

SURFACE CONSTRAINTS AND AGREEMENT RESOLUTION:  
SOME EVIDENCE FROM XHOSA<sup>1</sup>

Erhard Voeltz  
Department of Linguistics  
Indiana University

1. Introduction

It is the task of a grammar to separate the grammatical sentences of a language from the ungrammatical ones. In Chomsky [1965] this task was performed partly by transformations which acted as filters to screen prospective sentences. Recently it has been shown that the filtering function of the transformations is not always enough to predict the grammaticality of the sentences of a given language. In Spanish, for example, Perlmutter [1970] has shown that the placement and order of clitics cannot be predicted by the Chomsky model but must be determined by a surface constraint. Lakoff [1970] has gone even further in arguing that the traditional function of the transformations of relating individual or successive phrase markers (and thus stating the grammaticality of sentences) must be modified or extended to global rules, which permit reference to non-contiguous phrase markers, over parts or the entire derivation.

In the present paper I wish to argue that some constraints on grammaticality need to be even further removed from the transformations to apply after certain, late phonological rules have applied. To this effect I will consider data arising from problems in gender conflict resolution in the concord of conjoined noun phrases in Xhosa, a Bantu language of South Africa.

I will begin by discussing, at length, the data relevant to agreement conflicts in Xhosa. Two possible explanations for the grammaticality of certain sentences containing conjoined NP's of different genders will then be considered. Finally I will propose a post-

---

<sup>1</sup>For the Xhosa data I am indebted to Tiyo Soga. This paper was first presented at the LSA, Summer 1970, under the misleading title, "Conjunction reduction in Xhosa and Zulu." The present version has benefitted from comments from and discussions with Talmy Givón and Charles Bird.

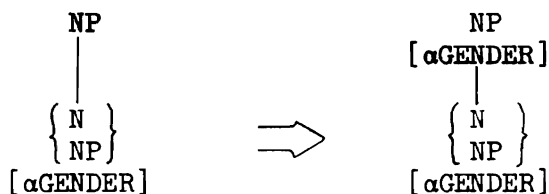
phonological constraint the operation of which will require a serious modification of our notion of 'normal' conditions for lexical insertion.

Givón [1969] has argued that the process of grammatical agreement, both in Bantu languages and universally involves two separate steps:

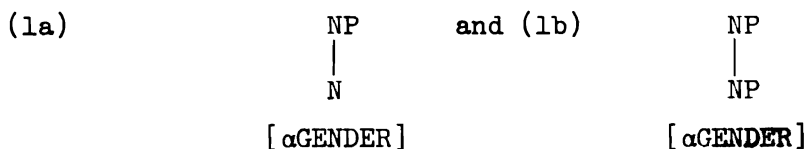
- (i) The transformational process of spreading the features of the nominal onto the verb (or unembedded modifier)
- (ii) the spelling of the agreement features by the second lexicon.

Givón further argues that agreement must be preceded by a universal convention which permits the feature gender (as well as all features of the noun) to 'migrate' upward from the noun and attach themselves to the NP node which dominates it. This convention can be formalized as:

(1) GENDER MIGRATION



Convention (1) is conjunctively ordered so that it applies both to the configuration



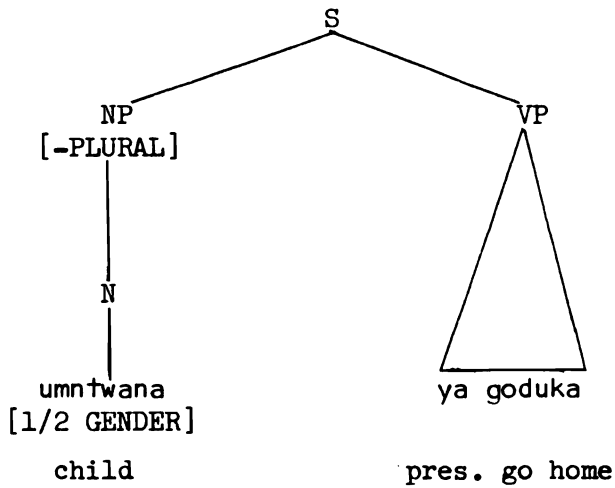
and in that order. (1) must be allowed to apply until all NP nodes dominating the N have been assigned the feature specification  $[\alpha\text{GENDER}]$ , where  $\alpha$  can be either 1, 2, 3, or masculine, feminine, neuter, or 1/2, 5/6, 9/10, etc. as in Bantu languages.<sup>2</sup>

The application of (1) to the structure (2) yields (3) where the feature  $[1/2 \text{ GENDER}]$  has migrated to the top NP:

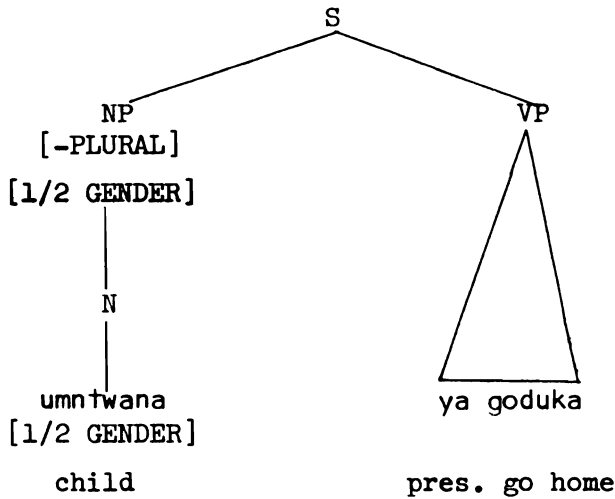
---

<sup>2</sup>It is traditional to label the genders of Bantu languages 1/2, 3/4, etc.

(2)



(3)



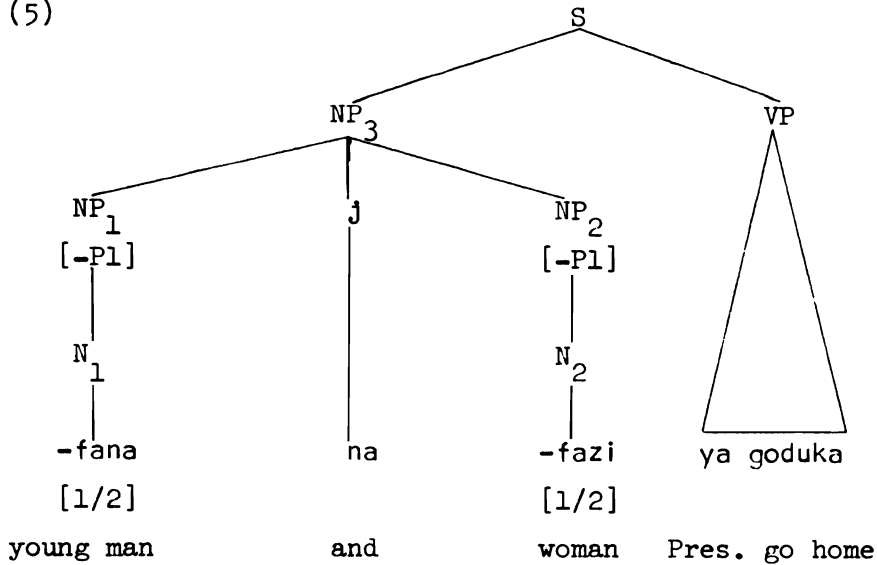
AGREEMENT step (i) copies the features [1/2 GENDER] and [-PLURAL] from the NP of (3) onto the verb, by step (ii) the correct agreement form, u, is spelled out by the second lexicon and ultimately we have the correct sentence (4):

(4) Umntwana uyagoduka  
'The child is going home'

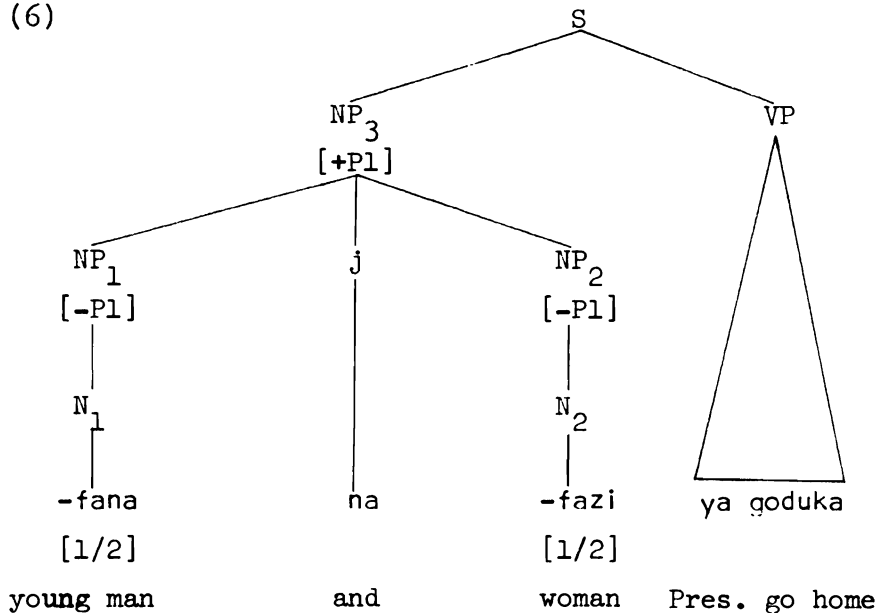
The second convention which is crucial in the operation of agreement is NA (number adjustment). By NA any NP dominating two or more conjoined NP's is automatically assigned the feature [+Pl] to account for the (probably universal) fact that conjoined NP's always govern plural agreement forms or plural pronouns. NA, for example, would

render (5) in which two singular NP's are conjoined as (6) where NP<sub>3</sub> has been marked [+Pl]:

(5)



(6)



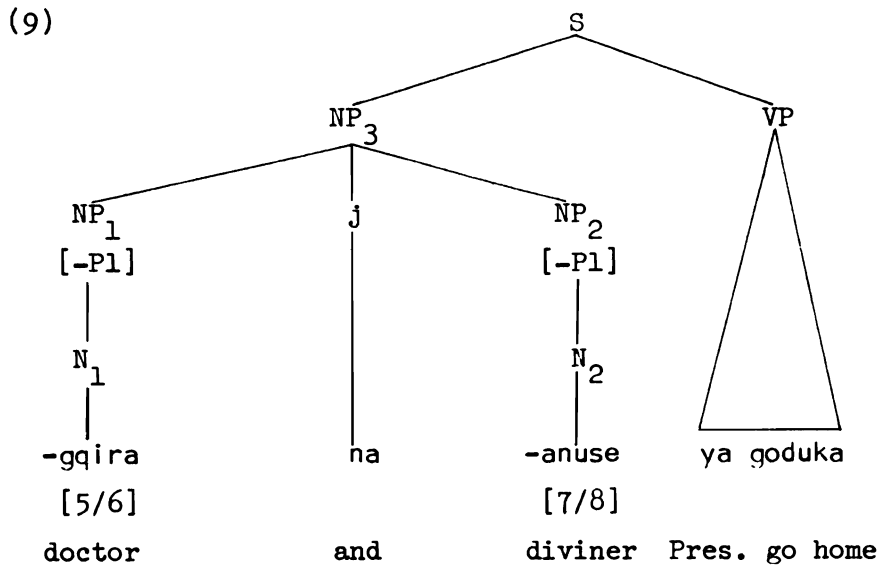
By the application of (1) NP<sub>3</sub> of (6) receives two instances of the feature specification [1/2] since NP<sub>3</sub> dominates both NP<sub>1</sub> and N<sub>1</sub> and NP<sub>2</sub> and N<sub>2</sub> and both of these configurations:



specification. For the present, then, I am assuming that in cases such as (7) where  $NP_3$  has two instances of the same gender specification, [1/2], all but one instance of a given feature specification are deleted by convention. I will return to this issue below.

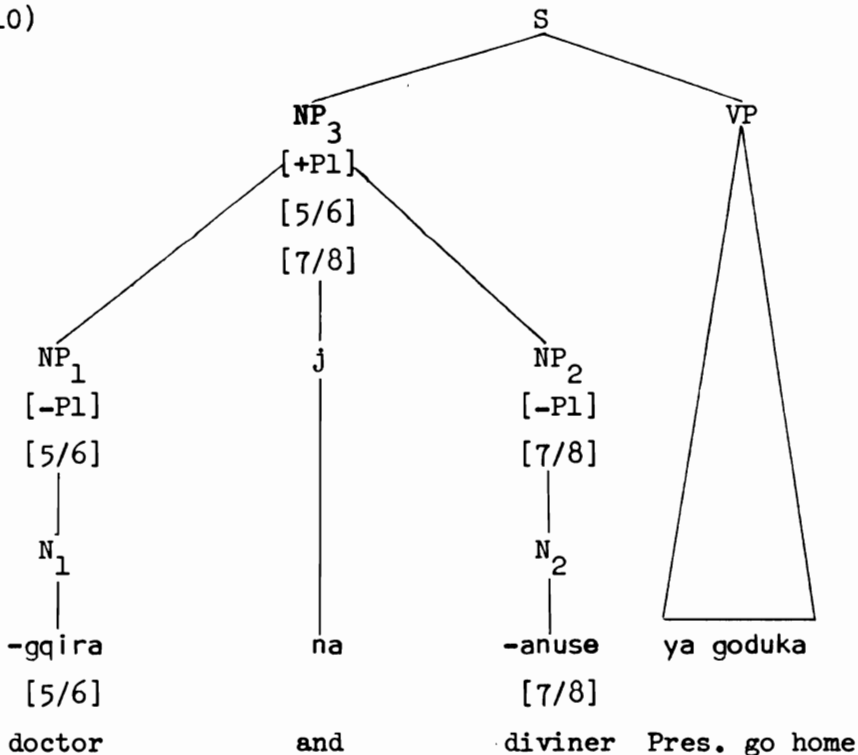
## 2. Some Xhosa data

Consider now the application of (1) to a structure essentially identical to (5) in which two nouns of different genders have been conjoined:



By conventions NA and (1) we obtain:

(10)



The convention reducing identical instances of a feature specification does not apply to NP<sub>3</sub> since the feature specifications are distinct. If step (i) of agreement were allowed to apply to (10) it would copy either of the two gender features, [5/6] or [7/8], from NP<sub>3</sub>. After lexical insertion with either of these features on the verb to trigger the corresponding concord we would have either sentence (11) or (12), both of which are starred.<sup>3</sup>

(11) Iqgira nesanuse \*ayagoduka (with 5/6 concord)

(12) Iqgira nesanuse \*ziyagoduka (with 7/8 concord)

Neither the concord for PLURAL, 5/6, as in (11), nor that for PLURAL, 7/8, as in (12) is grammatical. The only way to express 'The doctor and the diviner are going home' is to extrapose one or the other of the conjoined NP's to the end of the sentence and have the remaining NP control the agreement:

<sup>3</sup>Some speakers accept Iqgira nesanuse bayagoduka (with 1/2 agreement) for (11) and (12).

- (13) Igqira liyagoduka nesanuse  
'The doctor is going home with the diviner'
- (14) Isanuse siyagoduka nigqira  
'The diviner is going home with the doctor'

In pronominalization we can observe the same problem of gender resolution. Thus, while the pronominalization of conjoined nouns of identical genders is fine, as in (15), the pronominalization of nouns of non-identical gender again leads to ungrammatical sentences, (16) and (17).

- (15) Ndibona bona (i.e. umfana nomfazi)  
          [1/2]           [1/2]   [1/2]  
'I see them' (i.e. the young man and the woman)
- (16) \*Ndibona wona (i.e. igqira nesanuse)  
          [5/6]           [5/6]   [7/8]  
'I see them' (i.e. the doctor and the diviner)
- (17) \*Ndibona zona (i.e. igqira nesanuse)  
          [7/8]           [5/6]   [7/8]  
'I see them' (i.e. the doctor and the diviner)

In fact in Xhosa it is not possible to resolve agreement conflict of conjoined nouns of different genders so that:

#### Constraint X on conjunction

All sentences containing conjoined NP's of different genders involving agreement or pronominalization are starred.

There are two types of exceptions to this constraint. The first arises from all of those cases where the phonological form of the pronoun for the conjoined nouns happens to be the same. This applies, as evident from Table 1, below, in the spurious case of genders 1/2 and 1a/2a, where both the pronoun and each of the agreement forms are identical, and in the plurals of gender 7/8, 11/10 and 9/10 where the pronoun *zona* is shared and the secondary (weak) concord is identical. If genders 1/2 and 1a/2a are to be considered different at some point in the grammar, then in (18) and (19), with secondary and primary concord



XHOSA PRONOUNS AND ADJECTIVAL CONCORDS

GENDERS		PRONOUNS		ADJECTIVAL CONCORD			
<u>sg</u>	<u>pl</u>	<u>sg</u>	<u>pl</u>	secondary		primary	
<u>sg</u>	<u>pl</u>	<u>sg</u>	<u>pl</u>	<u>sg</u>	<u>pl</u>	<u>sg</u>	<u>pl</u>
1	2	yena	bona	u	ba	m	ba
1a	2a	yena	bona	u	ba	m	ba
3	4	wona	yona	u	i	m	mi
5	6	lona	wona	li	a	li	ma
7	8	sona	zona	si	zi	si	zi
9	10	yona	zona	i	zi	in	zin
11	10	lona	zona	lu	zi	lu	zin
14		bona		bu		bu	
15		kona		ku		ku	

TABLE 1.

respectively, the *ba* is ambiguous, permitting reference to both 1/2, PLURAL and 1a/2a, PLURAL. Similarly in (20), *bona* can be either PLURAL, 1/2 or PLURAL, 1a/2a. These sentences are thus grammatical.

(18) Abanakwethu noodadewethu bayagoduka  
       [1/2]      [1a/2a]      [1/2]/  
                                   [1a/2a]  
       'My brothers in law and my sisters are going home'

(19) Abanakwethu noodadewethu bahle  
       [1/2]      [1a/2a]      [1/2]/  
                                   [1a/2a]  
       'My brothers in law and my sisters are beautiful'

(20) Ndibona bona (i.e. abanakwethu noodadewethu)  
                   [1/2]/          [1/2]      [1a/2a]  
                   [1a/2a]  
       'I see them' (i.e. my brothers in law and my sisters)

In (21) the weak concord, *zi*, is acceptable as the agreement form for both 7/8 and 9/10 PLURALS and in (22), *zona*, can be pronoun of either of these same genders:

(21) Izandla neendlebe zibomvu  
       [7/8]      [9/10]      [7/8]/  
                                   [9/10]  
       'The hands and the ears are red'

(22) Ndibona zona (i.e. izilo neentaka)  
                   [7/8]/          [7/8]      [9/10]  
                   [9/10]  
       'I see them' (i.e. the animals and the birds)

In short, when on the systematic phonemic level the agreement forms for these different genders show neutralization, conjunction (reduction) may take place.

The second type of exception to the constraint arises from the application of a late-level phonological rule which merges two otherwise distinct predicates under certain conditions.

Above we noted that 7/8, 9/10 and 11/10 shared the secondary (weak) concord form as well as the pronoun which they take for their plural. It was not pointed out that they differ in terms of the primary (strong) concord. As evident from Table 1., the concord form for 7/8, PLURAL is zi, while 9/10 and 11/10 have zin. Now, the distinction between primary and secondary concord is particularly relevant in the inflection of adjectives.<sup>4</sup> By far the majority of Xhosa adjectives take the secondary (weak) concord. To this set belong bomvu 'red', lula 'light', ntsundu 'dark brown', nzima 'heavy' and others. There are eleven adjectives which take the primary (strong) concord:

(23)	(a)	-bi	bad	(b)	-ni?	of what sort?
		-dala	old		-ngaphi?	how many?
		-de	long, tall		-ncinane	little, small
		-futshane	short		-ninzi	much, many
		-hle	good, beautiful			
		-khulu	great			
		-tsha	young			

There exists in Xhosa a late-level phonological rule which reduces all instances of geminate consonants to one occurrence of that consonant.

(24)	C	C	→	C
	[αF <sub>i</sub> ]	[αF <sub>i</sub> ]		[αF <sub>i</sub> ]

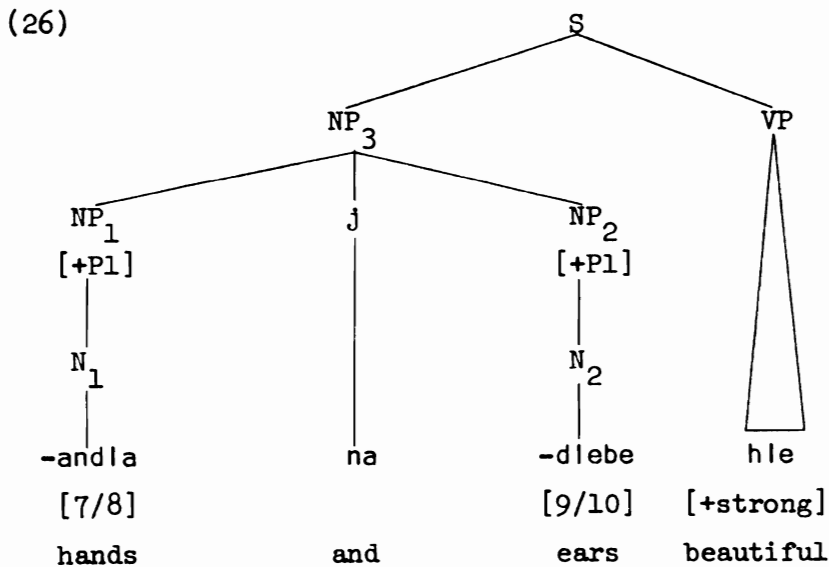
where F<sub>i</sub> may be any feature by which the given segment is specified. Rule (24) states that in all those cases in which two given consecutive segments agree in the specification of each of the features specifying that segment one segment is deleted (absorbed). It does not apply to the singular of -nama 'weak, unsteady person', but reduces the would-be plural \*izin nama to izinama:

---

<sup>4</sup>For an extensive discussion of the difference between strong and weak adjectives see the study by A. C. Jordan [1967].

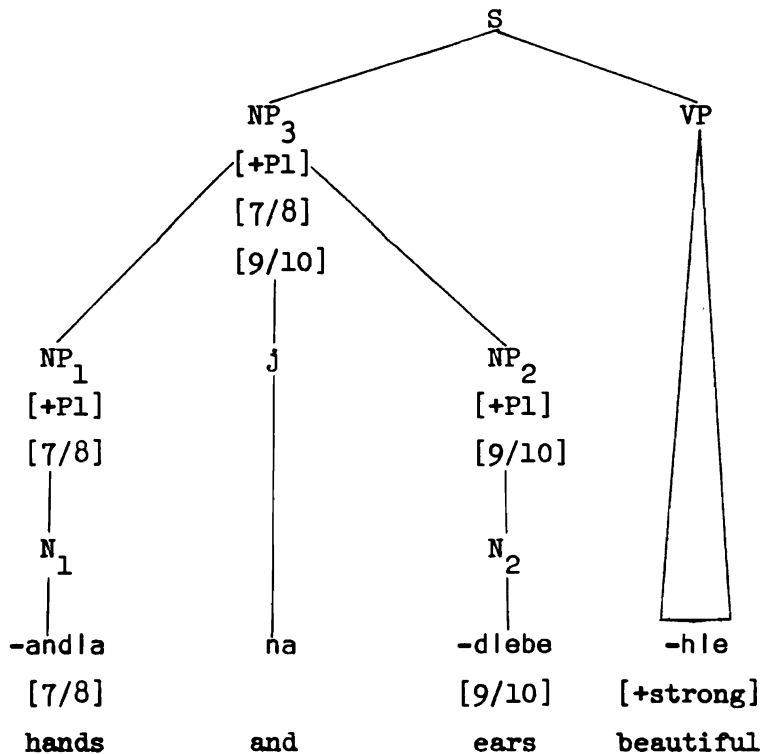
- (25) izin-nama → izinama (by Rule (24) )  
 ulu-nama → ulunama

Consider now the conjunction of two nouns from gender 7/8 and 9/10 with a strong adjective as predicate. At the point at which the feature-migration convention (1) would apply, we have the structure (26):



By (1) we get the expected (27) in which  $NP_3$  again has two different gender specifications:

(27)



By copying the feature specification of either 7/8 or 9/10 onto the verb and spelling the corresponding strong concord, (27) would become either (28) or (29), neither of which is grammatical:

(28) \*|zandla neendlebe zihle

[7/8] [9/10] [7/8]

'The hands and the ears are beautiful' (7/8 agreement)

(29) \*|zandla neendlebe zintle

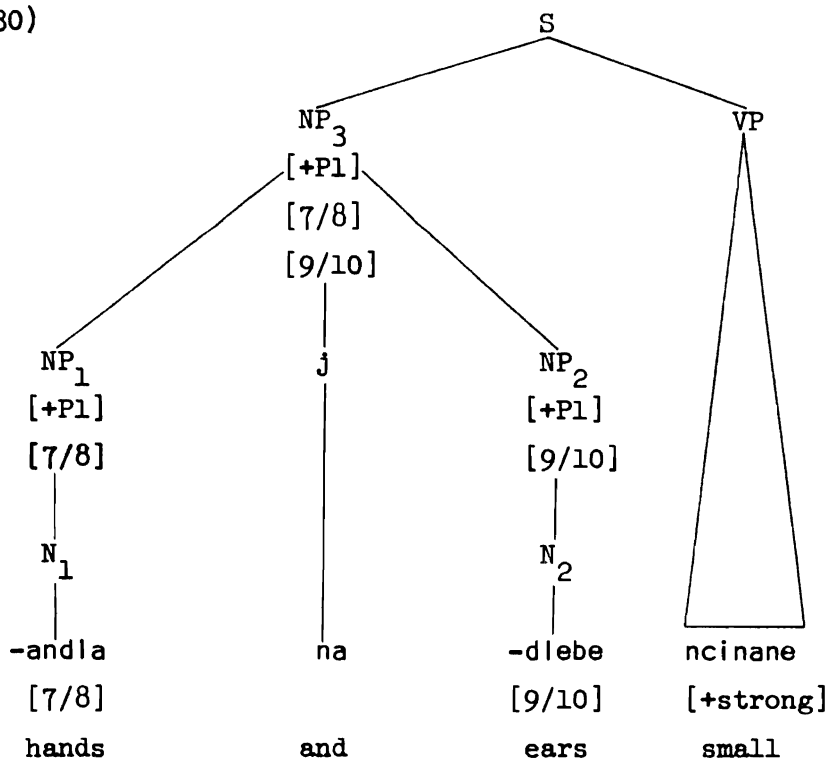
[7/8] [9/10] [9/10]

'The hands and the ears are beautiful' (9/10 agreement)

The ungrammaticality of (28) and (29) is clearly the result of the inability of the grammar to find a common agreement form for the two genders involved and clearly reflects our constraint on conjoined NP's.

Consider then (30), which is identical to (27), except that it has a nasal-initial strong adjective as its predicate:

(30)



By copying either the 7/8 or the 9/10 gender feature from NP<sub>3</sub> onto the predicate and by spelling the appropriate concord, zi and zin respectively, (30) becomes either (31) or (32):

(31) Izandla neendlebe zi-ncinane

(32) Izandla neendlebe zin-ncinane

zin-ncinane meets the structural description of the late phonological rule (24) and is reduced to zincinane; (24) does not apply to zi-ncinane, however, so that the two predicates are neutralized:

(31) zi-ncinane → zincinane

(32) zin-ncinane → zincinane (by (24) )

By the application of rule (24) we obtain the grammatical sentence

(33) which can be derived either via (31) or (32):

(33) Izandla neendlebe zincinane

'The hands and the ears are small'

We can now revise constraint X on conjunction:

(34) Constraint on Conjunction

All sentences containing conjoined nouns of different genders involving agreement or pronominalization are starred unless

- i. the conjoined nouns belong to genders which share the deep phonological form of the concordial morphemes;
- ii. the surface form of the concord morphemes are rendered identical by phonological merger due to a late phonological rule.

3. Discussion

Constraint (34) lends itself to two, theoretically quite distinct, interpretations: (i) the rule feature interpretation; and (ii) the global rule interpretation. Under neither of these interpretations is the conjunction of any nouns blocked **regardless of the gender** to which they belong.

The rule feature interpretation would place the burden of ruling out starred sentences on lexical insertion. All concords and all pronouns are marked for all of those genders to which they permit reference. The pronoun *zona*, for example, which can spell any pronominalized NP containing any combination and number of the features 7/8, 9/10 and 11/10 (but none containing any other gender feature), would be specified as follows in the second lexicon:

- (35) ZONA
- $$\begin{array}{l} [+PRO] \\ \left\{ \begin{array}{l} [7/8] \\ [9/10] \\ [11/10] \end{array} \right\} \\ [+P1] \end{array}$$

A condition must be placed on the grammar in general that the lexical insertion is sensitive to all and only the features on the node onto which the lexical entry is placed. All P-markers containing unfilled nodes are starred. Note that this type of formulation follows directly

from the filtering function of the transformations, and all lexical insertions are, in some sense, obligatory transformations.

The application of this condition to (35) and the NP onto which (35) may be inserted is straightforward. Note that the gender features on (35) are stated conjunctively so that *zona* can replace any of the NP's in (36) but none of the NP's in (37):

(36)	NP	NP	NP
	[+P1]	[+P1]	[+P1]
	[7/8]	[9/10]	[7/8]
	[11/10]	[11/10]	[9/10]

(37)	NP	NP
	[+P1]	[+P1]
	[7/8]	[11/10]
	[5/6]	[3/4]

Similarly the specification in the lexicon of concord morphemes which permit ambiguous reference will mark each concord form for all the genders possible. Thus *zi* (7/8, 9/10 and/or 11/10) has the gender specification (38) in which the features are, again, stated conjunctively so that it can be spelled out as an agreement form for the genders 7/8, 9/10 and 11/10, but not any others:

(38)	ZI
	[+P1]
	[-strong]
	{ [7/8]
	{ [9/10]
	{ [10/11]

The correct derivation of sentences falling under (34.ii) is more complex. The grammar can not, first of all, allow common reference to strong concords of 7/8 and 9/10 and 11/10. Their lexical entries should remain distinct:



- (39) (a) ZI (b) ZIN
- |                             |   |
|-----------------------------|---|
| [+P1]<br>[7/8]<br>[+strong] | [+P1]<br>[+strong]<br>{ [9/10] }<br>{ [11/10] } |
|-----------------------------|---|

As has been demonstrated, however, it is always when a strong adjective with an initial nasal is a predicate that rule (24) can merge the otherwise distinct (39a) and (39b) and thus render a grammatical sentence. It is proposed, then, that we split the strong adjectives into two groups, the Nasal-initial (= (23b) ) and the non-Nasal-initial (= (23a) ), and that we modify our entry for the 9/10 and 11/10, [+[\_\_nasal]] concord so that it agrees with that of 7/8:

- (40) (a) ZI (b) ZIN
- |  |   |
|--|---|
| [+P1]<br>[+strong]<br>{ [7/8] }<br>{ { [9/10] } }<br>{ { [11/10] } }<br>{ [+[__nasal]] } | [+P1]<br>[+strong]<br>[-[__nasal]]<br>{ [9/10] }<br>{ [11/10] } |
|--|---|

The rule feature analysis correctly predicts the grammaticality of any sentences containing conjoined NP's. It suggests that P-rules are redundancy conditions holding between lexical entries. It is questionable, however, whether this analysis correctly explains why sentences such as (33) are indeed grammatical. It fails to capture the fact common to both exceptions to constraint (34) that the grammaticality always comes about as a result of merger, either in the lexicon, or in the derivation of the sentence.

To this end let us consider assigning the task of deriving all and only the grammatical sentences containing conjoined NP's to a Global Rule. A global rule, Lakoff states, is a 'well formedness condition on configurations of corresponding nodes in non-adjacent trees' (Lakoff [1970:637]). Superficially (34.ii) meets the type of condition exemplified in Lakoff, in that the grammaticality of (30) is dependent on the

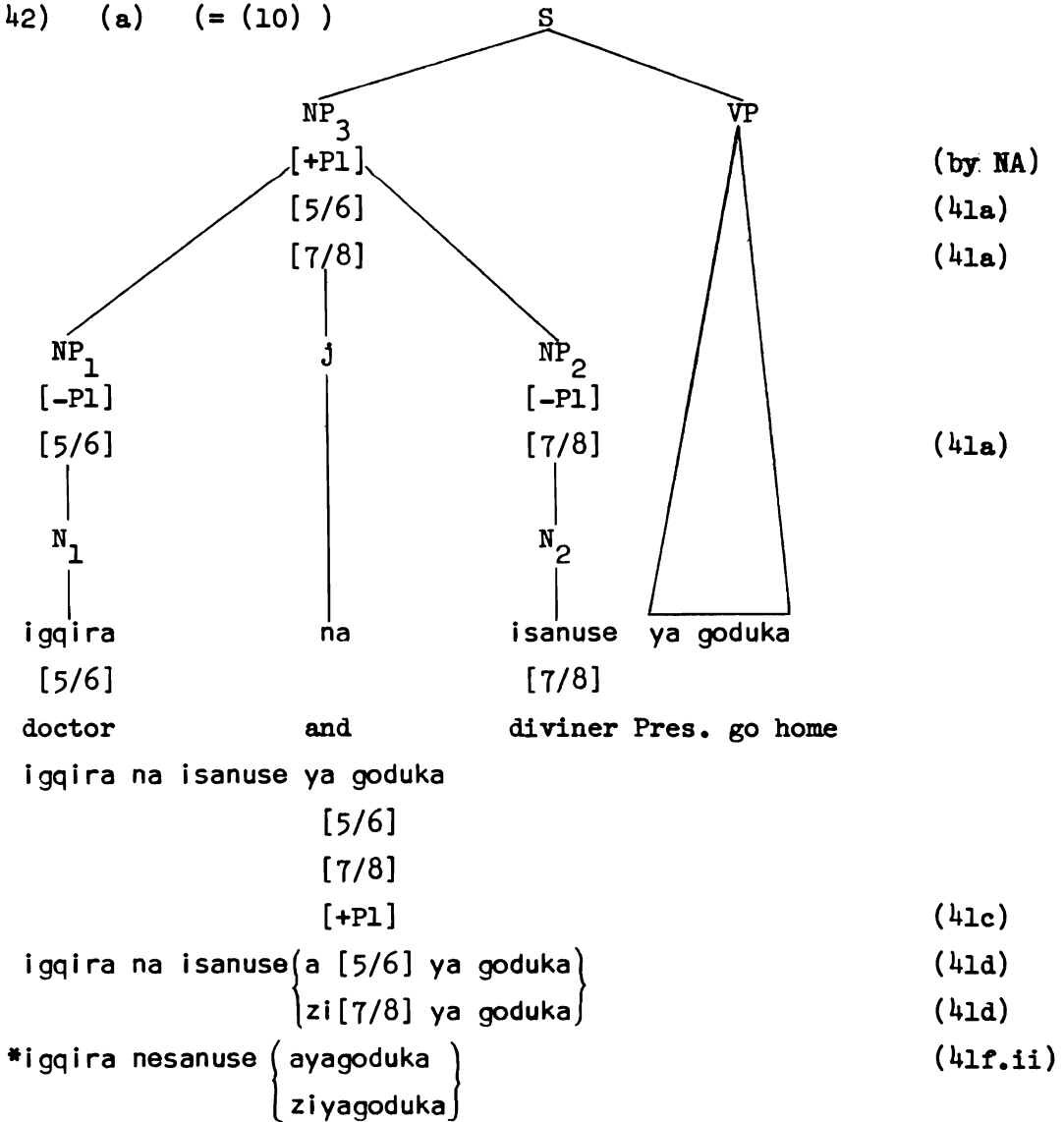
output of (24) and that agreement (i) and (ii) intervene between (30) and (24). Or, if the global rule is to refer to agreement and (24), any possible constraint on conjunction must be placed on or after agreement but before (24). Either of these formulations are predicated on the condition that agreement copies only one of the two possible gender features from the NP (in (30) ).

In a language which marks grammatical relationships with various forms of agreement, it is the task of the rule of agreement to define the grammatical relationships for each of the members of the subject which governs the particular predicate. To copy only one feature of the possible two would fail to show the subject-verb relationship on which the grammar of Xhosa insists. To have the agreement rule copy both of the gender features of (30) and have both of the concord forms inserted on the verb would eliminate any need for a global rule since now the condition of well formedness can be ordered after (24) and there would no longer be two adjacent trees to refer to. Let me propose, then, that all sentences containing conjoined NP's must follow these steps:

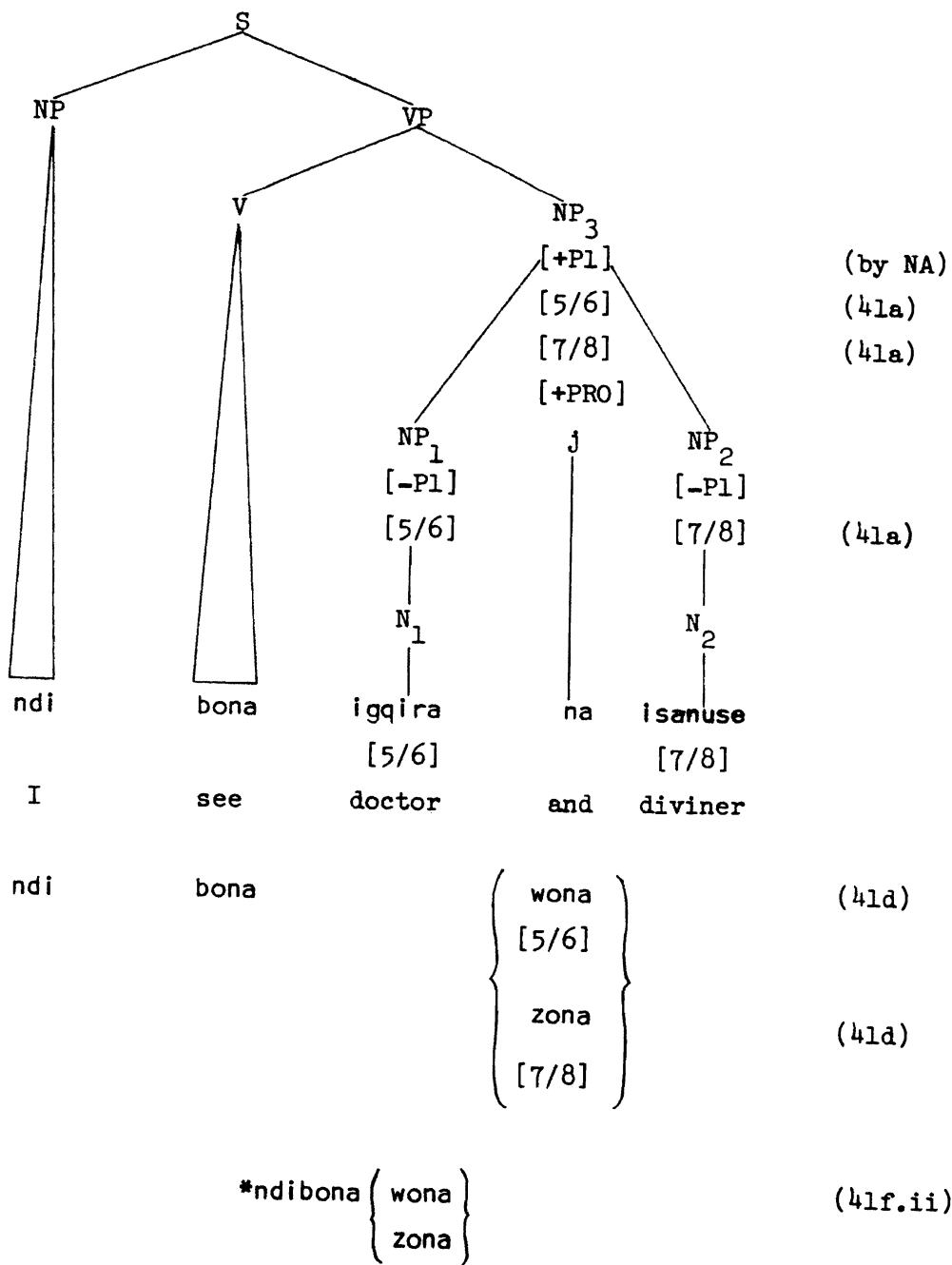
- (41)
- (a) Convention (1), which raises all gender features to the top NP dominating the conjoined NP's.
  - (b) All instances of nondistinct feature specifications are reduced to one such instance.
  - (c) Agreement (i) copies all features from the top NP onto the predicate.
  - (d) Second lexical lookup permits insertion of a concord or pronoun for each of the gender features on the predicate or on the NP, respectively.
  - (e) (24) applies to each concord-predicate form in the derivation.
  - (f) (i) All instances of segmentally identical predicates (concord and verb/adjective) or pronouns are reduced to one.
  - (ii) All derivations containing distinct predicates or pronouns on the same node are starred.

Some sample derivations are provided in (42).

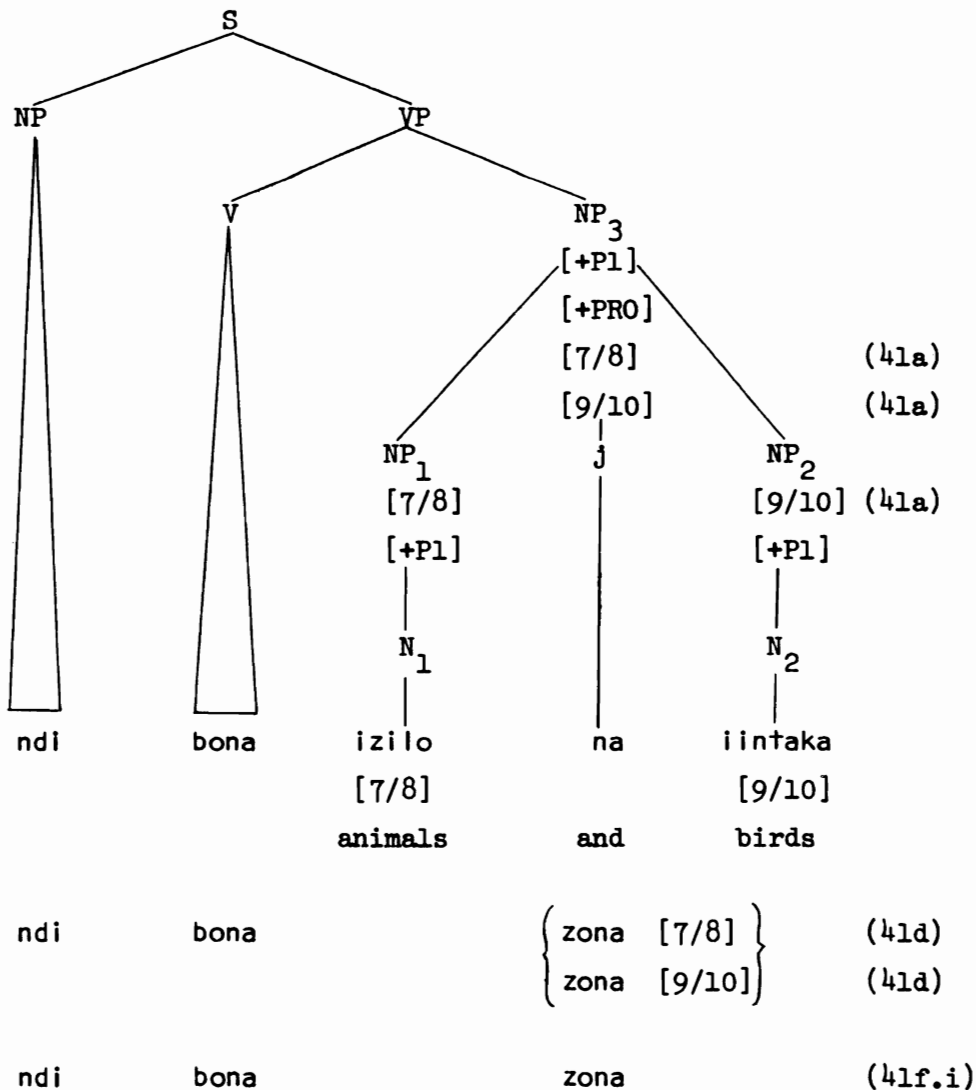
(42) (a) (= (10) )



(42) (b) (= (16 + 17) )



(42) (c) (= (22) )

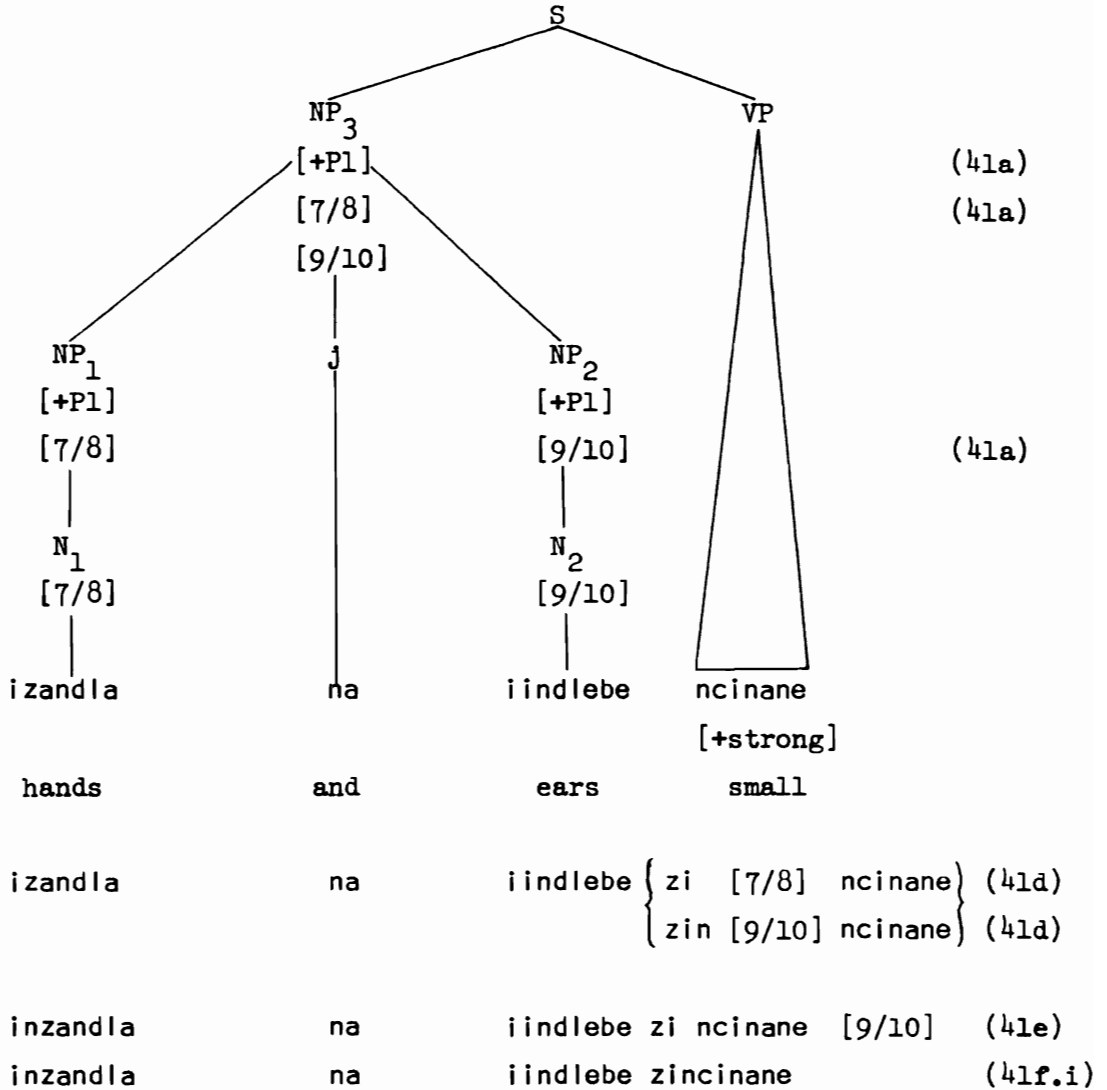



---

Ndibona zona (i.e. izilo neentaka)

'I see them' (i.e. the animals and the birds)

(42) (a) (= (30) )



Inzandla neendlebe zincinane

'The hands and the ears are small'

In (42a) neither (41a) nor (b) apply. (41c) copies both of the gender features, 5/6 and 7/8, onto the verb. These features are replaced by the corresponding concords by (41d). Notice that the application of both (41e) and (41f) requires that the predicate be repeated for each extra occurrence of a gender feature. (41f.ii) determines that the two predicates are distinct and the sentence is starred. (42b) follows essentially the same steps. This time two pronouns are inserted and again (41f.ii) rules the derivation ungrammatical. The derivations of (42 c and d) are largely parallel to those of (41 a and b). Note that in (42 c and d) the predicates are identical so that they can be merged by (41f.i) and the sentences are grammatical.

In evaluating the steps of (41) one can see a considerable parallel, both in content and function, between (41b) and (41f.i). The close similarity between these two steps is not accidental it seems, and one might suggest that even for conjoined NP's of identical genders all features are copied from the top NP, thereby eliminating (41b), and that all identical features be merged during lexical insertion, or after lexical insertion by (41f.i). Such a modification seems inherently correct. Under the present formulation (with (41b) ) the conjunction of same gender nouns is interpreted to be somewhat different, a position which might be consistent with the traditional semantic function of the noun-class system (see Givón [1971] for a discussion); but such is no longer the case today. The elimination of (41b) is compatible with the explanation for the exception to (34), namely that the grammar does not provide the concordial morphemes for gender resolution and that any occurrence of grammatical sentences containing conjoined nouns of different genders is purely accidental.

(41) is consistent with the formalisms provided by the grammatical theory within which we presently operate. It does not meet the description of global rules since it in no way requires reference to two or more non-adjacent P-markers. It does, however, require an extension of the notion 'multi-categorial attachment' (Gruber [1967]) (which has been shown (see Givón [1969] to be required for the notion of transitivity in such words as 'eat' for Bemba), to allow the insertion of

more than one lexical entry under a single node.

#### 4. Summary

The data presented in this paper suggest that some constraints on grammaticality must be ordered after the application of rather late phonological rules.

#### REFERENCES

- Chomsky, Noam. 1965. Aspects of the Theory of Syntax. Cambridge, Mass.: M.I.T. Press.
- Givón, Talmy. 1969. "Studies in ChiBemba and Bantu Grammar." University of California, Los Angeles doctoral dissertation. Available from University Microfilms, Ann Arbor, Michigan.
- Givón, Talmy. 1970. "The resolution of gender conflict in Bantu conjunction: when syntax and semantics clash," in Papers from the Sixth Regional Meeting, pp. 250-261. University of Chicago: Chicago Linguistic Society.
- Givón, Talmy. 1971. "Some continuing historical changes in the noun class system of Bantu," in Studies in African Languages and Linguistics. Edited by Chin-W. Kim and Herbert Stahlke.
- Jordan, Archibald C. 1967. "The adjective in the Nguni languages of Southern Africa with special reference to Xhosa." Journal of African Languages 6:132-145.
- Lakoff, George. 1970. "Global rules." Language 46:627-639.
- Perlmutter, David M. 1970. "Surface structure constraints in syntax." Linguistic Inquiry 1:187-255.