A NOTE ON GLOBAL RULES IN BANGUBANGU TONE

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1. __Introduction__

Recently McCawley [1973] has claimed that standard phonological theory, through its requirement that rules should be local, cannot account for some complicated cases, such as the tonal system of Bangubangu. (A local rule, when applying to a given string in a derivation, makes use of phonological information contained in the string itself, whereas a global rule in addition relies on phonological information contained in some previous string of the same derivation; in both cases, grammatical information can be used.) McCawley also submits two sets of rules for deriving Bangubangu tones; the first makes use of a "spurious" mid tone, the second contains global rules. The aim of the present paper is (1) to evaluate McCawley's arguments about the insufficiency of local rules, (2) to examine the validity of his global rules, and (3) to make some suggestions about other possibilities for an analysis of Bangubangu tone.

2. __Local Rules__

In the first case adduced by McCawley two possible derivations are given for the phonetic string [...mulondó múyende] '(put) the jar into the house':

(a)   /mu lóndo mu kí endó/

    Raising   ó

    Spreading   ú

    Lowering   o   e

Formalizing these rules, we obtain:

    __Raising:__

    $L \rightarrow H / H \underline{\quad}$

    __Spreading:__

    $L \rightarrow H / H \# \underline{\quad}$

    __Lowering:__

    $H \rightarrow L / L \underline{\quad} \begin{Bmatrix} H_1 \\ \#\# \end{Bmatrix}$

Here, McCawley's argument is: "lowering must be global, since it is the highs that were high before High Shift that get lowered, not the ones that it (or Terminal High Spreading) created." It is true that only non-derived highs must be lowered; but since every derived high is preced by high, any non-derived high can be identified at this stage through the fact that it is the first of a pair (or a sequence) of highs, or that it is preceded by low (or both conditions taken together). The environment given in the formalization, then, is doubly sufficient, and a global rule is superfluous.

(b)   /mu lóndo mu ki endé/

         Shift   o ó

         Spreading   ú

         Lowering   e

Formalized rules:

         Shift:

         HL ⟶ LH

         Spreading:

         L ⟶ H / H # ____

         Lowering:

         H ⟶ L / ____ # #

The difficulty about lowering does not arise here, and it can be observed that the lowering rule can be ordered before spreading or even before shift. The necessity of a global rule in this case is claimed by McCawley on the basis of a contrast with another string: [mbeté namáfumú] 'knives and spears', with the following derivation:

                    /n péte ná ma fúmu/

         Shift   e é   a á u ú

The argument is: "in such an example, Terminal High Spreading would incorrectly make the first syllable of the second word high unless it were allowed to refer to the tone which that syllable had before High

Shift." That is, the rule should not apply to derived low, but only
to underlying low. Now, derived low is followed by high (as a result
of HL → LH), whereas underlying low is followed by low. All that
has to be done, then, is to add the mention of a following low to
the environment of the spreading rule, thereby making it non-applicable
to mbeté namáfumú:

    <u>Spreading</u>:

    L ⟶ H / H # ____ L

It can be verified that this addition has no undesirable results in
(a) or (b). Again, a global rule appears not to be necessary.

    The second case where according to McCawley a rule must be global
is found in the examples [nǐlúcǐlné] 'I am afraid' and [ʃǐlyégélé nádǐ
nǐluclné] 'I don't go (around) with it (because) I am afraid'.
The first is straightforward if (final) lowering is ordered before
shift:

                /nǐ lú cǐ̌n á/

    Lowering   a

    Shift   ǐ ǐ á

The second requires a special rule, once more not applicable to (mbeté)
namáfumú. For this rule we can take advantage of a difference in
environment: namáfumú is preceded by LH # (:mbeté), whereas ...nǐlúcǐlné
is preceded by HH # (:nádǐ); the same is true of the other known
example: [gulúvulá] 'you want' but [hǐcú gúluvulá] 'if you want'.
The rule--apparently a late rule--will be:

    <u>Reversal</u>:

    LH ⟶ HL / HH # ____ LH

Once more, the necessity of a global rule is not proved. But it must
be admitted that the basis for the reversal rule is very narrow, and
we may assume that there are other difficult cases in the tonal system
of Bangubangu. In order to deal with these, one of the following
options will have to be adopted: (1) using "interim" features, such as
mid tone or extra high, which are absent both in depth and in surface;

(2) using some feature which is present in surface; (3) making use of
global rules. It will be clear that (2), if at all possible, is the
most satisfactory choice.

3. Global Rules

McCawley's second rule set includes three global rules: 7, 9, and
10. Of these, it looks as if rule 9, as it stands, is not applicable
to any string: it converts to high some syllables which were high
before rule 4, but none of the rules 4-8 rewrites anything as low; in
effect, then, rule 9 always applies vacuously.

Rule 10 converts all highs which were high before rule 4 into low
(except in the first syllable of a verb); in so doing, it yields wrong
results in the following cases, taken from McCawley's derivations:
*bónitagéna instead of [bónítágéna] 'they have called me', from
/bá ó ní tágan á/; **ʔuyltagézééna instead of [ʔuyltágézééna] 'to
call each other', from /ku yí tágan ĺʒeen á/; *niluclíná instead of
[nilúclíná] 'I am afraid', from /ní lú cífn á/, as well as all other
cases of localization. It is not clear whether it will be possible to
restrict rule 10 in such a way that these undesirable results are
avoided.

4. Suggestions

4.1. Rising tones must be introduced by rules, perhaps by late rules,
since they are present in surface. Moreover, every rising tone corres-
ponds to an underlying high. Therefore it is an attractive possibility
to convert most underlying highs into rising by a not too late rule,
instead of changing them into low by the shift rule. The result would
be that the desired distinction between derived high and non-derived high
is no longer a problem. Whether this should be handled by a new feature
[+ rising] or by the device of overspecified features, viz. [[-h] [+h]],
is a significant question in itself.

4.2. "Predeterminants" could be treated by setting up the three forma-
tives in question with an additional segment [-vo, -co, +hi], or
[+vo, -co, -sy, +hi], all other features being either negative or
unspecified: n'- 'it is', nde'- 'it is not', -a'- tense sign in

relatives. Such "free high" would be an instance of underspecified
features. Free high can be helpful also for tone parallelism (tense
sign -ʹ-) and for subjunctive (tense sign -ʹʹ- or -ʹ`-). Similarly,
free low can be used to account for the exceptional behavior of
pronominal prefixes: ˋyú-, ˋbá-, etc., which are low in word initial.

4.3. The possibility of a fairly early rule which makes all extension
syllables high before high final should be explored.

4.4. Much could be gained, expecially for the rules of doubling and
for those concerning the verb, by giving a special status to the
boundary between (last) prefix and stem.

REFERENCES

McCawley, James D. 1973. "Global rules and Bangubangu tone", in Issues
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