In the Light of Generative Rules: The Phonological Scrutiny of Word Stress in Zubairi Arabic

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Abstract

No doubt, generative phonology has recently witnessed a qualitative leap in its own trends, particularly in the domain of stress. That Zubairi Arabic is, among others, looked upon a dialect of richly stressed patterns attracts one to dive into the depths of its idiosyncratically phonological phenomena – stress would be one of the topics deserved to be fully covered. The current study is a humble endeavor as to how generative phonology treats Zubairi Arabic stress on its ground and what the rules are possibly postulated to account for the patterning and organization of stress in question.

Keywords: Stress, Phonological rules, Cycle rules, Prosody, Zubairi Arabic.

1. Introduction

As a phonological process, stress is viewed differently by the various linguistic schools of thought, among them, generative school of phonology. Generative phonology constitutes one part of the linguistic theory which is called Transformational Generative Grammar (TGG). As compared with many older approaches, generative treatments begin by stating syntactic structure and then passing on to phonology which can thus make use of any relevant syntactic facts. Accordingly, stating rules of stress requires knowledge of word-formation and knowledge of part-of-speech allocation.

Generative treatments have taken some form of phonetic distinctive features as their basic elements. Theory of distinctive features has led to modifications to the extent that the set of these features is not only used for phonetic representation of a sentence but also at the phonemic level to give the sentence what is usually called its phonological representation. This representation has no necessary direct relation to the actual pronunciation; its aim is to enable a root or an affix of the language to be represented in its entire occurrence by the same sequence of phonological elements irrespective of phonetic differences depending on the context.

Word-stress in Zubairi Arabic (a variety which is spoken in the town of Zubair, south of Iraq) can be fruitfully studied in terms of generative phonology and new insights might be given. The present paper is concerned with examining word-stress in Zubairi Arabic from a

generative point of view. It also aims at scrutinizing some transformational cycle rules and how far successful they are applied to the stress of such a variety.

2. The Theory of Generative Phonology: Some Considerations

2.1. Generative Phonology

Generative phonology is a theory of the sound structure of language. Its theoretical framework owes a great deal to *The Sound Pattern of English* (henceforth, *SPE*) in which Chomsky and Halle set forth the theory and the application to English. Generative Phonology is a developing set of approaches not a monolithic theory. It was originally developed as the phonological aspect of what was intended as a unified theory of grammar whose syntactic side was first brought in prominence in Chomsky's *Syntactic Structures*. Two important strands of the earlier theory can be traced (however, from a technical basis): a binary feature-theory (originally Jakopsonian) and a neo-Bloomfieldian process of morphophonemics. Thus, one can describe generative phonology as a theory of morphophonemic structure (Lass, 1984).

As stated previously, the grammar of the language is not a one-piece device. It is a combination of three devices or components, each of which fulfils a particular task. The syntactic component generates a set of syntactic structures which contain, among others, a well-formed sequence of morphemes. The meaning of each syntactic structure is given by the semantic component and the pronunciation by the phonological component. The syntactic component is the backbone of the grammatical system of the language simply because it is responsible for generating an infinite set of syntactic structures via a system of rules. The other two components interpret the abstract objects generated by the syntactic component to provide them with an audible aspect (pronunciation), and an intelligible aspect (meaning). The syntactic structure of a sentence is an abstract element containing all necessary information which enables one to deduce, with the aid of rules, the meaning and pronunciation of that sentence (Chomsky, 1957; Huddleston, 1976; Radford, 1988).

A distinction has been made between the basic function and other functions of phonology as a whole. According to Postal (1968: 155), the basic function of phonology is to describe how each sentence is pronounced, i.e. it is concerned with the pronunciation of each surface structure. This is usually done by the phonological component which allocates to each surface structure a phonetic representation or a set of phonetic representations in the case of free variation. He maintains that other phonological representations are the specification of free variation and contrast, the characterization of the concept of possible morpheme, and specification of the notion of phonologically possible word.

In so far as the structure of the phonological structure is concerned, Botha (1971: 214) reports that alternative conceptions of the structure and functioning of the formal devices of the phonological aspects of a natural language are best tackled in *The Sound Pattern of English*. Two basic conceptions of the phonological structure are fully recognized and then are considerably varied in the most fundamental principles: the original version where the notion of markedness does not play a role, and the last version to which the notion of markedness is significant.

The outlines of the markedness version of the phonological theory have been sketched by Chomsky and Halle (1968) and Dell (1980). This version has taken the place of the original one in which three levels of representation are given special importance in the specification of the phonological properties of a sentence and its constituents. They are: lexical level, phonological level and phonetic representation level. The phonological representation of a sentence, namely, of its surface structure, is derived from its lexical representation by means

of phonological redundancy rules and other readjustment rules. The phonetic representation of the surface structure is derived from its phonological representation by virtue of the rules of the phonological component.

2.2. Phonological Rules: Transformational Cycle Rules and Word Level Rules

The rules of the phonological component of a grammar constitute the formalized representations of the phonological process of a language. These rules are applied to the phonological surface structures to derive from them those aspects of phonetic representations of a language. Phonological rules modify phonological representations in different ways: First, they convert the binary phonological features into phonetic features. Secondly, they change the feature specification of columns in classificatory matrices to agree or disagree with that of adjacent segments. While the rules affecting such agreement formalize process of assimilation, those brining disagreement represent the process of dissimilation. Third, entire phonetic segments are inserted by phonological rules into the epenthetic vowels. Fourth, phonological rules delete entire phonological segments from classificatory matrices and thus, they represent the process of elision. Finally, the ordering of phonological segments relative to each other can be changed by phonological rules representing processes of metathesis.

According to Fischer-Jørgensen (1975: 245), phonological rules can be categorized on the basis of their mode of operation into transformational cycle rules and word level rules. The former is applicable to the phonological surface structures that vary in size from single words into phrases. These rules are ordered linearly and utilized in a cycle way; they are applied first to the minimal constituents in surface structures. Then, they are applied to those resulting larger strings which contain no internal brackets. After such an application, the inter-most brackets enclosing the strings in a later step are erased. In this way, transformational phonological rules keep applying until the boundaries of phonological phrase are reached. This kind of rules can be manipulated in the description of phonological phenomena like stress, vowel reduction, liaison and elision.

As their name suggests, word level rules are restricted to the word-boundaries; they constitute what is traditionally referred to as the word phonology of a language. This category of rules is particularly applied to lexemes without taking into account their syntactic classification. The major function of the word level rules is to change the underlying phonological representation of a particular lexeme into a phonetic surface representation. To serve such a purpose, the rules must be able to delete, insert and coalesce phonemes.

3. Treatment of Stress in Generative Thought

Stress is a supra-segmental feature of utterances that can be applied to individual vowels and consonants, and to syllables. Jones (1967:245) defines stress as "the degree of force with which a sound or a syllable is uttered". This definition is clearly made in physiological terms since he points out a strong force of utterance that means an energetic action of all articulatory organs. Ladefoged (2006:222) offers a similar definition: the stressed sounds are produced with more muscular efforts, i.e. pushing out air from the lungs by more muscular contraction caused by the movement of the rib cage. Moreover, stressed syllables are those on which the speaker expends more muscular energy.

Schane (1973:14) argues that stress is one of the prosodic elements associated with syllables and most often with particular vowels. He agrees with the articulatory approaches to stress stating that a considerable muscular effort lengthens the period during which the articulatory organs maintain appropriate configuration.

The principle of the transformational cycle is basic in generative phonology. Chomsky and Halle (1968:18) apply this principle to stress contours and offer the following rule for the compound and nuclear stress:

(1)
$$\begin{bmatrix} \text{1 stress} \\ \\ \text{V} \end{bmatrix} \longrightarrow [\text{1 stress}] \Big/ \begin{cases} \text{— … V …] NAV} \quad \text{(a) compound rule} \\ \\ \text{V … — …]} \quad \text{(b) nuclear stress rule} \end{cases}$$

Rule [1] is interpreted as a sequence of two rules in accordance with the following quite general convention: a rule of the form (2) is an abbreviation for a sequence of rules of the form (3):

(2) $X \longrightarrow Y \Big/ \begin{cases} Z_1 \\ Z_2 \\ \vdots \\ Z_n \end{cases}$

(3) $X \longrightarrow Y / Z_1$

$X \longrightarrow Y / Z_2$
$\vdots$
$X \longrightarrow Y / Z_n$

For different rationales, rules are stated to determine stress contours as a result of placement of primary stress rather than as rules of stress weakening, and thus, the following convention would be adopted: when primary stress is placed in a certain position, all other stresses in the string under consideration at that point are automatically weakened by one. This paves the way to state the following rules:

(4) $\underline{\qquad}$ … V …] N

(5) V … $\underline{\qquad}$ …] NP

Rule (4) assigns primary stress to a primary stressed vowel which is followed by another primary stressed vowel in a noun, while rule (5) assigns primary stress to a primary stressed vowel which is preceded by another primary stressed vowel in a noun phrase.

The above-mentioned rules illustrate two general observations that have proved valid in the study of stress: First, it is always possible to order the rules in a sequence and to adhere strictly to this ordering in constructing derivations without any loss of generality as compared to an ordered set of rules or a set of ordered on a different principle. Next, such linear ordering makes it possible to formulate grammatical processes that would not be expressed with comparable generality. However, the theory is possibly based on another principle, i.e. partial rule-ordering. This principle means that a certain ordering of rules perform more naturally than some other one taking into account that in this more natural order a rule may apply in a different environment rather than in an extrinsic order (Chomsky and Halle, 1968).

From a different angle, there is a set of rules which introduces degrees of prominence in compound words and phrases. The general criteria on the form and the manner of operation of

these rules can be illustrated as follows: In the first place, they apply cyclically, beginning with the innermost, or lowest constituents of a given final derived phrase markers, proceeding upward until the topmost constituent is reached. Next, they pick out one of the several primary stresses of a constituent to which they apply, and make it the main stress of that constituent, thereby lowering all other stresses by one degree. Finally, they are local transformations whose structural descriptions recognize only three factors: the constituents or bracketing of a sentence, the categorization of the constituents and the previously assigned stresses (Bierwisch, 1968).

3. The Generative Behavior of Zubairi Word–Stress

In Zubairi Arabic word–stress and its placement is predictable because if we take the structural patterns of the word, then rules can be formulated so as to pinpoint the syllable on which stress falls. Word–stress, therefore, is non–phonemic in Zubairi Arabic; it does not produce a distinction in word meanings. Nevertheless, most linguists and orientalists (Al–Ani, 1970; Odisho, 1976; Omar, 1985) have distinguished three degrees of non–phonemic stress: primary, secondary and weak. A general rule can be stated as to how to place a general rule of word–stress in Zubairi Arabic: stress falls on the long syllable nearest to the end of the word. In the absence of a long syllable, the stress falls on the first syllable and on the third syllable from the end in words of three or more syllables.

Zubairi Arabic shows that the main stress is on the final syllable, if that syllable is super-heavy (ending in a long vowel plus one consonant, or a short vowel plus two consonants), where **l** and **h** stand for light and heavy syllables, and **sh** for super-heavy syllable.

(6)   / tˤa ˈgeet /   "I hit"
                l   sh

        /ħaˈramt/   "I deprived"
            l   sh

        /da ka ˈkiin/   "shops"
          l   l   sh

If the penultimate syllable is heavy, that is of CVC, or CVVC it will be stressed.

(7)   / kaˈtabta /   "you wrote"
                l   h   l

          / haaˈðaani /   "here I am"
              h   h   l

But if the pre–final syllable is light, i.e. of the form CV, then either that syllable or the antepenultimate one is stressed depending on which of these of two syllables is separated by an even number of syllables from the right most, non-final heavy syllable in the word.

(8)   / ˈkaataba /   "he corresponded with"
                h   l   l

          /muxˈtalifa /   "she becomes nervous"
            h   l l   l

          / kataˈbataa /   "they (feminine) wrote"
              l l l   h

/ ʃayaratuˈhumaa /   "their (dual) tree"
   l l l l l h

If the word does not contain any heavy syllables, stress is placed on the syllable that is separated by an even number of syllables from the beginning of the word.

(9)   /ˈbuxala/   "misers"
            l l l

        /ʃayaˈratiha/   "her tree"
            l l l l l

The forgoing stress rules are formulated in terms of generative phonology as follows:

(10)

$$
\begin{bmatrix} +voc \\ -cons \end{bmatrix} \longrightarrow [+\text{stress}] \left/ \left\{ \begin{array}{l} \text{(a)} \left\{ \begin{array}{l} \# C - \quad C_0 \# \\ \quad - \quad C_2 \# \end{array} \right\} \\ \text{(b)} \quad - C2\ VC1\ \# \\ \text{(c)} \left\{ \begin{array}{l} C2 \\ \# C \end{array} \right\} (VCVC)_0 - (CV)\ CV(C)\ \# \end{array} \right\} \right.
$$

However, the general stress rule (stated above) may be modified to account for the moraic picture of a syllable in Zubairi Arabic: a main stress falls on the vowel that occurs before the last two morae in the word, where a mora is V or CC. If a word has less than three morae, the first vowel in the word is stressed.

The stress rule then should follow a rule that shortens a long vowel VV occurring finally in a word:

(11) $V_2 \longrightarrow \emptyset /\ V_1 - \ \#$ (where $V_1 = V_2$)

$$
\text{(12) } V \longrightarrow [+\text{stress}] \left/ \begin{array}{l} \text{(a)} \left\{ \begin{array}{r} - \quad X \\ \\ \# (C)C - \quad Y \\ [-\text{stress}] \end{array} \right\} \# \end{array} \right.
$$

(where X contains two morae)

The restriction that Y does not contain stress is necessary so that words, which have received stress by rule (12a), will not be stressed again by rule (12b). The following examples illustrate the above mentioned rules:

(13)   /kaˈtabna/   "we wrote"
                    /katabnaa/ ⟶   katab+na   rule (11)

(14)   /tamur/ ⟶ kaˈtab+na   rule (12a)
                              "dates"
                    /tamur/ ⟶ ˈtam+ur   rule (12b)

(15)   /kitaaba/   "his book"
                    /kitaaba/ ⟶ kiˈtaab+a   rule (12a)

The deletion of affix endings in "base forms", e.g. /kitaab/ vs. /kitaaba/ (stem form), and jussive verbs including the imperative, e.g. /tantaðˤir/ 'she waits' and /ʔintaðˤir/ 'wait', follow the stress rule:

(16)   kitaab+ba ⟶ kitaab+a   stress rule

                    ⟶ kitaab   ending deletion rule

(17) tantaðˤir+a ⟶ tantaðˤir+a   stress rule

                    ⟶ tantaðˤir   jussive or stem form

                    ⟶ ʔintaðˤir   imperative

Generally speaking, the stress rule for Zubairi Arabic can be given in terms of the *SPE* formalism as three rules below, where $\tilde{V}$ stands for a short vowel and V either for a long or for a short vowel.

(18)   a. $V \longrightarrow$ [+stress] / ____ C0 $\tilde{V}$ C1 V C0 #

        b. $V \longrightarrow$ [+stress] / ____ C0 V C0 #

        c. $V \longrightarrow$ [+stress] / ____ C0 #

If applied in this order, rule (18a) is tried first, and only if its structural description is met, namely, if there is a word of more than two syllables with pre-final light syllable, then it will apply. It cannot apply if the word contains only one or two syllables, or if the word contains more than two syllables and the pre-final is heavy. In that case, (18b) is tried. This rule will apply in all remaining cases, unless the word has only one syllable. Rule (18c) will then provide monosyllabic words with main stress. The above three rules can be collapsed as the single rule in (19), with the condition that the longest expansion of the rule is tried first.

(19) $V \longrightarrow$ [+stress] / ____ C0 (($\tilde{V}$ C1) V C0) #

Secondary stresses in longer words like /waddeetilhiyˈyaa/ "I sent it to him" and /dˤammeetilhiyˈyaa/ "I kept it for him" can be interpreted by applying rule [20]. This reflects that stresses are assigned to every syllable that is separated by one syllable from the following stressed syllable. This repeating action of the rule is called iterative rule application.

(20) $V \longrightarrow$ [+stress] / ____ C0 V C0 V [+stress] C0 (iterative)

To recapitulate, the entire rules may be rewritten as follows:

(21)

$$V \longrightarrow [+\text{stress}] \left/ \left\{ \begin{array}{l} \text{(a)} \quad \underline{\quad} \left\{ \begin{array}{l} C^2 \quad V \\ C \end{array} \right\} C\,V\,(\,C\,) \\ \\ \text{(b)} \quad \#\ C \ \underline{\quad} \ [-\text{stress}] \end{array} \right\} \# \right.$$

This is an abbreviation of the following rule:

(22)

$$V \longrightarrow [+\text{stress}] \left/ \left\{ \begin{array}{l} -\text{CCVCVC} \\ -\text{CCVCV} \\ -\text{CVCVC} \\ -\text{VCVC} \\ -\text{VCV} \\ -\text{CCVC} \\ -\text{CCV} \\ \#\text{CC} - \text{CVC} \\ \#\text{CC} - \text{CV} \\ \#\text{C} - \text{CVC} \\ \#\text{C} - \text{CV} \\ \#\text{C} - \text{C} \\ \ \#\text{C} \end{array} \right\} \right.$$

4. Conclusion

The above generative account of word–stress in Zubairi Arabic does not claim perfection and of course not exhaustive. It only sheds light on the importance of approaching stress from a generative point of view. It proves that generative phonology in its classical version (*SPE*) is powerful in handling word–stress in Zubairi Arabic. In addition, universal as they are, generative rules are set forth to refer to a property which is common for all languages and dialects and to demonstrate the validity of which is a main target of generative theory. In this sense, generative thought states that all languages and their own varieties can be generated by using the same set of basic rules which are viewed as being an important step in the task of understanding human phonological capacities.

More research would surely be required to examine the status of traditional rules put for the supra-segmental features of Zubairi Arabic. A fruitful area of study is the comparison between word–stress in classical Arabic and modern dialects of Arabic; such a comparison may cast light on the unity of dialects' origins and sound changes.

Appendix (1): Zubairi Segmental Symbols

The Vowels:

i   as in /ʔibn/ 'son'

ii as in /diin/ 'religion'

a as in /matˤbax/ 'kitchen'

aa as in /baab/ 'door'

u as in /sakat/ 'he stopped talking'

uu as in /nuur/ 'light'

The Consonants:

b as in /bhaam/ 'thumb'   s as in /sirdaab/ 'cellar'

t as in /taʕbaan/ 'tired'   sˤ as in /sˤamt/ 'silence'

tˤ as in /tˤiin/ 'mud'   ħ as in /ħilm/ 'dream'

d as in /dumuuʕ/ 'tears'   ʕ as in /ʕaqil/ 'mind'

dˤ as in /dˤaabutˤ / 'officer'   h as in /hnaak/ 'there'

k as in /katala/ 'he killed'   m as in /maħlluk/ 'your place'

q as in /qamiis/ 'shirt'   n as in /nahar/ 'river'

ʔ as in /ʔamal/ 'hope'   r as in /ruma/ 'throw'

f as in /faaz/ 'win'   y as in /bayyan/ 'manifesto'

θ as in /θaani/ 'second'   ʃ as in /ʔiʃtara/ 'he bought'

ð as in / ðiib/ 'wolf'   ʤ as in /ʤamaal/ 'beauty'

ðˤas in / ðˤahir/ 'noon'   ʧ as in /ʧima/ 'truffles'

Appendix (2): Phonological Notations

⟶   is changed into

/   in the environment of

⎯⎯⎯   position of the affected segment

word boundary

{ }   either/or relationship between two environments

[ ]   represents all the features the changed sounds have in common

( )   represents optional elements

C0   a string of zero consonant

C1   a string of a single consonant

C2   a string of two consonants

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