a generic number node (#) which dominates up to two privative features,[9] where 'Minimal' is characteristic for minimal sets of entities (in the default a singleton set, hence singular) and 'Group' for non-singleton sets of entities (in the default case plural). Dual results from the combination of 'Minimal' and 'Group' since a two-member set is the minimal non-singleton set. Among other advantages, this feature geometry captures Greenberg's universal 34 which states that languages do not have dual if they do not have a plural number (Greenberg, 1963) and allows a straightforward account of the famous 'constructed dual' in Hopi, where dual subjects trigger the same morphology on the subject itself which is found with plural subjects, while verbs realize agreement with dual subjects in the same way as agreement with singular subjects (Corbett, 2000):

(36) **Constructed Dual in Hopi (Corbett, 2000)**

a. **Singular**	b. **Plural**	c. **Dual**
Pam wari	Puma yuʔtu	Puma wari
that ran(sg.)	those ran(pl.)	those ran(sg.)
'He/she ran'	'They (pl.) ran'	'They (du) ran'

However, Cowper (2003) points out a conceptual shortcoming of Harley & Ritter's approach: Minimal is assumed to be the unmarked interpretation of a bare number node not dominating any features, but at the same time Minimal is marked if it cooccurs with Group in languages with a dual category. To solve this problem, Cowper proposes an alternative geometry which retains the advantages of the Harley & Ritter system, but associates languages with a three-way number system with a single additional feature which is assumed not to occur in languages with a two-way number system:

[9] Harley and Ritter (2002) call this node 'Individuation'. I abbreviate it here as '#' following Bejar (2003) and Cowper (2003).

(37) **The Representation of Number in Cowper (2003)**

a. Two-way number system

Singular	**Plural**
#	#
	|
	>1

b. Three-way number system

Singular	**Dual**	**Plural**
#	#	#
	|	|
	>1	>1
		|
		>2

In (37) the interpretation of geometric structure is context-dependent. Thus exactly the same tree denotes plural in a language with a two-way number system, and dual in a language with a three-way number system. While Cowper makes the mechanism which generates this context sensitivity not completely explicit, it can be conceptualized as follows. Assume that the semantics of a feature-geometric tree is completely determined by terminal elements (nodes which do not dominate any other nodes). Then the semantics of the single features in Cowper's system can be stated as in (38):

(38) **Semantic of Single Features in Cowper (2003)**

Structures with terminal		**denote sets of cardinality**
#	⇔	1 2 more
>1	⇔	2 more
>2	⇔	more

For a two-way number system this leads to the base denotations in (39):

(39) **Base Denotations in a Two-way Number System**

Structures		**denote sets of cardinality**
#	⇔	1 2 more
# – >1	⇔	2 more

The two structures in (39) have now overlapping interpretations: both can denote sets of cardinality 2 or more. I assume that contextualized meanings result from the rule in (40) which removes 'redundant' denotations according to specificity:

(40) **Contextualization:** Remove all denotations D for a feature tree T if the language licenses at least one feature tree T' such that T is a proper subtree of T' and D is also in the denotation of T'

Applied to (40), Contextualization deletes the denotations '2' and 'more' for the tree containing only the bare '#' since it is a proper subtree of the more complex tree and the latter also contains the same denotations. As required, the denotation of bare '#' is now restricted to singleton sets (singular):

(41) **Contextualized Denotations in a Two-way Number System**

Structures		**denote sets of cardinality**
#	⇔	1 ~~2~~ ~~more~~
# – >1	⇔	2 more

In a three-way number system, one additional tree structure is licensed leading to additional overlap in the respective denotations:

(42) **Base Denotations in a Three-way Number System**

Structures ...		**denote sets of cardinality** ...
#	⇔	1 2 more
# – >1	⇔	2 more
# – >1 – >2	⇔	more

Here, the tree # – >1 overlaps for the denotation 2 with the most complex tree. Since the first is a subtree of the latter, 2 is deleted from the denotations for # – >1 in addition to the deletions for the bare # tree and we get the contextualized denotations in (43):

(43) **Contextualized Denotations in a Three-way Number System**

Structures		**denote sets of cardinality**
#	⇔	1 ~~2~~ ~~more~~
# – >1	⇔	2 ~~more~~
# – >1 – >2	⇔	more

What I propose here is to retain Cowper's mechanism of contextual interpretation for number categories and the geometric structures she assumes, but to simplify further the system of number features. More specifically I argue that it is possible to replace Cowper's three-feature system by one where there is only 1 number feature (or number element) symbolized by '•'. This results in the number systems in (44). I will call this system the 'Iconic Theory of Number' since it implies that the denotation of a number category roughly corresponds to the number of instances the number element occurs in the corresponding feature tree.

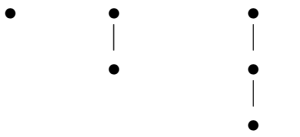
(44) **Number Categories in the Iconic Theory of Number**

a. Two-way number system

Singular **Plural**

b. Three-way number system

Singular **Dual** **Plural**



Instead of assigning a fixed interpretation to the number element itself, I make the null assumption that feature geometries are by default assigned the full array of possible number denotations (i.e. sets of cardinality 0, 1, 2, ...). I assume further that these denotations are organized in a stack of the form in (45):

(45) **Universal Number Stack:** 0 ➔ 1 ➔ 2 ➔ more

The semantics of • is now a function which takes a denotational number stack and removes the highest element on the stack resulting in the base denotations in (46):[10]

(46) **Base Denotations in the Iconic Theory of Number**

Structures		**denote sets of cardinality**
•	⇔	1 2 more
•–•	⇔	2 more
•–•–•	⇔	more

Contextualization now applies in exactly the same way as in Cowper's system as is shown in (47) for a two-way, and in (48) for a three-way number system:

(47) **Contextualized Denotations in a Two-way Number System**

Structures		**denote sets of cardinality**
•	⇔	1 ~~2~~ ~~more~~
•–•	⇔	2 more

[10] Under the assumption that every well-formed tree of Φ-features contains at least one number element, this system derives the fact that no language has a 'nullular', a number category specifying empty groups or sets.

(48) **Contextualized Denotations in a Three-way Number System**

Structures		**denote sets of cardinality**
•	⇔	1 ~~2 more~~
•–•	⇔	2 ~~more~~
•–•–•	⇔	more

As Harley & Ritter's and Cowper's approach, the iconic number system provides a straightforward account of Greenberg's universal 34. Under the natural assumption that a language allows a geometric structure G only if it also allows any proper subtree of G, a dual interpretation in a language can only arise if there is also a structure which will be interpreted as plural. The Iconic Theory of Number also allows a simple analysis of the constructed plural in Hopi.[11] The relevant data from (36) are repeated in (49):

(49) **Number in Hopi (Corbett, 2000)**

a. **Singular**
Pam wari
that(sg.) ran(sg.)
'He/she ran'

b. **Plural**
Puma yuʔtu
that(pl.) ran(pl.)
'They ran'

c. **Dual**
Puma wari
that(pl.) ran(sg.)
'They (two) ran'

A maximally parsimonious account is based on the VIs in (50) which assumes that the different forms of pronouns and verbs in (49) are due to suppletive allomorphy where the number heads themselves are not realized. The pronoun ([D]) is realized as **puma** if the number head contains at least two number elements. Otherwise [D] is realized as **pam**. The verb form **yuʔtu** is restricted to plural contexts (•–•–•). Therefore the default realization of the verb occurs in dual and singular forms:

(50) **VIs for Number Marking in Hopi**

puma ↔ [D] / [•–•]
pam ↔ [D]

yuʔtu ↔ [V] / [•–•–•]
wari ↔ [V]

[11] The following analysis basically translates the analysis from (Cowper, 2003) into the Iconic Theory of Number.

(51) shows explicit derivations for the corresponding sentences in (49). In the singular only the default VIs for D and V can be inserted because all other markers require contexts with more number elements. In the plural **puma** is inserted into D since its context specification (•–•) subsumes •–•–•. In the V position, **yuʔtu** wins because it perfectly matches the plural context. Finally, in the dual **puma** wins for D (again a perfect match), and in the V position only default **wari** is possible because **yuʔtu** requires the more specific •–•–•.

(51) **Derivation of Number Marking in Hopi**

Singular

[D] [•]		[V] [•]	
/Ø/ [•]	pam	/Ø/ [•]	wari

Plural

[D] [•–•–•]		[V] [•–•–•]	
/Ø/ [•–•–•]	puma	/Ø/ [•–•–•]	yuʔutu

Dual

[D] [•–•]		[V] [•–•]	
/Ø/ [•–•]	puma	/Ø/ [•–•]	wari

5. Constructed Plural in Nocte

Combining the representational advances made in sections 3 and 3 we are now in a situation to capture plural insertion by nothing else than vocabulary insertion. The basic idea is that two singular number elements from different heads (i.e. two singular agreement heads) have the same spellout as a tree containing two number elements from a single head (one plural agreement head) since an ambiguous context restriction of a specific VI does not distinguish between the two constellations. Section 5.1 develops the core analysis for plural insertion in Nocte, and section 5.2 extends the account to a full analysis of the basic intransitive and transitive agreement patterns of the language.

5.1. Accounting for the Basic Facts

(52) shows the basic set of VIs I assume for Nocte. (53) (repeated from (15)) shows where these markers occur in intransitive forms:

(52) **Vocabulary Items**

a. -e ↔ [+1 •] / {–3 •}
b. -an ↔ [+2 •–•]
c. -ang ↔ [+1]
d. -o ↔ [+2]
e. -a ↔ [+3]

(53) **Nocte Intransitive Forms**

	Sg	**Pl**
1	rang-ka-**ang**	rang-ka-**e**
2	rang-ka-**o**	rang-ka-**an**
3	rang-ka-**a**	

Since Nocte is a two-way number system, the 2pl marker **-an** just contains a subtree with two number elements. However, the representation for the 1pl marker **-e** is slightly more complex: Besides +1, **-e** realizes a number element in the context of another number element. (54) shows why **-e** is inserted into the feature structure of the agreement head for 1pl, but not in the one for 1sg:

(54) **Insertion of 1pl -e**

1sg

		[+1 –2 –3 •]
-e	↔	[**+1** •] / {–**3** •}
✔ -ang	↔	[+1]

1pl

		[+1 –2 –3 • – •]
✔ -e	↔	[**+1** •] / {–**3** •}
-ang	↔	[+1]

Thus in the 1pl head, one number element of the structure •– • counts as substantive feature and the other one as a context feature. Crucially, in the 1sg head the single number element cannot be targeted as substantive and context feature at the same time since this is excluded by the condition in (33).

(55) shows now that **-e** must also be inserted into 1sg ➔ 2sg forms even though there is no 1pl head. Here the substantive features of the VI are part of the subject agreement head, and the context features part of the object agreement head.

(55) **Nocte Plural Insertion as Constructive Number**

1	**➔**	**2**				
[Nom –3–2+1 •]		[Acc–3+2–1•]	✔-e	↔	[**+1** •] / {–**3** •}
[Nom –3–2~~+1~~•]		[Acc+3–2–1•]	-ang	↔	[+1]

Importantly, no feature insertion of any kind is taking place. Instead, different features already present in the syntax in different heads are interpreted by the morphology in a way which makes them appear non-distinct to a combination of features in the same head. This mechanism can hence be viewed as a new type of constructed number comparable to the Hopi case (see section 4).

5.2. Full Analysis of Nocte Agreement

While intransitive agreement in Nocte can be straightforwardly derived from the VIs in (52) and the Elsewhere Principle, Nocte transitive agreement involves two complications which partially interfere with the analysis of 'plural insertion': direction marking and hierarchy-based competition. In this section I will provide a full analysis of all transitive forms to show that the account developed in 5.1 extends naturally to the entire agreement system of the language.

The Nocte affix **-h** is often cited in the literature as a prototypical inverse marker (e.g. Aissen, 1999). The term inverse implies that natural languages tend to categorize transitive predications into natural and unnatural cases. If inherent prominence hierarchies such as 1st ≻ 2nd ≻ 3rd person and the hierarchy of grammatical functions (Subject ≻ Object ≻ ...) are not aligned in a clause, i.e. what is higher on one hierarchy is lower on the other, this counts as unnatural and might be signaled by an inverse marker on the verb. This is for example the case if the subject is 3rd and the object 1st person. If both hierarchies are aligned, this results in a natural or 'direct' constellation which remains unmarked (as in Nocte) or is indicated by a specific inverse marker (e.g. in Algonquian). (56) shows that the distribution of Nocte **-h** fits perfectly into this picture:

(56) **Nocte Transitive Forms: Inverse Marking**

	Direct	**Inverse**	
1sg ➔ 2sg	hetho-e	hetho-**h**-ang	**2sg ➔ 1sg**
	teach-1pl	teach-**Inv**-1sg	
1sg ➔ 3sg	hetho-ang	hetho-**h**-ang	**3sg ➔ 1sg**
	teach-1sg	teach-**Inv**-1sg	
2sg ➔ 3pl	hetho-o	hetho-**h**-o	**3sg ➔ 2sg**
	teach-2sg	teach-**Inv**-2sg	

A simple way to implement the intuition that **-h** marks misalignment of prominence emerges if person categories are decomposed into more atomic person features: It turns out that in all and only the cases where **-h** appears, subject agreement has the feature [–1] and object agreement the feature [–3]:

(57) **Common Features of Inverse Configurations**

	Direct			**Inverse**		
	Subj	**Obj**		**Subj**	**Obj**
1 ➔ 2	[+1-2–3]	[–1+2–3]	**2 ➔ 1**	[–1+2–3]	[+1–2–3]
1 ➔ 3	[+1-2–3]	[–1–2+3]	**3 ➔ 1**	[–1–2+3]	[+1–2–3]
2 ➔ 3	[–1+2–3]	[–1–2+3]	**3 ➔ 2**	[–1–2+3]	[–1+2–3]

This means that the distribution of **-h** can simply be captured by the VI in (58). Since [–1] (2nd and 3rd person) comprises hierarchically low person categories compared to 1st person, and [–3] (1st and 2nd person) hierarchially high categories, this marker directly encodes that the grammatical functions – here indicated by abstract case features - are inversely linked to the person hierarchy:

(58) **VI for Inverse Marking**

-h ↔ [-1 Nom] / [–3 Acc]

The second complication for an analysis of Nocte agreement is the fact that apart from **-h**, transitive agreement in the language iss not consistently with subject or object (or both). Instead agreement is only with the argument which is higher on the person hierarchy 1st ≻ 2nd ≻ 3rd person. Thus for example, 1 ➔ 3 and 3 ➔ 1 forms both exhibit agreement with the 1st person argument, and suppress agreement with the 3rd person argument. The corresponding forms are only distinguished by the inverse marker **-h**:

(59) **Nocte Transitive Forms: Hierarchy-based Competition**

1 ➔ 2	⇒	1	⇐	**2 ➔ 1**	-ang/-e
1 ➔ 3	⇒	2	⇐	**3 ➔ 1**	-ang
2 ➔ 3	⇒	3	⇐	**3 ➔ 2**	-o

Systems of this type are called 'hierarchy-based competition' in (Trommer, 2006a,b) since it appears that features of different agreement heads compete for a single morphological position and competition is resolved by prominence hierarchies.[12] For the Nocte data, I propose to shift perspective and to treat the phenomenon not as a competition process, but as direct suppression of features with lower prominence in the context of a head with higher-prominence features This idea is captured by the two zero VIs in (60), which delete 3rd and 2nd person in the context of a [–3] argument ([–3] in (60-b) amounts to [+1] because there are no 2 ➔ 2 predications in Nocte):

(60) **Hierarchy-based Competition: VIs**

a. Ø ↔ [+3] / [–3]
b. Ø ↔ [+2] / [–3]

The list of VIs for Nocte hence extends to the following:

(61) **Extended List of VIs**

a. -h ↔ [–1 Nom] / [–3 Acc]
b. -e ↔ [+1 •] / {–3 •}
c. Ø ↔ [+3] / [–3]
d. Ø ↔ [+2] / [–3]
e. -an ↔ [+2 ••]
f. -ang ↔ [+1]
g. -o ↔ [+2]
h. -a ↔ [+3]

(62) shows the derivation of a 3sg ➔ 1sg form involving both, the inverse marker and hierarchy-based competition. I assume that subject agreement is closer to the verb root than object agreement. Since vocabulary proceeds cyclically, VIs for subject agreement are generally inserted before those for object agreement. **-h** is inserted into the subject agreement head since the

[12] These phenomena are also studied in detail by Bejar (2003) under the heading 'context-sensitive agreement'.

subject is [–1] and the object provides a [–3] context. The impoverishment rule bleeds insertion of **-a** ↔ [+3] since it is more specific. The only additional VI which can be inserted is **-ang** the horizontal lines mark the transition of Vocabulary insertion from the first to the second head):

(62) **Hierarchy-based Competition: Derivation**

3	**➔**	**1**				
[Nom +3–2–1]		[Acc–3–2+1]	-h	↔	[–1 Nom]	/ [–3 Acc]
[Nom +3–2–1]		[Acc–3–2+1]	Ø	↔	[+3]	/ [–3]
[–2]		[Acc–3–2+1]	-ang	↔	[+1]	
[–2]		[Acc–3–2+1]				

A final complication arises with 2sg/pl ➔ 1sg forms which amounts to the feature structures in (63) (for 2sg ➔ 1sg): According to (62), we expect insertion of **-e** because this is just the mirror image of 1sg ➔ 2sg forms where **-e** is inserted, and **-e** is not marked for case.

(63) **2sg ➔ 1sg:** [Nom –1 +2 –3 •][Acc +1 –2 –3 •]

However, this prediction is incorrect, since 2sg ➔ 1sg forms are marked by **-ang**, not by **-e** (64-a). Restricting the vocabulary item for **-e** further such that **-e** only matches nominative [+1] heads is not an option since **-e** spells out object agreement in 2 ➔ 1pl forms (64-b):

(64) **2 ➔ 1 Forms**

a. hetho-h-ang 'you (sg.) teach me'
   teach-Inv-1sg
b. hetho-h-e 'you (pl.) teach me'
   teach-Inv-1pl

I solve this problem by the additional zero VI in (65-a) which deletes a number element in the same head as the features +1 and Acc and with the additional context restriction to [–3 •] in an adjacent head. This completes the list of VIs necessary to account for Nocte transitive agreement:

(65) **Full List of VIs**

a. **Ø** ↔ **[•] / +1 Acc [–3 •]**
b. -h ↔ [–1 Nom] / [–3 Acc]
c. -e ↔ [+1 •] / {–3 •}
d. Ø ↔ [+3] / [–3]
e. Ø ↔ [+2] / [–3]
f. -an ↔ [+2 ••]
g. -ang ↔ [+1]
h. -o ↔ [+2]
i. -a ↔ [+3]

Since 1 ➔ 1 clauses are independently excluded by binding-theoretic constraints, (65-a) may only be inserted in 2 ➔ 1 predications. (66) shows the derivation for a 2sg ➔ 1sg form. (65-a) bleeds the VI for **-e** since it is more specific and leaves only one number element behind, while **-e** requires two. **-h** and **-ang** spell out the remaining person features:

(66) **Derivation for 2sg ➔ 1sg**

2sg	**➔**	**1sg**			
[Nom –3+2–1•]		[Acc–3–2+1•]	-h	↔	[–1 Nom] / [–3 Acc]
[~~Nom~~ –3+2~~–1~~•]		[Acc–3–2+1•]	Ø	↔	[+2] / [–3]
[–3~~+2~~ •]		[Acc–3–2+1•]	Ø	↔	[•] / +1 Acc {–3 •}
[–3 •]		[Acc–3–2+1~~•~~]	-ang	↔	[+1]
[–3 •]		[Acc–3–2~~+1~~]			

While deletion of one number element also happens in 2 ➔ 1pl forms this still leaves one number element in the object agreement head intact to license insertion of **-e**:[13]

[13] I assume here that every VI V can only be inserted once in a head H even if H contains more than one instance of a feature F which would license insertion of V. This follows without stipulation from the computational model of vocabulary insertion in Trommer (1999) where for every head the list of VIs is run through only once to check whether insertion is possible. Hence this restriction ultimately follows from economy considerations. There is also additional empirical support that this is the right move: Otherwise we would expect (unattested) number systems where plural is marked by two instances of the same marker used in the singular.

(67) **Derivation for 2sg ➔ 1pl**

2sg	**➔**	**1pl**	
[Nom –3+2–1•]		[Acc–3–2+1•–•]	-h ↔ [–1 Nom] / [–3 Acc]
[~~Nom~~ –3+2–~~1~~•]		[Acc–3–2+1•–•]	Ø ↔ [+2] / [–3]
[–3~~+2~~ •]		[Acc–3–2+1•–•]	-e ↔ [+1 •] / {–3 •}
[–3+2 •]		[Acc–3–2~~+1~~•–•]	Ø ↔ [•] / +1 Acc {–3 •}
[–3~~+2~~ •]		[Acc–3–2 •]	

Finally, in 1sg ➔ 2sg forms, (65-a) is not inserted since there is no [+1 Acc] head, and neither (65-b) because the subject agreement head is not [–1]. Hence **-e** is inserted as discussed above:

(68) **Full derivation for 1sg ➔ 2sg**

1sg	**➔**	**2sg**	
[Nom –3–2+1•]		[Acc–3+2–1•]	-e ↔ [+1 •] / {–3 •}
[Nom –3–2~~+1~~•]		[Acc–3+2–1•]	Ø ↔ [+2] / [–3]
[Nom –3–2]		[Acc–3~~+2~~–1•]	

6. Summary

In this paper I have shown that 'plural insertion' in Nocte, i.e. the appearance of plural morphology in transitive contexts involving only singular arguments, can be captured without postsyntactic rules which insert syntactically unmotivated features. This is achieved by independently motivated refinements in the representation of number features and vocabulary entries. Future research will investigate whether this account carries over to all cases of plural insertion. An important typological prediction of the approach developed here is that apparently unmotivated plural morphology for a specific head should always be triggered by other heads also specifying Φ−features since ambiguity of exponence involving plural requires an additional adjacent number element.

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