BANTU LEXICAL CLASSES AND SEMANTIC UNIVERSALS
(With some remarks on how not to write phonological rules)

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1. Introduction

This paper has three related yet partially independent aims. In the first place I want to argue for a particular analysis of Shona adjectives, showing that at a rather deep syntactic level they are closely related to nouns. Secondly, I want to show that this analysis tends to vindicate the hypothesis of a syntactically and semantically defined level quite close to Chomsky's [1965] deep structure. Thirdly, I hope that the paper may serve as a kind of prolegomenon to a theory of lexical classes -- an important yet almost totally neglected aspect of the theory of natural language. In developing the argument for the analysis of adjectives, which is the central part of the paper, I shall deal primarily with some problems in the concord system. It will be necessary to demonstrate that a phonological solution is inappropriate although apparently possible within current theory. Some general restrictions are proposed on the use of morphological features or syntactic brackets in phonological rules, and it is argued briefly that the lexicon must probably include some of the rules which are now treated as phonological -- i.e. some of the P-rules.

In many Bantu languages, including Shona, there is a small, closed class of lexical items which have generally been called adjectives. There appear to be less than forty in Shona (Fortune [1955: 152-156]). Most can be glossed by English adjectives, with which they also share a good number of syntactic characteristics. As in English, adjectives in Shona can be used either predicatively (e.g. 'The sky is blue') or

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1This is a greatly expanded and modified version of a paper first read at the summer 1968 meeting of the Linguistic Society of America. I should like to thank Barbara Partee for extensive discussion of the earliest versions, and Earl Stevick for helpful comments. Talmi Givón, Erhard Voeltz, Tom Hanwell, Tom Peterson, and Richard Demers have made helpful comments on an intermediate version. None of them agree with everything I say here.
attributively (e.g. 'the blue sky ...'). In either environment, the Shona adjective consists of a stem and a prefix, the latter determined by one of the nouns in its sentence.

If the adjective is attributive, the prefix is identical to that of its head noun, as in:

(1) munhu mukuru akaenda
    man  big  went
    'The big man went.'

The prefix of an adjective used predicatively differs only in tone from its attributive form, the copula being deleted, leaving behind a high tone on the adjective prefix. In this case, however, the adjective agrees with the subject:

(2) munhu mūkuru
    'The man (is) big.'

The agreement of an adjective with its noun is part of an extensive concordial system found throughout the Bantu languages. I shall assume that the reader is familiar with this system of class concord, and will simply draw attention to certain relevant aspects.

It is important, first, to note that the genders have some kind of semantic (as well as syntactic) significance. For full details the reader is referred to Fortune [1955]; the following summarizes the main semantic categories that are represented in the common, basic genders; noun stems naming classes of people tend to take class 1 and 2 prefixes, and so on.

(3) Class 1/2 : people
    Class 3/4 : atmospheric phenomena, plants, long things
    Class 5/6 : masses or pairs (6), things inspiring fear
    Class 7/8 : inanimate objects, worthless things
    Class 9/10 : animals, many everyday objects
    Class 11/10 \{ 11/6 \} : long thin things, times of day
    Class 14 : abstractions, substances
It would be a mistake to emphasize too strongly the semantic significance of the class system since there are numerous examples which resist the most determined efforts to interpret the classificatory system as strictly semantic -- it often seems to be purely arbitrary. On the other hand it would be pointless to deny that there is some kind of semantic basis to the class system. We shall later make some use of this.

The second important set of facts to note is the precise form of each class prefix before a noun or an adjective:

(4) Class 1: mu- munhu 'person'
     2: va- vanhu 'people'
     3: mu- muti 'tree'
     4: mi- miti 'trees'
     5: voicing danga 'corral'
     6: ma- mafanga 'corrals'
     7: chi- chigaro 'chair'
     8: zvi- zvigaro 'chairs'
     9,10: nasalization huni 'firewood'
     11: ru- rukuni 'stick'
     14: hu- hurwere 'sickness'

It will be noticed that the class 5 prefix is given as "voicing" while that for 9/10 is said to be "nasalization". These "prefixes" have no segmental realization at all, but affect certain consonants in stem-initial position. All the other prefixes consist of a single CV syllable. We shall concentrate on the non-segmental prefixes since they are crucial to the present argument. Notice that if the noun is in class 5, 9 or 10, the precise effect of the prefix may not be the same for that noun and an adjective in agreement with it since they need not possess identical stem-initial consonants; nevertheless, their prefixes may be considered identical -- either "voicing" ("nasalization") or whatever causes the phonological change to occur. Some attributive adjectives in agreement with head nouns will show these facts in more detail:
It is not only adjectives that show agreement with nouns. Every constituent of the noun phrase does, while the verb acquires a prefix in agreement with its subject noun. The following sentence serves to illustrate the effect that concordial agreement has in the language:

In this example, using a class 2 noun, all the prefixes have essentially the same segmental form. That is not always the case. If instead of a class 2 noun we use one in class 5, it is immediately obvious that the phonological shape of the concordial prefix is strikingly different according to its environment:

In the plural, preceded by a class 6 prefix, the stem of 'knife' is -panga, while the stem of 'big' is otherwise -kuru, thus, the class 5 prefix is realized as the voicing of the initial consonant of the noun and adjective. Notice that even if the consonant following ri- could be voiced it would undergo no changes following that overt, segmentally realized form of the prefix. In a similar way, the prefix for classes 9 and 10 is realized solely by a series of stem-initial changes before nouns and adjectives, but elsewhere the class 9 prefix is basically i-, the class 10 one basically dzi-. Finally, the prefixes of classes 1, 3, 4, and 6 lose their initial (bilabial) nasal when they do not precede either a noun or an adjective.
Thus we can distinguish two very similar but distinct sets of prefixes. Begging the question somewhat, let us call these the noun series and the agreement series:

(8) Noun Agreement

<table>
<thead>
<tr>
<th>Class</th>
<th>Noun</th>
<th>Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>mu-</td>
<td>i-</td>
</tr>
<tr>
<td>2</td>
<td>va-</td>
<td>va-</td>
</tr>
<tr>
<td>3</td>
<td>mu-</td>
<td>u-</td>
</tr>
<tr>
<td>4</td>
<td>mi-</td>
<td>i-</td>
</tr>
<tr>
<td>5</td>
<td>voicing</td>
<td>ri-</td>
</tr>
<tr>
<td>6</td>
<td>ma-</td>
<td>a-</td>
</tr>
<tr>
<td>7</td>
<td>chi-</td>
<td>chi-</td>
</tr>
<tr>
<td>8</td>
<td>zvi-</td>
<td>zvi-</td>
</tr>
<tr>
<td>9</td>
<td>nasalization</td>
<td>i-</td>
</tr>
<tr>
<td>10</td>
<td>nasalization</td>
<td>dzi-</td>
</tr>
<tr>
<td>11</td>
<td>ru-</td>
<td>ru-</td>
</tr>
<tr>
<td>14</td>
<td>hu-</td>
<td>hu-</td>
</tr>
</tbody>
</table>

A fully satisfactory account of this data will explain:

(a) The considerable similarity between the series.
(b) The fact that there are nevertheless two series.
(c) The association of one series with just nouns and adjectives in Shona.
(d) The phonological details of the observed differences.

Probably the most obvious way of trying to handle the data is by means of phonological rules or low level adjustment rules just prior to the phonology. These rules would either apply just to nouns and adjectives or to all other relevant environments, modifying appropriately the basic segmental form of those prefixes which differ in the two series. Such an account would set up a single series of prefix formatives, treating the differences as trivial and either as an integral part of the sound system of the language or as a set of minor unexplained deviants. In either case it is very hard to imagine that we could explain in any serious way why nouns and adjectives act alike (and unlike the rest) with respect to the rules that differentiate the two series. For if the rules are
phonological, we should expect any explanation of the difference to involve, crucially, some general phonological factor which sets aside the nouns and adjectives. There does not appear to be any such factor. Low level rules prior to the phonology are rather unlikely in principle to explain a difference of this sort since they seem to be essentially no more than a way of describing a lack of fit between the output of the syntax and the input to the phonology. There is, of course, no difficulty in describing the Shona facts, and either of these methods would be acceptable, were it not for the fact that a more explanatory account seems to be available.

Under this very different, and, according to the arguments presented here, more explanatory account of Shona concord, we postulate two closely related but at all stages distinct sets of prefixes: one for nouns and adjectives and another for the rest. Then we attempt to argue that the noun-adjective prefix is present in deep structure, while the other is not. Certain semantic and syntactic facts about Shona nouns and adjectives either predict or gibe very well with the existence of two distinct series of prefixes, giving this account considerable explanatory value and suggesting the need to modify current linguistic theory to select it rather than any other.

My account suffers from the considerable disadvantage that whereas a phonological solution appears to work using established theoretical mechanisms, there is at present no way or representing two series of distinct yet phonologically very similar formatives or of capturing the generalizations that hold between the noun and agreement series if they are basically distinct. However, insofar as the analysis is successful, this must be taken to demonstrate the need for adding suitable apparatus to the theory.

2. The phonological solution

Previous generative treatments of Bantu concord (at least those of which I am aware) have chosen a phonological account of the relationships between the two series. Gregerson [1967], dealing with Swahili, simply
used one set of concordial prefixes, and one very general rule to spread these from the noun to demonstratives, relatives, adjectives, verbs and so on, assuming that there would be phonological rules to take care of the differences. He saw no particular significance in the two series and did not try to account for them directly. Givón [1969] for Bemba noted some of the problems inherent in Gregerson's rules; nevertheless he, too, chose to regard the differences between the noun prefix and agreement prefix as trivial, and he handled them in the phonology.\(^2\)

Let us see more precisely what this would involve for Shona. First, I shall deal with the nasal of the prefixes of classes 1, 3, 4 and 6. The prefixes which appear as mu, mi and ma before nouns and adjectives are realized elsewhere as u, i and a respectively. At this stage there is little to choose between a rule of insertion and one of deletion. Loss of a nasal, rather than insertion, is probably commoner, in some sense less expensive, so let us assume that there is a rule:

\[(9) \quad [ + \text{nasal }] \rightarrow \emptyset / \text{env.}\]

What environment? There seem to be no relevant phonological features. The crucial fact is that a nasal is deleted (according to our present

\(^2\)Givón's account did not, strictly speaking, involve ordinary phonological rules. He introduced a device, which he called "spelling out" rules, to convert various syntactic features directly into phonological features. He did not provide any clear motivation for adopting this formalism; as far as I can see he uses it in such a way that it is no more capable of explaining Shona facts than a standard phonological account, though it has the distinct advantage of placing the phonological rules applying to the concord system in (or in close association with) the lexicon. We shall later propose doing the same; but the rules will be far less powerful than his. Givón has claimed [personal communication] that his account of the similarity between noun and adjective prefixes in Shona (as opposed to e.g. Bemba) relies on the historical facts. But history cannot explain the fact that these two series are the same in Shona. I am trying to provide such an explanation in this paper.
account) whenever it would be initial in a prefix before any form except a noun or an adjective. There are several possible ways of representing this; it does not seem to be very important which we choose. If we use labeled brackets, the negative environment will be a little complicated to state, so let us simply assume that the syntactic class features are spread from a stem onto its prefixes -- but not vice versa. We could formulate the rule thus: 3

(10) **Nasal Deletion:**

\[
[ + \text{n} ] \rightarrow \emptyset \quad \begin{array}{c}
- \text{Noun} \\
- \text{Adjective} \\
+ \text{Prefix}
\end{array}
\]

This rule, or something essentially like it, will account for the differences between the two series for classes 1, 3, 4, 6.

Now let's try and deal with the prefixes of classes 9 and 10. These two classes are linked in a singular/plural gender -- though there are noun stems which take the class 10 prefix in the plural yet have some other singular prefix. There is generally no difference in the noun prefix for classes 9 and 10: the same nasalization process occurs initially in both. Thus nhou means either 'elephant' or 'elephants'. However the agreement prefix for class 9 is i-, for class 10, dzi-.

Historically we can be fairly sure that there were two prefixes: ni- and dzini- respectively. If we assume that the underlying forms of these prefixes remain roughly just that (i.e. /ni/ and /dzini/) we may be able to account both for the neutralization of the prefixes before nouns (and adjectives) and for the difference in form of the noun and agreement

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3The phonological rules which we set up at this stage will later be rejected. Hence we shall not spend much time trying to justify them in detail. The use of lexical features in this particular rule is a very natural extension of the original proposal for the use of morphological features contained in Chomsky and Halle [1968: 374] to the revised lexicon proposed in Chomsky [1969]. It is, however, probably too powerful in principle -- see later in text.
series, using only, or mainly, phonological rules. First of all, our
**nasal deletion** rule will automatically delete the nasal /n/ before forms
other than nouns and adjectives, leaving /i/ and /dzi/. A rule commonly
found in Bantu languages,

(11) **Vowel Shortening:**

\[ V_i \rightarrow \phi / V_i \]

(applying only within morphemes), would reduce /dzi/ to /dzi/. Thus the
correct form of the agreement prefix can be generated.

The nasal of ni- would not be deleted before nouns and adjectives,
of course, (just as the nasal of mu, mi and ma is not deleted there),
and it would therefore be available to induce the so-called "nasalization"
of certain initial consonants in those forms. The principle changes are:

(12) \[
\begin{align*}
\text{p} & \rightarrow \text{mh} \\
\text{t} & \rightarrow \text{nh} \\
\text{k} & \rightarrow \text{h} \\
\text{b, b, v} & \rightarrow \text{mb} \\
\text{d, r} & \rightarrow \text{nd} \\
\text{t} & \rightarrow \text{pf} \\
\text{s} & \rightarrow \text{ts}
\end{align*}
\]

Where /mh/ and /nh/ are a
kind of murmured nasal and
/h/ is essentially a
murmured onset to the
following vowel.

To subsume all these under the title "nasalization" is at least super­
finally misleading. Nevertheless they may all have a common origin, and
it is, in fact, quite feasible to add a few rules to generate the correct
forms through processes triggered by the nasal of ni-.

However, it is worth trying to establish first that there are indeed
synchronic rules of some kind operating in the language to derive these
forms. This is not immediately obvious since a noun stem in 9/10 never
appears in any form exhibiting the underlying /t/, /p/, /r/ or whatever
of the above table but only in the "nasalized" form determined by the out­
put of these putative rules. However, there are adjective stems that
clearly exhibit the alternations. The stem -kuru 'big' generally occurs
with an initial /k/: munhu mukuru 'big person'. But in agreement with
classes 9 or 10 it appears as huru:
Moreover, there are some noun stems which occur with a segmental prefix of class 11 in the singular but with class 10 prefix in the plural, and appropriate changes occur, as in rurimi 'tongue', ndimi 'tongues'. There are abundant examples like these, showing clearly that some sort of synchronic relationship is involved.

In reaching for a unified account of the changes that were outlined above, let us suppose that the /i/ of ni- is deleted, that the nasal then assimilates a following voiceless stop to itself in nasality, that /v/ and /r/ become stops, that an intrusive voiceless stop appears between a nasal and a following voiceless fricative, and that there is a late rule of nasal deletion which, unlike the rule we have already postulated applies to nouns and adjectives. A set of rules capturing these processes will generate more or less the right output, with one or two important exceptions to be dealt with directly. I give the rules very roughly below, along with the rules discussed earlier.

(14) Rule 1. **Nasal deletion:**

\[
[ + \text{nasal} ] \rightarrow \emptyset / \begin{cases} \text{- noun} \\ \text{- adj} \\ + \text{prefix} \end{cases}
\]

This rule deletes the nasals of /mu/, /mi/, /ma/ and /(dzi)ni/ except before nouns and adjectives.

(15) Rule 2. **i-deletion:**

\[
i \rightarrow \emptyset / \begin{cases} + \text{nasal} \\ + \text{coronal} \end{cases}\begin{cases} \text{C} \\ \text{N} \\ \text{Adj} \end{cases}\text{stem}
\]
This rule changes \( ni + \) stem to \( n + \) stem, hence setting up an environment which is phonologically unique in the language, with \( /n/ \) preceding all sorts of consonants that it does not otherwise precede. The consonant is mentioned so that this rule fails to operate before a vowel and forms like \( \text{nyama} \) 'meat' and \( \text{nyoka} \) 'snake' can be automatically derived, by a well-motivated rule not spelled out here, from \( \text{ni-ama} \) and \( \text{ni-oka} \) respectively.

The first set of changes that we shall deal with are those found with the voiceless stops: \(/np/ \rightarrow /mh/, /nt/ \rightarrow /nh/, /nk/ \rightarrow /h/\). The \(/h/\) signifies a murmured or slack voice quality, adhering either in the nasal or (in the case of \(/k/ \rightarrow /h/\)) in the onset of the following vowel. This is a very interesting set of relationships. Were the rules that are involved really part of the synchronic grammar, we should have to examine it in more detail. But for the purpose of this exposition it is necessary only to show that a reasonably satisfactory phonological account can be given of the facts. There is some merit in interpreting this aspect of "nasalization" as an assimilation of the nasal to a subsequent consonant in terms of place of articulation, followed by a change of the following voiceless consonant to a murmured glide. Late rules not given here will delete \(/n/\) before \(/h/\) and interpret a nasal followed by \(/h/\) as a murmured nasal. The basic rules are:

(16) Rule 3. Nasal assimilation:

\[
[\ + \text{nasal} ] \rightarrow [\times \text{place}] / \_ [\text{place}]
\]

(where \([\text{place}]\) is a convenient cover symbol)

(17) Rule 4. Murmur:

\[
[\ - \text{voice} ] \rightarrow h / [\ + \text{nasal} ]
\]

At this point, let us deal with the affricates \( [\mathfrak{r}] \) and \( [\mathfrak{ts}] \):

(18) Rule 5. Stop intrusion:

\[
\emptyset \rightarrow [\ - \text{voice} ] / [\ + \text{nasal} ]
\]

\[
[\times \mathfrak{F}_i] [\ + \text{cont}] [\times \mathfrak{F}_i] [\ - \text{cont}]
\]
The intention is to introduce /p/ and /t/ between a nasal and /f/ and /s/ respectively, examples of a process which is very widespread in the languages of the world. Allowing for certain frankly ad hoc aspects of the rule, it will correctly generate the observed affricates—provided we interpret them (at some stage) as clusters, and later as affricates.

(19) Rule 6. Stopping:

\[ \{v\} \rightarrow [ - \text{cont} ] / n \]

This, if we assume some kind of linking rules, will change /v/ to /b/ and /r/ to /d/ after the nasal. It might be possible to combine it with the previous rule but precisely how is not clear.

Several different accounts could be given of the relationship between the elements of what is written as a nasal + stop cluster like /nd/. For several reasons, which need not concern us here, it is very reasonable to interpret such a "cluster" as a single, prenasalized stop. For simplicity, let us therefore assume that a voiced stop immediately following a nasal acquires a feature [ + prenasal ].

(20) Rule 7. Prenasalization:

\[ [ - \text{cont} ] \rightarrow [ + \text{prenasal} ] / [ + \text{nasal} ] \]

We can now delete any nasal preceding a true consonant. Nasals drop before the affricates, before these prenasalized stops and before stem-initial consonants like /č/, /š/ which are totally unaffected by our rules. A fair approximation to the rule would be the following.

(21) Rule 8. Nasal deletion 2:

\[ [ + \text{nasal} ] \rightarrow \emptyset / [ + \text{consonantal} ] \]

Notice that this second rule of nasal deletion is required to delete the /n/ of the putative prefix /nI/ after it has been used to induce the necessary stem-initial changes. Except in combination with /b/ or in

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"It may be inconsistently with the treatment of the affricates as clusters in rule (5) to deal with the prenasalized stops as units. But we need not take these rules too seriously."
the form of prenasalization in stops (and some voiced fricatives, which we have ignored) this nasal never reaches the surface even when the first deletion rule left it alone.

Finally, it is necessary to shorten long vowels produced by the deletion of the nasal in the class 10 prefix *dzǐː -- dzǐː.

(22) Rule 9. Vowel shortening:

\[ V_i \rightarrow \emptyset / V_i \]

Let us summarize our progress toward a phonological account of the difference between the noun and agreement series. None of our rules will apply to prefixes of classes 2, 7, 8, 11 and 14. That is correct. In these classes there is no difference between the two series. In classes 1, 3, 4 and 6, only rule (1) will apply, accounting for the loss of the nasal in the agreement series. So we have only to account for the complicated differences that occur in classes 5, 9 and 10.

In class 9, the first nasal deletion rule will apply as before in the environments where the agreement series is found, leaving behind (correctly) the prefix /l-/-. No other rules then apply. But before nouns and adjectives, rule (2) will apply if the stem starts with a consonant, bringing the nasal next to stem-initial consonants. Rules (3) -- (9) can then apply, only where appropriate, giving derivations like the following, and producing more or less the right output:

(23a) \ni + rimi \quad \text{(tongues)}

\[ \emptyset \mathbin{\text{i-deletion}} \]

\[ d \mathbin{\text{stopping}} \]

\[ nd \mathbin{\text{prenasalization}} \]

\[ \emptyset \quad \text{ndimi} \]

(23b) \ni + ama \quad \text{(meat)}

\[ ny \quad \text{glide formation} \]

\[ ny \quad \text{ama} \quad \text{(not given)} \]
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(23c) \(n\) + \(p\)ami (broad; adj.)

\(\theta\) i-deletion

\(m\) nasal assimilation

\(h\) murmum

In class 10, in the agreement environments rules (1) and (9) will remove the \(/n/\) in /dzini/ and will then shorten the long /Ii/. Before nouns and adjectives on the other hand rule (2) will apply, removing the second /I/ of /dzini/ thus placing /n/ next to stem-initial consonants. All subsequent rules will apply as for class 9.

The postulated dzi- will remain before the stem, yielding forms like *dzinyoka, *dzhuku. It is interesting to note that while such plurals are generally unacceptable, there are two stems that do form their plurals in that way. In class 9 there is the singular imba 'house'; in class 10, dzimba 'houses'. There is a class 11 noun rumbo 'song', and a corresponding class 10 plural, dzimbo 'songs'.\(^5\) Our rules correctly generate these forms. But we must suppose that there is a further rule deleting that part of the prefix before all other noun and adjective stems. The existence of such a general deletion rule is suspicious -- but the two exceptional items, along with the satisfactory operation of the rest of our rules may be thought to provide some justification for generating the full form and later removing part of it. We can simply assume that there is a rule of dzi-deletion.

We still have to deal with class 5. In the agreement series, the prefix is ri-. Let us assume that this is the general form of the prefix

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\(^5\)Fortune [1955: 90] also notes a rather special use of the full class 10 prefix dzi + nasalization with class 9 nouns in "secondary function", as in e.g. dzimhandara ('girls' -- disparaging them). For a general discussion of this usage see Fortune. I have not been able to get much agreement among informants on this particular secondary usage. Note that the examples in the text have stem-initial vowels. The nasal(ized) consonants probably do not arise by rule but are basic stem consonants. The nasal prefix (if any) then has no effect at all on the stem -imbo.
although nouns and adjectives exhibit only the voicing of the stem-initial consonant if that consonant is p, t, k, č, tʃw, or rʃ. If we can somehow get rid of the ri- after using it to induce voicing, and if all the above are stops, the rule seems basically quite simple if we ignore the strange fact that plain tʃ has to be excluded from the rule (cf. tšimba/matsimba 'footprint(s)').

(24) [- cont] ---→ [+ voice] / ri—

This rule must apply only before noun and adjective stems.

But recall rule (2), which deleted /i/ after /n/, before nouns and adjectives. We could very easily generalize that rule roughly as follows:

(25) Rule 2a. Vowel deletion:

\[
i → \emptyset / \begin{cases} + \text{sonorant} \\ + \text{coronal} \end{cases} \quad \begin{cases} C \\ N \{\text{Adj}\} \end{cases} \quad \text{stem}
\]

This will take niC- and riC- to nC- and rC- respectively, both otherwise absent from the language. We can now reformulate the class 5 voicing rule as one of assimilation:

(26) Rule 10. Voicing assimilation:

\[
[- \text{cont}] \quad \begin{cases} + \text{voice} \end{cases} \quad / \quad \begin{cases} - \text{nasal} \end{cases}
\]

Now we need to delete /r/ immediately before a consonant. Again, we can extend a rule that was needed elsewhere; the rule Nasal deletion \_2 can be ordered after (10) and restated as:

(27) Rule 11. Cluster simplification:

\[
\begin{cases} + \text{sonorant} \\ + \text{anterior} \end{cases} \quad → \quad \emptyset / \quad \begin{cases} \quad \emptyset \end{cases} \quad \begin{cases} C \end{cases}
\]

With this rule we have completed in rough outline a more or less standard phonological account of the relationship between the noun and agreement series. We showed first that synchronic rules of some sort must apply to generate the stem-initial consonants of class 9 and 10, and
there is abundant evidence for this, as well as for the synchronic nature of the voicing rule of class 5. We then sketched a set of rules which would generate virtually all the forms of both series. These rules are on the whole quite unexceptionable. They seem to be, at first sight, no more than a rather dull set of not very tightly structured and relatively unmotivated phonological rules. Every one of them could probably be found more or less as it stands or in more complex form in some existing generative grammar. In fact there is no question but that several of them do occur as synchronic phonological rules in languages closely related to Shona. The processes of nasalization and voicing are obviously very natural phonological processes involving assimilation to /n/ and /r/ respectively. So what is wrong with our account?

There is no doubt in my mind that it is a totally misguided treatment of the relationship between the two series of concords even though it superficially mirrors what is probably a partially correct account of what happened historically. I should like to show that it is wrong, that it should probably be excluded in principle, and that there is in any case in this instance a far better account available of the synchronic facts, which has at least some explanatory value.

First, some objections to the rules sketched above. Perhaps the most obvious is that none of them operate synchronically in Shona beyond the particular phenomena we are trying to explain. Because of the effect of rule (2) (which is in itself a perfectly harmless kind of rule), most of the other rules can be formulated in quite general terms. Rule (2) creates phonological sequences which don't otherwise occur in the language, so very little environment has to be given in subsequent rules in order to make them apply to just the right form. Yet there is absolutely no evidence that those rules apply elsewhere in the synchronic grammar of Shona (whatever the case in related languages like Xhosa) and their apparent generality is

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I should like to thank Erhard Voeltz for Xhosa examples which (had I needed it) would have convinced me that a generalized form of this rule is a synchronic P-rule in that language. The reader must forgive me for assuming that while there are many universal aspects of language structure, the existence of specific P-rules in a grammar must be argued afresh for each language.
quite spurious. The fact that none are independently motivated as present-day Shona rules means that they have scarcely any explanatory power.

A second objection is that rule (2) as a synchronic rule is really little more than a trick. It makes no mention at all of the concord classes in which it applies, but appears to be a perfectly ordinary rule of phonology relevant to certain very general, structurally defined contexts. Yet, only stems with class 5, 9 or 10 prefixes can possibly meet the description of its domain, while the fact that it results in two different series of sound changes in the initial consonants of such forms is represented as a chance result. That seems quite wrong. Unless we have other good evidence to the contrary, we should accept the superficial evidence provided directly by the language: the two distinct series of sound changes (or whatever they are) in present-day Shona depend not upon the presence of initial /n/ or /r/ in the prefix, but on the class features of 5 or 9/10. We shall shortly return to this point, but first let us consider some other objections to the rules.

A third, minor, problem concerns rules (1) and (8) (= (11)), two rules deleting nasals. The first removes all prefix nasals when they don't occur before a noun or an adjective; the second has the effect of removing the nasal of class 9/10 before a noun or adjective. In other words, it removes a nasal left just long enough to condition the assimilations etc. that realize the 9/10 prefix before nouns and adjectives, and then it, too, disappears. It has recently been argued (e.g. by Brame [1970]) that identical or similar rules must sometimes apply at a number of points in a grammar; but the presence of two rules related in this manner in a set of such narrow relevance and little motivation must be regarded as suspicious. The rules cannot, of course, be combined, since the difference between the non-noun prefixes i-/dzi- and the corresponding process of nasalization before nouns is "explained" by the ordering. The possibility of generalizing (8) to (11) does not, of course, increase significantly the credibility of having a second rule that deletes the previously protected nasal -- and the generalization is not strongly motivated.
A fourth objection depends crucially upon some observations made by Hale [1970]. I shall not repeat Hale's evidence. Suffice it to say that he has argued that there is a general constraint on underlying structures which prevents them from violating the "canonical form" of the morphemes of a language. It is hard to make this idea precise, partly because the notion of "canonical form" is not really well-defined, so any objection resting on these claims cannot be allowed too much weight. Nevertheless it is worth pointing out that Hale's constraint would exclude the postulated form for the basic class 10 prefix /dzini/ since no current Shona noun class or concord prefix is disyllabic at the surface. Most have a mono-syllabic form, while even apart from classes 5, 9 and 10 there is a small class of nouns ((1a): mainly kinship terms) which have no segmental prefix. To set up an underlying prefix /dzini/ would therefore violate Hale's suggested constraint, although either a zero prefix or a mono-syllabic one would not.

The most significant of these internal objections is probably the second, and I want to develop a little further the point that by using these rules we have represented as phonological a process which is in fact primarily morphological in nature. Take the deletion of the nasal in classes 1, 3, 4, 6 and (by hypothesis) 9 and 10. Rule (1) deletes nasals occurring in a prefix before anything but a noun or adjective. No phonological features at all are mentioned in the environment of the rule. The only purely phonological rules that it interacts with in any way are those which follow in the set given above -- and they simply fill in the details of the class 9/10 prefix as realized before nouns and adjectives. There is, in other words, no independent empirical reason for claiming that the difference between, say, mu and u has anything to do with the sound pattern of Shona.

Of course we need to be able to mention aspects of the syntax, morphological features and so on as part of the environment of phonological rules: some must be restricted to nouns, others to verbs and so on. Pre-generative phonologists have been rightly criticized for arbitrarily excluding grammatical information from phonological rules by insisting
on the complete separation of "levels". Numerous examples could be cited of rules which have to make use of non-phonological information. The English stress rules are an obvious example (Chomsky and Halle [1968]). Kuroda [1967] suggests a number for Yawelmani; so does Kisseberth [1970]. Such rules seem to be at least as well motivated as many rules which refer only to phonological features.

So there is, at present, no way of excluding from the phonology a rule like (1) which has absolutely no phonological content. It is of course very easy, and probably quite correct, to modify present theory so as to prohibit P-rules that produce a deletion or feature change in an environment defined solely in non-phonological terms. Let us assume that a principle to that effect is incorporated into the theory. What are its effects?

We shall have to find some other, general way of accounting for the relationship between the noun and agreement prefixes in 1, 3, 4, 6 and for the postulated underlying forms for 5, 9 and 10.

First, however, let us consider the relevance of the proposal to a rule like (2a):

(28) Rule 2a. Vowel-deletion:

\[ i \rightarrow \emptyset / \begin{cases} + \text{sonorant} \end{cases} \begin{cases} + \text{coronal} \end{cases} \begin{cases} \text{C} \end{cases} \begin{cases} \text{N} \end{cases} \begin{cases} \text{Adj} \end{cases} \begin{cases} \text{stem} \end{cases} \]

This rule would escape our prohibition as it stands. The rule makes reference to some obviously phonological information. Yet, as we observed earlier, Vowel-deletion seems to be little more than a trick which makes use of the fact that only in the prefixes of classes 5, 9 and 10 does /i/ appear in the stated, largely phonological environment. In other words, we could substitute for (2a) a rule of roughly the following form — assuming (as I believe we must) that concordial class features are easily

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7For example by Chomsky [1964].
available to the phonology: 8

(29) Rule 2a'. Vowel-deletion:

\[ \begin{array}{c}
I \rightarrow \phi / [ + \text{Class 5} ] [ + \text{Class 9} ] [ + \text{Class 10} ] \{N_{\text{Adj}} \} \text{stem} \\
\end{array} \]

The precise form of the rule is unimportant. What matters is that it makes use of no phonological features yet achieves precisely the same effect as rule (2a). Perhaps we should extend the original principle:

The anti-cheating law:

No P-rule may be included in the phonological component
which makes exclusive use of a non-phonological environment
or is equivalent in effect to such a rule.

To include such a general principle in linguistic theory incorporates, I suppose, the claim that a language learner will prefer to make use of syntactic/morphological information rather than phonological, if possible.

Such a claim seems quite plausible, though I don't want to pursue it until later. 9 For whether or not there is a general principle of grammar which will exclude rules like (1) and (2a), we have seen that those particular rules are highly suspect and lack independent motivation. I shall now show that there is an alternative account of the phenomena which looks more promising.

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8 It would, of course, be possible to avoid all the separate "phonological" rules discussed earlier, to set up zero prefixes (or delete the entire prefixes) before nouns and adjectives in classes 5, 9 and 10, and to use class features to initiate directly the stem-initial changes of voicing and nasalization. This would avoid the specific objections made earlier to the proposed set of phonological rules. Nevertheless such a solution would remain totally unexplanatory. Fortunately it is excluded in principle by the prohibition just suggested.

9 It will be possible to discuss this principle more meaningfully once an alternative framework is sketched for the Shona data, and we shall return to consider it in some detail at the end of the paper.
3. The two-prefix solution

Up to now we have been assuming that there is a single prefix available for each noun class, which starts out before appropriate noun stems and is presumably spread to other items in the noun phrase, such as demonstratives, possessives, and perhaps adjectives and relative clauses, and to the verb with which a subject noun agrees. We have, in other words, assumed that a sentence like vanhu vose vanofa, 'all people die', starts out in deep structure as something like:

(30)

The morpheme (or formative) va- is simply spread as shown. Or, to follow Givón's [1969] more sophisticated proposal, the noun munhu/vanhu 'person'/'people' has a set of appropriate features associated with it in the lexicon and in deep structure and these are spread onto other items. Late lexical rules insert the appropriate prefix (va- in this case) before elements bearing the relevant features. For our present purposes the two proposals need not be distinguished since both involve the assumption that only one basic phonological form is involved for each class prefix.

This is a very natural assumption. It has formed the basis of much of generative phonology. Unless we permit pairs like 'decide' and 'decision' to incorporate a single phonologically invariant morpheme, there is no basis for many of the rules of Sound Pattern of English. Generative phonology is characterized, in fact, by a reluctance to posit distinct allomorphs which are at all related in sound. Clearly there are no sound rules in English which will relate 'go' and 'went', so those must be regarded as suppletive allomorphs. But not 'sit' - 'sat', any more than 'receive' - 'reception', or 'satisfy' - 'satisfaction' -- pairs which are all to be accounted for by regular sound rules [SPE, p. 201].
Now it must be perfectly obvious that the class 2 noun prefix va­
and the class 2 prefix used in concord with it (i.e. va- ) are very
closely related; even more so perhaps, than the basic stem in a pair like
the English 'receive' - 'reception', where there may be no simple rela-
tionship in meaning between the two words. And the prefixes of the noun
and agreement series are phonologically identical for most classes. So
it would certainly be right, other things being equal, to derive the
aberrant forms from the other series by phonological rules, positing a
single basic set of prefixes.

However, it is worth noting that if there are really two distinct yet
related series of prefixes this will not be the first case in generative
phonology where an obvious, "phonological" solution seems to be wrong.
Hale [1971] has shown that there are good reasons for setting up a whole
series of allomorphs for the Maori passive, and has extended his argument
to other cases. Stampe\(^{10}\) has argued against a "phonological" solution for
the English strong verbs.

Now notice that the noun prefix is not necessarily "the same morpheme"
as the concordial prefix related to it. Indeed there are some rather good
reasons for thinking that they may be distinct -- quite apart from the
fact that they are not always phonologically identical. For one thing,
the noun prefix bears at least some elements of meaning. As a classifi-
catory device each prefix might be regarded as the realization of certain
aspects of the inherent meaning of its noun. (See (3) above). For example,
the word mukadzi, in class 1, means 'woman'. There is also a class 9
noun hadzi meaning 'female animal'. The only difference in form is the
class difference, and the difference in class "meaning" between 1 and 9
amounts in effect to the observed semantic difference between these two
words. With most nouns, the semantic relevance of the characteristic
prefix is less clear: it generally seems to contribute to the meaning
of the whole construct much as the English prefixes 'dis-', 'de-' and
're-' do in 'disappear', 'detach', and 'receive'. To varying degrees the

\(^{10}\)According to Jim Heringer [personal communication].
meaning of the whole word is affected by the prefix (as we can see from contrasting words like 'appear', 'attach' and 'deceive') yet somewhat idiosyncratically and not in such a way that the prefixed morpheme can be assigned a clear independent meaning.

However there is a way of using noun prefixes which focuses unambiguously on their semantic content and shows clearly that they differ in this respect from the concordial series.

As in most Bantu languages, noun prefixes can be used in "secondary function" (Fortune [1955: 54]). In this usage a prefix which is not normally associated with some stem is used before it, either alone or in addition to a normal prefix. Clear semantic change results. For example, the word mwana (i.e. mu-ana) means 'child'; a prefix used only in secondary function is ka- meaning 'small', and a small child may be either kamwana or kana. Lacking the "human" prefix mu-, the latter is rather more general in meaning. Fortune glosses it 'small offspring' [p. 58]. All class prefixes may be used in this way. The class 7 chi- has as one of its meanings in secondary function the notion 'short, stumpy'. So the class 3 word muti 'tree' may take the class 7 prefix in secondary function, yielding chimuti 'short stumpy tree'. It is often not necessary to include the basic, customary prefix in order to retain the meaning of the original word. Sometimes, in fact, it is necessary to discard it. For example, the word musikana 'girl' may be modified by secondary use of the class 5 prefix (which before an /s/ is unrealized) yielding sikana 'big girl'. A good deal is known about the environments in which the original prefix is lost, the meaning relations, and so on, but the area is still in need of a good deal of study.

How to represent these relations in a theory of linguistic structure is not yet clear. It may seem that the prefixes should be segmentalized out transformationally, using features of the noun stem after the manner suggested by Postal [1966] for the English determiners and pronouns. Givón [1969] in effect chooses such a system, entering all prefixes from the lexicon at a very late stage and representing them only in the form of semantic and syntactic features on nouns in the underlying structure.
That may be correct, though Givón's system is not adequately structured to account naturally for the differences between e.g. kamwana and kana and at the same time to explain the existence of only sikana, on the one hand and only chimuti (not *chiti) on the other.

One significant fact which must be handled by any account of the prefixes is this: when a prefix is added to an existing prefix then it is only the left-most one that controls concord.\textsuperscript{11} So we get chimuti ichi 'this short tree', not *chimuti uyu. Hence, if the noun prefixes are to be segmentalized on the basis of features of the noun stem, there are three consequences: (1) the normal "class" features associated with that stem must first segmentalize to mu-, and (2) the added semantic (and perhaps syntactic) force apparently carried by the secondary prefix must be assigned to the noun, and (3) these added features must segmentalize, and they alone are permitted to induce concordial agreement. It is therefore necessary to ensure, for example, that while both chi- and -mu- can appear (in that order) on -ti, any other elements in concord with chimuti will have the prefix chi-. The most important point is the fact that chi-, a meaning-bearing element entirely un-related to the stem -ti (or whatever corresponds to chi- at the appropriate stage in a derivation) controls the concord.

The most economical account of these facts will, as far as I can see, be a notational variant of a theory in which the left-most prefix of a string of noun prefixes determines the form of all the non-noun prefixes in concordial dependence on that noun.\textsuperscript{12} If we generalize such an account

\textsuperscript{11}When one of the locative prefixes pa-, mu, ku- appears, either that prefix or the left-most noun prefix controls concord: pamusha apa or pamusha uyu. There is a meaning difference. The locative prefix appears to be analyzable as either inside or outside the noun phrase with which it is associated. This may well be comparable to the behavior of prepositions in English which may optionally be treated for certain purposes (e.g. question fronting) as part of their object noun phrases.

\textsuperscript{12}Givón [personal communication] has pointed out that he considers a system of ordered features, which includes some features on the noun stem, to be just such a notational variant. Probably it is. But I see no reason at present for adding the power of ordering to a system of features which is already grossly over-powerful. I see every reason for trying to avoid having to use features if at all possible.
to cover the normal case, as when the noun *muti* selects a class 3 demonstrative, in *muti uyu*, we shall have to assume that even a basic noun prefix is entered before any concordial prefix is entered.

Then *mu-* will be the left-most noun prefix -- since it will be the only one -- and will be available to spread the prefixes onto the other items.

I claimed above that the simplest account of this process would be a notational variant of the version I have just given. Thus, while it would be possible to reformulate this account using a hierarchical arrangement of features within the noun, to do so would be no different from what we have suggested.

Thus, *pace* Givón [1969] -- but following Gregerson [1967] -- we need to have a rule spreading concord from a noun prefix, roughly thus:

\[(31)\]

Instead of:

\[(32)\]

We could, of course, assume that in a normal case like *muti* the noun prefix *mu-* was attached to the noun by the same transformational process that attached the concord prefix *u-* to other constituents of the noun phrase and to the verbs as in *muti uyu uzofa* 'This tree will die'. However, even if we did that, we should still have to introduce a special
rule into the grammar to enter the -mu- prefix found in chimutí, this
time without affecting any of the concordial prefixes. Obviously the most
general procedure is to separate the entering of the noun prefix(es) from
the process whereby features, prefixes or whatever are spread onto or
entered before demonstratives, relative pronouns, verbs and so on.

In fact there is no good reason for supposing that a noun like mutí
comes out of the lexicon in any other form than precisely that. If such
lexical items are entered into syntactic trees at a level somewhat resem­
bling Chomsky's [1965] deep structure; then just as English words like
'dismay', 'disappointment' and so on enter deep structure as units, so
does mutí. No matter how the affixal material is stored in the lexicon
(and we can safely leave that question quite open) the English words are
syntactic units. Likewise Shona words like mutí and munhu. In due
course I shall show how it is necessary to assume a level much like deep
structure in order to capture several important relations which are other­
wise lost -- in particular to explain the identity of the noun and adjective
series of prefixes, but so far we have only provided one slight argument
for separating the noun prefixes from the rest -- by implication regarding
the noun prefixes in all instances as, in some sense, meaning bearing
morphemes present in deep structure, while treating the related concordial
prefixes as empty formatives introduced by transformation. Such an analysis
is intuitively satisfying -- but not yet well supported. The really strong

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13Something obviously needs to be said at this point about the fact
that the plural of mutí 'tree' is mití. At the very least, the stem
-tí cannot appear in the lexicon associated irrevocably with just one
prefix. There must be some way of capturing the fact that each stem is
normally associated with two or more prefixes. If number is a syntactic
category in Shona, then the plural prefixes (at least) may have to be
associated with the stems after conjunction reduction. (See Givón [1969]
but also Roberts and Wolontis [1972]). Nevertheless, the relationship
between a stem and its prefixes appears to be a lexical fact. Both the
singular and the plural prefix appropriate to a stem are lexically asso­
ciated with it either individually or by redundancy rules or in both ways.
If there is a second access to the lexicon after conjunction reduction
(etc.), this probably needs to do no more than make use of the information
already given there concerning the normal association of pairs of singular/
plural prefixes.
arguments for adopting it come from its explanatory value when applied to our original problem -- the two series of prefixes.

A moment's reflection will serve to throw considerable doubt on the relevance of our present strategy to an explanation of those facts. For we have suggested only that noun prefixes should be entered directly from the lexicon with the stems. The rest will be handled by a transformational rule -- including the prefixes on adjectives. Yet it is the prefixes on nouns and adjectives that are identical, and they differ from the others. I shall now try to show that far from defeating our proposal, this may actually increase the explanatory value of that hypothesis.

We must consider the details of the system of concord spreading. Both Gregerson [1967] and Givón [1969] have formulated rules. Gregerson proposed the following very general rule:

\[(33) \quad A^*P - N - X \Rightarrow A^*P - N - A - X\]

A is the left-most prefix
P is the noun prefix
X is a variable, possibly null
N is a noun stem

This may be represented, still roughly but in less esoteric notation as:

\[(34) \quad X - P - (P^*) - N - Y \quad 1 
2 
3 
4 
5 \Rightarrow 
1 
2 
3 
4+2 
5\]

What Gregerson intended his rule to do was to copy the left-most noun prefix once, immediately to the right of the head noun. So from "vanhu-no", the rule would derive "vanhu vano 'these people'.

Of course a very general rule like Gregerson's is highly desirable. If it really worked, we should be much inclined to accept it even if that meant treating the irregularities in the form of the concord prefixes in a very ad hoc fashion. But it is grossly over-simplified. None of the boxed prefixes below can be generated since they don't fall immediately to the right of the head noun and since only one concordial prefix can be obtained from each head.
(35a) N → X
mite yangu iyipo se
trees mine those all
Not generated Gloss
'all those trees of mine'

(35b) mite iyip hippichazowira pasi
trees mine they-will- ... 'Those trees will fall down'

Givón [1969] gave a more adequate rule. His is in the form of a schema. In this discussion I shall simplify his treatment whenever this will not affect the argument. First he defines the categories of lexical item which can take concord, letting X be such a category:

(36) X → (DEM, QUANT, VERB, COP, ADJ, NUM, ORD)

Then he spreads concordial features14 (which I shall simply represent as [Classi] onto all such items in the relevant positions:

(37) S → [X [Classi] /... [N [Classi] ... -- ] NP ]

The first case of the schema spreads concord onto demonstratives and quantifiers. All the other categories are assumed by Givón to be somewhere in the predicate at the time that this spreading rule operates so will acquire appropriate features from the operation of the second sub-part. At least in outline, then, the rule schema seems to work. We might find fault with the details, but there seems no doubt that concord must be spread (a) onto certain constituents of NP, and (b) onto certain constituents of VP, and Givón's rule reflects this.

I shall assume without further discussion that Shona ordinals (and possessives -- not mentioned in this connection by Givón) are generated within the noun phrase -- or at any rate need not be assigned concord

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14Givón [1969] ends up spreading various pronominal and referential features, in addition to his concord rules. He does not make his motive for doing so clear enough to be persuasive.
by any rule other than the first case of the above, since I know of no serious arguments to the contrary. Likewise, there is no syntactic reason for distinguishing Givón's class of numerals ("two", "three" etc.) from the adjectives.

If we make these adjustments, it is possible to generalize Givón's rule and reformulate it within our framework so that it assigns concordial features (or a prefix -- whichever turns out to be the correct version) to:

(a) every other constituent in the noun phrase of the head noun; and
(b) to the initial element in a VP following a head noun.

I shall not bother to formulate the new concord rule precisely. It must operate as shown below:

(38a) **NP agreement:**

\[
\begin{array}{c}
\text{NP} \\
\text{x} \quad \text{N} \quad \text{y} \quad \text{z} \\
\text{Pre} \quad \text{Stem}
\end{array}
\]

(38b) **Verb agreement:**

\[
\begin{array}{c}
\text{S} \\
\text{NP} \quad \text{VP} \\
\text{x} \quad \text{N} \quad \text{y} \quad \text{z} \\
\text{Pre} \quad \text{Stem} \quad \{ \text{V} \} \\
\{ \text{COP} \}
\end{array}
\]

Other things being equal it would be nice to be able to formulate the concordial agreement rules in this way. We should not need to specify the whole set of concordable elements, and could apparently provide a much simpler structural description for the rule. Furthermore it may well turn out that universal constraints can be put on agreement transformations permitting them to recognize only such grammatical relations as "head-modifier", "subject-verb", "object-verb". Our new rule(s) would be able
to reflect such constraints while the old one would not. We have not, of course, provided direct evidence for modifying Givón's rule in this way, but have simply suggested that it would be good to try and introduce such a simplification.

There is some apparent counter-evidence. For notice that we have apparently failed, in our new account of the syntax of concord, to assign agreement to predicate adjectives. That this is so may not be obvious. For we find sentences like the following:

(39) munhu mūkuru
    person big
    'The person (is) big.'

No overt copula occurs. In fact it cannot do so: *munhu ari mukuru.
Thus it might seem that a predicate adjective works just like a verb in Shona, acquiring concord by the second sub-part of our tentative rule. Gregerson [1967] analyzed adjectives as verbs in Swahili, citing in support Ross's [1969] analysis of English adjectives; and he used this analysis to avoid a special concord rule for predicate adjectives in Swahili, subsuming them under his one, very general (and incorrect) schema. See also Voeltz [1970: 150].

But there is pretty clear evidence that munhu mūkuru ('The person is big') has a deleted copula. The structure is:

(40)

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15Voeltz [personal communication] has indicated that he intended only to imply that the "adjectives" in Xhosa which take secondary (i.e. non-noun) prefixes are derived from verbs. This was not clear. In any case I rather doubt whether even that class of words, which does not occur in Shona and is not discussed further in my paper, comes from verbs. The concord comes from a relative clause; the words are basically nouns used as predicatives, just like the more generally found class of Bantu adjectives.
rather than

(41) *

For in all but the positive indicative and relative forms with third person subjects the copula -ri (or some more obvious form of that verb than the high tone indicated in the above examples) has to appear. Thus there are forms like:

(42a) ha a ri múdiki
   neg he be small
   'He is not small.'

(42b) a nga ari múdiki
   He past he be small
   'He was small.'

Low tones are indicated on the adjective to show that in such constructions we do not find the high tone that occurs when -ri is deleted.

Even if we obtained the adjectival concord for munhu múdiki by using the verbal rule we should need another for all other tenses and for negative sentences, e.g.

(43)

We could, of course, follow Ross's analysis yet further, postulating a noun phrase dominating a sentence out in the predicate after the copula:
Cyclical operation of the concord rule would obtain the right agreement in this sentence prior to the operation of EQUI to delete the subject of the lower sentence.

That would be wrong for two reasons. In the first place it would force us to yield up all hope of explaining the fact that nouns and adjectives possess prefixes which are alike and differ significantly from the verbal prefix. Any account of concord which can explain that fact is (other things being equal) better than one that can't.\(^{16}\) The second objection is more tangible and, perhaps, more immediately persuasive. It involves predicate adjectives with first and second person subjects, such as:

\[(45)\] ndi ri mudiki

\[\text{I be small}\]

'I am small.'

Observe that in such forms the adjective has a class 1 prefix. A form like *ndiri ndidiki is totally unacceptable, although there is clearly a first person concordial prefix available and used elsewhere, as in\(^{17}\):

\[(46)\] ini ndonga hdiri mudiki

\[\text{I only am small}\]

\(^{16}\)We could posit a special kind of EQUI which would leave behind (and move onto the adjective) a copy of the noun prefix. If independently motivated, that would explain the similarity between nouns and adjectives. Unfortunately, I find no other evidence for such a rule.

\(^{17}\)The form ini shown under the subject NP is the "absolute pronoun" for the 1st person. When it appears it generally has somewhat emphatic force. Nevertheless I shall assume that the underlying form of ndinoenda is *ini -noenda. Then ndi- the subject concord is inserted by transformation and ini is deleted.
Hence we should expect an underlying structure modeled on Ross to be something like

which would generate only the undesirable form shown earlier.

The existence of sentences like ndiri mūdiki beside ndira ndona..., while not crucial, must be seen to play a major role in my argument. For such examples show very clearly that no matter how the rule of adjective concord is stated it cannot be precisely the same as any other rule spreading agreement. For the adjective rule, alone, must spread class 1 instead of first and second person agreement. Hence it becomes more profitable to look

\[\text{18Shona is not alone in displaying this phenomenon. It is, in fact, common. Thus Sotho possesses forms like Ke mobe 'I am bad (evil)', where the stem -be is an adjective and the syllable -moe- is the noun prefix (NOT the concordial prefix) of class 1. In contrast, a verbal construction like Kēlīlo 'I have come' exhibits only the first person concord. Likewise in Xhosa there are adjectival constructions like Sihahlè 'We are beautiful' which must incorporate the noun prefix, -ba- of class 2 in this instance, and thus contrast with verbal forms like Sihamba 'We go'. Notice that in both Sotho and Xhosa, the overt form of the concord has disappeared, even with first and second person pronouns. Givón [personal communication] has pointed out that in Bemba the relative clause concord for first and second persons in class 1/2 e.g. né-ù-bomba 'I who work'. He considers this to reduce the force of my argument. However, it must be remembered throughout this paper that my argument forms a coherent whole for Shona, not necessarily for other, even closely related languages. I would not be surprised to find a radically different analysis to apply to this small class of words in other Bantu languages. See footnote 33.}\]
elsewhere for an account of adjective agreement and to leave the concord spreading rule in the very general form set out above: (a) NP agreement and (b) Verb agreement.

There is a way of accounting for the agreement of predicate adjectives which will handle forms like ndiri mudi ki perfectly well. We could derive all adjectives from the attributive form. Thus we should obtain the sentence munhu mukuru ('The person is big') from an underlying form:

\[(48)\]

\[
\text{S} \quad \text{NP} \quad \text{VP} \quad \text{NP}
\]

munhu \(\rightarrow\) -ri \(\rightarrow\) munhu mukuru

The NP agreement rule would, of course, operate within the predicate noun phrase, producing *munhu ari munhu mukuru \(\rightarrow\) munhu munhu mukuru.\(^{19}\)

Optionally, the head of the predicate noun phrase would be deleted\(^{20}\) (in addition to the copula) and a simple rule moving the high tone acquired by munhu onto mukuru would yield the correct forms. Now since we already have separate rules for NP and Verb agreement, we should need to posit a deleted head noun, say munhu in the predicate of the underlying structure of ndiri mukuru, and to permit the rule deleting the identical head noun in the predicate of the previous case to cover the head noun when there is a first or second person subject:

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\(^{19}\)This is, of course, a perfectly well-formed sentence -- it means, roughly, 'The person is a big person'.

\(^{20}\)There appears to be a rule in the grammar which deletes the head noun in phrases containing a modifier e.g. Mukuru akaenda 'The big (person) has gone'. This rule must be rather similar to the one that might be proposed to derive the English sentence 'That book is John's' from 'That (book) is John's book'.
This treatment comes very close to accounting for all the facts. But it is not quite good enough. In the first place, although deletion of an identical head noun in the predicate is a reasonable hypothesis, the required extension is very ad hoc. Moreover, the choice of head, munhu, is entirely arbitrary.

A more serious objection concerns the change in meaning which results from the hypothetical deletion. In English, there is one meaning of 'that elephant is small' which is not synonymous with 'that elephant is a small one'. The reading in question is probably false. Fleas, mice and perhaps even dogs are small in that sense but not elephants. In a comparable fashion 'that singer is good' may be non-synonymous with 'that singer is a good singer'; the former but not the latter may be interpreted as a reference to the singer's moral rectitude. Such facts are well known. They have been used by Vendler [1967] to argue for an adverbial source for one sense of the adjective in 'good singer'; they can equally well argue against deriving all predicate adjectives from within a noun phrase, for it is at least clear that we should not be able to represent the meaning of 'that elephant is small' by deriving it from 'that elephant is a small elephant'.

Shona speakers (predictably) make the same distinction. Informants have reported in particular that ndiri múdiki 'I am small' and ndiri múnhu múdiki 'I am a small person', differ in the expected fashion and hence to derive the former from the latter would fail to give any account of the difference in meaning between them.

Moreover, if we derived all adjectives as modifiers in a noun phrase this would (just as surely as a derivation from verbs) totally fail to
explain the special relationship between noun and adjective prefixes — we should expect the adjective prefix to be the same as the one on demonstratives, quantifiers and so on. 21

We have now shown that all the obvious alternative derivations fail to explain the fact that nouns and adjectives take the same series of prefixes, and that all those sources introduce additional problems. At the same time we have demonstrated that the adjective concord rule must be quite distinct from the others and should assign the features of a noun class to a predicate adjective — even when the subject is not third person. We are now in a position to set up a specific counter-proposal which will not be subject to the objections raised so far. Above all, it will permit a (partial) explanation of the two series of prefixes. It is proposed that noun-adjective agreement in Shona is obtained not by a transformational rule at all, but by the operation of selectional restrictions operating at the point of lexical entry. Shona adjectives are a special kind of noun which appears only in the predicate of a copula and which has to agree in class with the subject of the sentence.

To justify this proposal, consider first the fact that there are selectional restrictions between a subject and nouns or adjectives after the copula in English:

(50)  
(i)(a) John is a teacher  
(b) *John is a fire  
(ii)(a) The gun is a weapon  
(b) *The gun is abstractions  
(iii)(a) For John to go now is a pity  
(b) *For John to go now is a flower  
(iv)(a) Mary is pregnant  
(b) *John is pregnant

21The special relationship between the noun prefix and the prefix on predicate adjectives might still be accounted for: the prefix of the deleted noun could simply be left behind when the noun was deleted. But I know of no motivation for such a manoeuvre. In any case, since attributive adjectives would be basic, and could not come from reduced relatives, such an account could not in principle be extended to cover adjectives within noun phrases.
His recovery is unlikely
*His shirt is unlikely

In Chomsky [1965] such selectional restrictions are taken to be a part of the syntax. McCawley [1968] argued, largely on the basis of sentences like *'My buxom neighbor is virile' that selection was really accomplished in the semantics. Whichever is correct, it seems clear that there is a mechanism which (1) involves at least some semantic rather than purely syntactic machinery, and (2) operates no later than the point of lexical insertion, to characterize sentences like (50)(i.b) - (v.b) as anomalous. The degree to which those sentences are felt to be syntactically anomalous varies. A speaker might hesitate to call (50)(i.b) ungrammatical yet be willing to admit that (50)(iii.b) is syntactically bad. Without trying to deal in more detail with the problem of sub-categorization, and merely noting these facts, we may pass on to the problem at hand.

Can the concord of predicate adjectives in Shona be handled by the mechanism for capturing selectional restrictions? I think it can. But the theory of selection needs to be broadened. Precisely the same kinds of anomaly result in Shona in sentences comparable to (50)(i) - (v). I shall not bother to illustrate that, since it is predictable on general grounds. However, ordinarily there is no constraint on the concordial class of the subject and predicate noun. We find sentences like:

(51) munhu uyu fongoa
    man this doctor
    (class 1) (class 9)
    'This man is a doctor.'

Hence, if we wish to account for the ungrammaticality of:

(52) *munhu uyu fguru
    man this big
    (class 1) (class 5)
    'This man is big.'

by using the selectional apparatus of the grammar, we cannot do so merely by using the existing machinery which applies to ordinary nouns.
Yet recall that the noun class system is at least in part semantic. We need to find some special aspect of the semantics of the class prefixes which would block the insertion of an adjective unless it fell into the same class as its subject noun. If we found that, we could seek to analyze adjectives as:

1. a special class of nouns which occur in all classes, and are
2. restricted to insertion in predicate position after the copula,\(^{22}\) and are
3. permitted to enter a syntactic structure only if their class prefix did not clash with that of the subject.

Such a proposal for the syntax of Shona adjectives clearly requires that we justify (1) and (3), especially the latter.\(^{23}\) Before we try to do so let us consider what such an analysis will buy us.

First of all, it will permit us (with a little extension) to generate all and only the correct agreement for predicate adjectives. The third part of the proposal has been specifically worded to cover the fact that first and second person pronouns select class 1 adjectives. I shall not discuss that extension further; it seems perfectly natural if the agreement in question is semantically based, since class 1 is the human class.

\(^{22}\)This assumption may be wrong. Attributive adjectives are clearly derived from relative clauses in Shona -- whatever is the case in English. (See later in text.) But it is possible that the use of adjectives as superficial heads of noun phrases, as in footnote 19 above, arises not by deletion but by direct entry in deep structure. In any case, however, there are similarly restricted predicative nouns in English:

(i) \#A pity \{ happened was found \} yesterday.

(ii) That is a pity.

\(^{23}\)The justification of both (1) and (3) in fact forms the topic of section (4), Adjectives as a lexical class. It is easy to object to these proposals in general terms on the grounds that they are "costly" -- but that is like complaining that linguistics is "difficult". Any alternative proposal must systematically explain at least as much as this one.
and only humans can generally be expected to speak or be addressed and hence to be represented as first or second person.  

Secondly, the proposal accounts very naturally for the fact that the attributive adjective (as in munhu múdiki ('a small person')) have, in Shona, precisely the same form as their predicative counterparts save only for the low tone on the prefix. We need only to suppose that all adjectives are ultimately derived from the predicatives, as implied in (2) above. The high tone on a predicative adjective is transferred from the high tone on the subject concord of the copula when that copula is last:

\[(53)\]  

\[
\begin{array}{cl}
\text{munhu } & \text{ári} \\
\text{ári} & \text{munhu múdiki}
\end{array}
\]

In Shona the only overt mark of relativization involving the subject of an embedded sentence is lowering of the high tone on the subject concord. We find contrasts like the following:

\[(54a)\]  

munhu ánofamba  
'The man travels.'

\[(54b)\]  

munhu ánofamba ...  
'The man who travels'

In the process of relativization the high tone normally acquired by the predicative form is therefore lost.  

\[24\] Note that in stories involving animals having the power of speech etc., those animals generally act as class 1.1 nouns (see Fortune [1955]) and select class 1/2 concord. Voeltz [personal communication] has advanced a very interesting objection to the present proposal which, I believe, should be accounted for in a similar manner to this. He points out that under my proposal, gender resolution under conjunction reduction (see Voeltz [1971]) would be selectional for adjectives, but transformational for verbs. It is obviously unsatisfactory to propose two distinct methods of resolution which happen to have the same effect: I expect to find that a single semantic mechanism will handle the problem but cannot at present provide details. See, however, Roberts and Wolontis [1972].

\[25\] Fortune [1955:329] makes the rather confusing claim that "the positive relative (of the copula, -ri)...is not used in the third person with a (noun or adjective) complement, this not being used in the indicative." We have interpreted munhu múkuru 'The person is big' as having a deleted
copula remains at this stage in the cycle, the high tone being lost from its subject concord. Loss of the copula may occur only on the last cycle, when there is no high tone to transfer to the prefix of the relativized adjective.) The attributive adjective ends up with the correct, low tone on its prefix.

Thirdly, such an analysis will permit us to modify Givón's spreading rule (37), as suggested above, to copy concord only onto the first constituent of VP.

Finally, and most important, this account will permit us to explain in semantic terms why nouns and adjectives take the same prefix series. For we can now permit the concord transformation(s) to enter not a copy of the prefix of the head noun, but the equivalent member of a related series of meaningless formatives. The adjective prefix on the other hand is the same as the noun prefix because it is not entered by concord transformation but is itself the noun prefix, a meaning-bearing element present in deep structure.

4. Adjectives as a lexical class

So far we have shown only that this proposal will work -- indeed will provide a more general account of a number of different aspects of the data than any other. Nothing has been said to justify the details of that proposal, in particular the idea that Shona adjectives are a special type of noun with a special selectional relation (of class identity) with their subjects.

Consider the following data showing some of the ways in which English adjectives would be translated into Shona:

(55) (i) a. munhu anorurama
     'a person who 'justs'; a just person'

b. vanhu vanowadzana
     'people who befriend each other; friendly people'

VERBS

'Active'

qualities

copula; it seems correct and perfectly in harmony with the rest of the language to interpret munhu muku 'the big person' as also possessing a deleted copula.
In each case, semantically typical examples of the syntactic construction are given. Together they make up virtually all the notions represented in English by adjectives. As can be seen, the syntactic constructions divide roughly along semantic lines. These examples have not been chosen too unfairly but they probably represent the classification as a little more clear-cut than it actually is.\textsuperscript{26} Nevertheless it seems quite clear

\textsuperscript{26}For example some of the adjectives have related verbs. I am indebted to Earl Stevick for the example kureba 'to be long', probably morphologically related to the adjective refu 'long'. There are others like
that Shona makes more syntactic distinctions than English in this area, and that the syntactic distinctions possess semantic relevance.

It is very hard to talk precisely about the factors involved in this classification; we are far from having an empirically testable theory within which to analyze them. Nevertheless it may be worth trying to justify more adequately the claim that there is a real semantic classification involved. Starting with the examples of (55)(i), it is certainly possible to identify 'just', 'friendly' and 'gentle' as qualities which are recognized largely through characteristic, habitual (tendencies toward certain) kinds of action; it is in this sense that they can be thought of as "active" qualities. And such properties seem to be typically represented by verbs in Shona.

In contrast, there are independently recognizable emotions or feelings associated with the qualities named (under (ii)) by a relative clause formed on the associative -na 'have' followed by an abstract noun characterizing the emotion. It is these emotions (or physical pains) rather than any actions which overtly at least, Shona uses to refer to the notions captured by the English adjectives 'angry', 'hungry' and impulsive'.

The third class is harder to characterize. Syntactically it consists of a possessive with an infinitive. A verbal notion is involved, but there is no implication that the possessor noun head of the construction refers to something that actually carries out the activity in question. Often, in fact, the infinitive contains a negative, as is found in the form translating 'ungrateful'; in the other two examples, corresponding to 'deadly' and 'final', there is no question of the disease or the words dying or ending -- something else may, or may tend to.

\underline{kupamba} 'to be wide' which are not related to an adjective. It is not yet clear how the grammar would deal with such cases but in general it seems that the 'adjectival' use of such verbs does, as would be predicted by this analysis, involve a notion of activity or process. Thus kupamba which seems to mean primarily 'to be spread out', rather than simply 'wide' is closely related to verbs meaning 'to divide', 'to separate', etc. The other example, kureba, appears to be inapplicable to, for example, a piece of string. Hannan [1961] gives as an example of the use of this form, Rebesa nhambwe dzako 'Lengthen your steps' and it would seem that such usage is typical.
It is the last class that interests us most. In contrast with all others, members of this class, represented by the Shona adjectives, typically refer to qualities which are both totally unrelated to activity, and involve no clearly separable emotion or quality which could serve to characterize them, as seems to be the case for set (ii). Among the concepts represented by Shona adjectives are (most of) the cardinal numbers: 'two', 'three' and so on as well as concepts like 'tall'. These, likewise, do not crucially involve either action or easily separable qualities, though they differ in other ways.

Having characterized the class of Shona adjectives in that way we are still unable to provide good independent theoretical reasons for analyzing them as a special class of nouns. For linguistic theory today lacks entirely a theory of lexical classes. There are some rather obvious things one can say about the syntactic characteristics of a (superficial) noun or verb. But it is clear that we know next to nothing about the universal semantic and syntactic properties of lexical classes or the inter-relation­ship between these. Nothing has been done even to define the semantic constraints which must be placed upon the notion "possible lexical class", let alone find out whether these can be derived from other aspects of grammatical theory.

A moment's reflection will serve to demonstrate that there are very definite syntactic constraints -- and that some of these are derivable immediately from the set of possible phrase structure grammars for natural language if lexical items are inserted into Chomsky's level of [1965] deep structure. The semantic constraints are less obvious but no less real. Some rather trivial negative examples should be persuasive.

We should not expect to find a language with four major lexical classes -- among which concepts represented in English by nouns, verbs, adjectives and adverbs were distributed at random, one class including, for example, words corresponding to 'jump', 'big', 'calmly' and 'beetle'. Obviously there must be some kind of semantic basis for every lexical class. But not every semantic notion can provide such a basis. We should be more than surprised to discover a language in which all the lexical items
referring to actions, processes, entities, or qualities associated with night as opposed to day or to find that animates as opposed to inanimates formed a single, syntactically and morphologically distinct class.

To characterize lexical classes positively in semantic terms is much more difficult. But even if we cannot yet constrain the notion "noun" semantically we can, on the basis of no more evidence than that just given assume that it is in principle possible to provide such constraints. And we must assume that linguistic theory must eventually yield an adequate semantic characterization of lexical classes.

It may be worth pointing out that recent work within generative semantics may well have obscured the importance of developing such a theory. For if lexical items are supposed to enter syntactic structures at relatively late stages in a derivation, stages at which semantics has no direct relevance, there is no special reason to expect significant semantic relationships to emerge from a study of lexical classes. Indeed, that such relationships exist constitutes something of a problem for generative semantics. It is frequently assumed or argued by generative semanticists, moreover, that nouns, verbs, adjectives, adverbs and quantifiers should all be derived from similar predicates at the only semantically relevant level allowed in that framework: underlying P-markers of the base. Hence even at that level there is no clear basis for the emergence of semantically and syntactically differentiated lexical classes at the various points of lexical insertion. Not that it is impossible to represent the fact that such classes do emerge. But that their emergence is difficult to explain.

If on the other hand we assume that (1) there is a semantically relevant level at which lexical insertion takes place, and (2) each lexical class plays a characteristic role in the semantic processes or relations at that level, then we have the basis for an explanation of the general semantic constraints on lexical classes and, more particularly relevant to our present concerns, an explanation of Shona adjectival concord. In so far as such an explanation is forthcoming it will provide prima facie justification for positing such a level.

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*See McCawley [1968b].*
Since we admittedly lack a theoretical framework in which to discuss the issues -- and can scarcely develop one here -- it is best to try and provide only a very general sketch of the semantic relationship between nouns and Shona adjectives.

Basic, underived nouns like 'cow' seem most typically to define classes of entities linked by the fact that they characteristically possess various persistent properties in common. Derived nouns like 'swimmer' define sub-classes which are characterized by more transient properties -- often actions. But we can leave those out of account for the present. For it is clear that such a noun is typically related to a verb, which defines a class solely by reference to one property (or a few linked properties) often having to do with an activity or process only temporarily associated with those entities.

Shona adjectives are like nouns in that they define sets of entities not on the basis of transient activity or change but on the basis of (relatively) persistent properties -- but they differ from most nouns in that the classes which they define are related only by a single more or less primitive property. All cows have much in common but all big things probably have nothing in common beyond the fact that they are big. Yet bigness, like 'cowness' -- and unlike the property of running -- tends to define a class with a fairly constant membership. If this is relevant, it may well turn out that Shona adjectives can best be regarded as a special class of noun. Yet other factors both syntactic and semantic may cause us to isolate a different, broader class of distinct, non-nominal adjectives in English. The only way to tell is ultimately to work out the details of the interaction between interpretive functions assigned to the members of such classes.

Meanwhile, we can anticipate this result -- since it points the way to an explanation of otherwise unexplained facts -- and observe that since the Shona adjectives define classes which obviously cut right across the basic, stable semantic classification partially realized by the noun class system, and fail to have any effect on the basic classification of any entity to which they apply, it would be quite inappropriate for them to do more than recognize, as it were, the basic classificatory designation of that entity;
hence the selectional agreement in terms of noun class between a predicate adjective and the head of the subject NP. Then, the fact that adjective prefixes are just like noun prefixes turns out to be a direct consequence of the semantic properties of adjectives: they are nouns that involve no essential classification.

That we are able to envisage an explanation at such a deep level of what would otherwise be a totally mysterious, superficial relationship between noun and adjective prefixes provides very strong grounds indeed for thinking that our analyses are basically correct and provides considerable impetus to efforts to develop a theory within which they can be adequately expressed. Notice that the relationship between noun and adjective prefixes is not an isolated fact about Shona. Although we have drawn our examples almost entirely from that language the word "Bantu" in the title is advisedly chosen. The details vary considerably but in very many Bantu languages there is a close relationship between nouns and a small closed class of adjectives. It remains to be seen whether other languages can provide equally strong support for similar hypotheses.28

5. Phonological relations in the lexicon

The main result is now given, together with a clear program for future investigation. What remains is the nature of an epilogue. Let us return to consider briefly the implications of such an analysis for the phonology of Shona. I implied earlier that we should want to set up two related but distinct series of prefixes in Shona. It may not be clear how our present semantic and syntactic hypotheses strengthen the earlier phonological objections to the series of rules presented in the first part of the paper.

28We have not considered how far Ross's [1969] arguments that English adjectives are verbs on the deeper syntactic level might apply equally to Shona adjectives. It is likely that they do. But that should not be considered highly significant in view of the fact that nouns are likewise derived from verbs in generative semantics. The present paper suggests that Ross's data must be interpreted in some other way for Shona (whatever the case in English) since he would be unable to set up an appropriate relationship between the phonological and semantic facts in order to capture significant aspects of the relationship between Shona nouns and adjectives.
For if nouns and "adjectives" turn out to be in effect a single major class in Shona we could actually simplify those rules and attribute to that fact the similarity in the application of the rules to both sub-classes of nouns. To account for the data in that way, however, would still be to describe what we could explain, and would crucially fail to represent the fact that the difference in prefix form depends, as we can now see clearly, on whether the prefix is entered from the lexicon with its stem, or is spread by transformation. Coupled with the objections listed earlier this suggests very strongly that a derivation by phonological rules from a single series of prefixes is wrong.

How then, are we to capture the relationships between the two series? The most likely solution seems to be in the following direction. The power of that part of the phonological component which is directly associated with the lexicon must be increased somewhat so that morpheme-structure type conditions (Stanley [1968]) are permitted to:

(a) recognize different "declensional" classes such as the noun classes; and
(b) apply after the rules combining the morphemes of a basic word; and
(c) hence to capture relationships holding between different basic forms of a morpheme in conformity with any special morphological conditions.

Thus we can suppose that a stem like -pfeni29 'baboon' has TWO basic shapes -pfeni and -bveni. There is a structure condition:

\[
\begin{align*}
\text{Class 5} & + [ - \text{continuant} ] \\
\text{Prefix} & \downarrow \\
[ + \text{voice} ]
\end{align*}
\]

This will ensure that only the second form is incorporated in a word with a class 5 prefix. We then define a convention permitting only the other

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29I am assuming that by, by, pf, etc. are not clusters but affricates. There is no good reason to think otherwise. This assumption, however, is not important to my argument.
form to occur elsewhere. Similarly there must be three conditions controlling the form of initial consonants in class 9/10 stems, conditions corresponding to the arrangement in (12), above.

As far as the prefixes go, it seems that there must be redundancy rules (roughly of the sort which Chomsky [1970] proposed largely for syntactic purposes) which capture the fact that most related pairs from the two series have precisely the same shape. The absence of the nasals from the concord series will be incorporated in those rules -- rather than the structure conditions -- since here we are dealing with two grammatically related series of formatives, and not two phonologically related forms of a single morpheme. Class 5, 9 and 10 will have no phonologically realized prefixes in the noun series; hence they will not figure in the rules. Whatever such redundancy rules have to be permitted to do, they must not be allowed to make ordered, phonological changes in a segment.

What is the advantage of such an account over the earlier one? To see that, we must take our extended structure conditions along with the Anti-cheating law. Together they amount to the claim that "sound changes" which serve solely to realize aspects of the syntax will be associated with particular morphemic environments and will not tend to generalize phonologically. They will not be ordered with respect to each other. And they will be ordered prior to the other, "true" phonological rules. They permit

30Notice that the relationship between -bveni and -ŋfeni is a special, isolated, lexical, phonological relationship between alternative forms of a single morpheme. On the other hand, the relationship between the noun prefix mu- and the concord prefix u- (or φ and ri-) is a (non-phonological) relationship between two distinct formatives. Two distinct kinds of redundancy rule are proposed in the text to handle these two kinds of relationships. The reader is referred to Lightner [1965: 54-55] for Russian examples (some involving a kind of ablaut, some not) which he seems to consider unsuited to a purely phonological treatment. It appears to me that Lightner's instinct was right, and that the forms which are not phonologically related cannot be used (as he used them) as evidence for the form of P-rules etc. Some of his examples appear to be related like -ŋfeni/-bveni; others like φ/ri-. It would be interesting to see if this is so. (I am indebted to Linda Thomas for these examples.)
us to begin to distinguish formally between "live" and "dead" parts of the synchronic phonology. And, more generally, they enable us to articulate in more detail our theory of linguistic structure.

It is extremely interesting and relevant to observe that in a great number of the Bantu languages there are "sound changes" of one sort or another associated with the initial consonants of classes 5, 9 and 10. The actual form of the relationships varies enormously from language to language. Yet the rules are almost always tied very closely to these or certain other morphological environments -- of which they often serve as the sole marker. There are scarcely any examples in the southern, central and eastern languages known to me of rules originally applying to these morphological environments which have been generalized. Such a situation is, of course, totally inexplicable in the standard theory but is just what is predicted by a modification along the lines suggested in this paper. That fact in turn tends, of course, to support the non-phonological analysis proposed earlier and hence the hypothesis that Shona adjectives form a special class of noun.

6. Conclusion

I have presented a number of conclusions here affecting widely different aspects of grammatical theory. None is, on its own, especially well motivated. I have not amassed 25 independent arguments in favor of

\[\text{\begin{quote}
\text{31 For further details see Meinhof [1932] and other Bantu grammars cited here.}
\end{quote}}\]

\[\text{\begin{quote}
\text{32 Tswana appears to have a rather complex set of active phonological rules some of which apply to initial consonants in nouns of classes 5, 9 and 10 and verbs following either a first person object concord or a reflexive marker. Some of the same rules may well be involved in apparent phonological changes affecting stem final and other consonants when passive, causative, diminutive and locative suffixes are added to verbs and nouns. See Cole [1955] and Fudge [1967]. Especially persistent is a rule which may involve consonant changes before /y/. The data must, however, be re-interpreted in the light of claims made in the present paper, but if synchronic rules have really been generalized, the contrast between Tswana and Shona may be crucial in developing my proposal -- in particular, in discovering the factors necessary for a non-phonological restructuring of sound patterns in natural language.}
\end{quote}}\]
any one proposal. (And time alone is not responsible for that failure.) Instead, I have shown how various conclusions which emerge independently in a rather tenuous fashion combine to form a theoretical network which alone seems capable of supporting a very simple, deep explanation (itself still unfortunately loosely formulated) of an otherwise altogether mysterious irregularity in Bantu concord. It is this fabric as a whole, incorporating as it does the promise of an interesting explanation, which most strongly justifies each of the separate conclusions. For convenience I list here what seem to me to be the most significant of these results:

(1) Shona "adjectives" are in fact a special class of noun.
(2) The agreement of "adjective" prefixes with a head noun is handled by selection, not a concord spreading transformation. Only verbs, demonstratives, etc. have concord spread onto them.
(3) Lexical insertion (of nouns and "adjectives") in Shona takes place at a point where semantic considerations are relevant. (There is no particular reason to distinguish this from Chomsky's deep structure.)
(4) Phonological theory must be extended to
   (a) ban ordered P-rules which in effect use purely non-phonological contexts to delete\textsuperscript{33} segments or change features.
   (b) permit structure conditions to apply beyond a single morpheme.

\textsuperscript{33}I intentionally permit phonological rules to add entire segments. There appear to be numerous cases of reduplication occurring in purely morphological environments as the sole surface representation of nominalization, intensification etc. In some cases reduplication probably has to follow true phonological rules. The mechanism involved forms an important subject for further study in the light of present proposals. Notice, however, that at least in the case of reduplication there is seldom any reason for thinking that phonological elements themselves play any crucial role in that process itself. In the simplest case, the rules just generate fresh copies of existing segments or, more properly, syllables. Any changes that are introduced may well result always from additional rules obeying our proposed constraint.
(c) incorporate other lexical redundancy rules linking related morphemes.

Finally, the paper points to the need for a systematic study of the semantic and syntactic constraints on lexical classes.

REFERENCES


Hale, K. 1971. "On non-uniqueness in linguistic descriptions". Paper read at the University of Massachusetts, Amherst.


Heny, F. Forthcoming. "Focus, interrogatives and relative clauses in Bali, Mungaka and other languages". Unpublished, University of Massachusetts. (Revised version of a paper given at the 1971 conference on African languages, University of California, Los Angeles)


