

Stress Assignment in Madina Hijazi Arabic

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ملخص:

نتحدث في هذا البحث عن معرفة وتحديد موضع النبر في مقاطع اللهجة العربية الحجازية المتكلمة في المدينة المنورة المملكة العربية السعودية. وقد قارنا في هذا البحث بين طريقتين: الأولى وهي القديمة وهي طريقة القوانين والثانية وهي طريقة القيود والمساة اوبنيماليستي وقد بنينا في كلتا الطريقتين ان المقطع يلعب دورا كبيرا في تحديد موضع النبر . والطريقة الثانية تعتبر القواعد عالمية وعامة لكل اللغات و مكونة من مجموعة قيود للتمثيل الاحسن ومن خلال هذه القواعد تكون اللغات القيود الخاصة بها، وأن كل لغة تتكون فيها هذه القيود، بالإضافة الى طرق حل الصراع بينها (بين القيود) وذلك في التحليلات المتبعة في كل لغة كي تعطي افضل نتيجة ممكنة للغة المستهدفة. وقد ظهر من خلال البحث أن نظام النبر في هذه اللهجة يمكن معرفته عن طريق تطبيق بعض القيود العامة مرتبة ترتيبا حسب حاجة اللهجة. وقد حددنا فيه موضع النبر وذلك باستخدام قياس القدم أو القياس المتري وهي طريقة تستخدم للمقاطع بوضع علامة على المقاطع في الكلمة ومن ثم علامة مثلها فوق المقطع المنبور. وفي هذا القياس كونا المكون البائدي أو الثاني للهجة من مقاطع احادية ومتعددة، وأثبتنا أن طريقة القيود أفضل من طريقة القوانين في تحديد موضع النبر في اللهجة المستهدفة. وقد أظهرت النتائج أن نظام اللهجة الحجازية في المدينة المنورة حساس لوزن المقطع بحيث أنها تحتوي على مقاطع قصيرة وأخرى طويلة، والمقاطع الطويلة تجذب النبر اليها اكثر من القصيرة. وقد اظهر التحليل الثاني ان النبر ALIGN-R (F', ينحصر في آخر مقطعين حسب احد القيود التي ذكرت في التحليل واسمه:

PWd)

وقد اظهرنا ايضا ان بعض الكلمات تنبر في آخرها وأخرى لا تنبر في آخرها وذلك حسب وجود المقطع الطويل في آخرها او في مكان آخر قبله. وقد ظهر لنا ايضا ان القدم الذي يحتوي على مقطع قصير متبوع بمقطع طويل مقدم على القدم الذي عكسه تماما رغم وجودهما معا في هذه اللهجة. وفي الختام أوضحنا أن تقسيم الكلمة الى مقاطع لا ينتهك القيود الأعلى مرتبة والتي ينتهجها هذا التحليل

Résumé :

Cette étude vise à explorer le système de l'accent en Arabe et plus particulièrement celui de la variété parlée dans La Madina El Munawwara située dans la région du Hedjaz au nord-est de l'Arabie Saoudite (abrégré à MHA). Deux approches sont employées, à savoir, l'approche traditionnelle à base de règles du langage et la nouvelle qui se base sur les contraintes séquentielles ou Théorie de l'Optimalité (abrégée à OT) (Prince et Smolensky 1993, McCarthy et Prince 1993a). La comparaison des deux approches est le but principal de cette étude pour démontrer que l'approche de l'optimalité est celle qui décrit le mieux les caractéristiques de l'accent en MHA. L'analyse dans cet article est le résultat de l'échelle de violation de contraintes universelles. Celle-ci représente la pierre angulaire de la Théorie de l'Optimalité. Les contraintes impliquaient une logique dans leurs interactions et elles se sont avérées révélatrices d'une certaine activité importante de contraintes par rapport à l'échelle de l'OT.

Introduction

Prosodic rules translate special approaches to the syllable structure of the word when stress is involved. Many languages commonly place stress on the basis of syllable weight. In Arabic, classical and dialects, heavy syllables generally attract stress to them, in ways that will be examined about Madina Hijazi Arabic (MHA) in details below. Traditionally, quantity sensitivity is assumed to be a parameter in some languages, such as Arabic, in which syllable weight systematically influences the distribution of stress. In this paper, I propose a quantitative approach to MHA stress assignment, in terms of the Optimality Theory (Prince and Smolensky 1993), which depends on constraints rather than rules. In this paper quantity sensitivity is seen as the result of the interaction between constraints that favour weight effects and others that obscure them.

Review of Literature (Stress in Rule-based Theory)

Stress in previous studies for Arabic has been discussed by many researchers in the last two decades (Abu-Abbas, 2003, Abu salim 1982, Abu mansour ,1987, Al-ani 1970, Al-jarrah, 2002, 2008, Al-Mohanna, 2005, Aoun 1979, Boudlal, 1996, Brame 1970, Broselow 1976, 1979 and 1980, jarrah 1993, Selkirk 1981). Researchers applied many approaches to Arabic stress since the first arising of the Sound Patterns of English (SPE) model within the generative framework (Chomsky and Halle 1968). SPE treated stress as a property of individual segments and the distribution of stressed and unstressed syllables within the word could be predicted in a large number of cases by simple rules. The SPE model rules out any role of syllables in a stress assignment process. Many linguists recognized that a theory of stress must take into consideration the fact that stress is a relational concept among the syllables constituting the word, instead of being a local feature for a particular segment (the vowel). What matters is that a stressed syllable is more salient than the unstressed one. The theory of Metrical phonology resulted from that shift.

Metrical phonology is an approach developed to handle stress phenomena. It complements the theory of autosegmental phonology, which was originally proposed to describe the structure of tone

languages (Goldsmith 1976) and later used for the description of Semitic languages (McCarthy 1981, 1986). The autosegmental approach, according to (Liberman and prince 1977, Hayes 1981, Prince 1983, and Halle and vernaud 1987) represents stress on an independent tier, in other words, the autosegmental line for stress is a sequence of abstract positions- conventionally marked with asterisks- associated with stress-bearing positions on the central line of phonemes. Stress, then, is a property of a prosodic unit, such as a syllable or a foot.

The metrical framework is represented by organizing sequences of elements into constituents, each of which is headed by a designated element. Stress is defined in terms of an abstract array of asterisks that locates metrical positions for levels of prominence, this array of asterisks being referred to as the metrical grid. Syllables or syllabic nuclei bear stress by autosegmental association with one of these metrical positions (Halle and Vergnaud 1987). In locating stress , the asterisks representing the stress-bearing elements are assigned to the bottom line (line-0, the syllable line) on which the metrical constituents are constructed. Line (1) is called the 'foot' and line (2) the word level. Stressed syllables are marked by an extra asterisk on line (1) to indicate the presence of stress. Line (20) shows which of the stressed syllables is the strongest by adding an extra asterisk on it as the following examples for MHA show:

- | | |
|---|---|
| <p>1. a.</p> <div style="margin-left: 40px;"> <p>*</p> <p>*</p> <p>* *</p> </div> <p style="margin-left: 20px;">k a t a b</p> | <p>b.</p> <div style="margin-left: 40px;"> <p style="text-align: right;">* line2</p> <p style="text-align: right;">* * line1</p> <p style="text-align: right;">* * line 0</p> </div> <p style="margin-left: 20px;">m a k t o o b</p> |
|---|---|

According to Prince (1983), words receive stress depending on whether the mapping starts with a stressed (peak) or unstressed (trough) positions, and whether we start with the first or the last syllable of the word, thus the following are obtained:

2. a. position: [peak first, trough first]
 b. direction: [left-to-right, right-to-left]

From the above parameters, we find four basic stress patterns:

3. a. [peak first, L-R]
b. [peak first, R-L]
c. [trough first, R-L]
d. [trough first, L-R]

In addition to the above parameters and patterns for stress, Halle and Vergnaud (1987) suggest that stress assignment arises from the parsing of syllables into metrical feet. The stressed position differs in that the head of the foot occurs on the left or on the right as follows:

- | | |
|---|--|
| 4.a. *
(* *)
Left-headed (trochaic) | b. *
(* *)
Right headed (iambic) |
|---|--|

The representations in (4) are interpreted as rules for assigning constituent boundaries as heads in specific positions in the string. Feet can [+ or – BND]. The [+BND] foot structure is as in (4) above, with a governed position adjacent to the head on its right or on its left, depending on the direction of government, bounded feet being therefore either binary or ternary. In [- BND] feet, a right or a left headed constituent can contain three or more elements. Moreover, a [left-to-right, right –to-left] parameter specifies the direction in which syllables are grouped into metrical feet. MHA distinguishes between light CV, heavy CVV and CVC, and super-heavy syllables CVVC and CVCC Jarrah (1993). According to the metrical framework, light syllables are defined with a non-branching rime, and heavy syllables are those with a branching rime that dominates either a long vowel or a short vowel followed by a consonant. Super-heavy syllables, on the other hand, consist of a heavy rime followed by a consonant.

Hence, Jarrah (1993:171) claims that stress location in MHA must be formulated and stated according to the syllable-weight distinction described above. The following algorithm summarizes stress location in MHA in three statements:

5. a. stress is on the final superheavy;
b. otherwise, stress falls on the penultimate heavy syllable;

c. In all other words, stress is on the antepenultimate syllable, whatever its weight is.

The above algorithm shows that heavy syllables are in phonological opposition to light syllables when stress is assigned, and that heavy syllables invite stress to more than light syllables do. Another characteristic feature of stress in MHA is that a given syllable may bear stress not only by its own make-up, but also due to its position in the word or the phrase, that is, heavy penultimate syllables are always stressed if the ultimate is not a super-heavy one.

Since MHA is quantity sensitive, Jarrah (1993) adopted the metrical framework with parameters (3c) and (4a) above. That is, stress in MHA is assigned from [trough first, R-L] and feet are left headed.

Syllables and Metrical Feet

There are different approaches to the organization of syllables into metrical feet. Hayes (1981) claims that feet are either bound or unbound. Halle and Vergnaud (1987) argue for binary, ternary, or unbounded feet. This implies that stress location depends upon the whole syllabic make up of the entire word, the number of the syllables and their weight, thus the following example obtain:

- | | | |
|----------------|-------------|--------------------|
| 6. a. /daras/ | [d'aras] | ' he studied' |
| b. /daras-t/ | [dar'ast] | ' I studied' |
| c. / daras-na/ | [dar'asna] | ' we studied' |
| d. /daras-uuh/ | [daras'uuh] | ' they studied it' |

To capture stress in MHA, all the rime heads are assigned an asterisk on line (0), the resulting elements will then be parsed into binary left headed constituents from right to left. Final word syllables are considered extrametrical if they are not superheavy, for instance:

- | | | | | |
|-------|-------|-----|----|-------------|
| 7. a. | * | | b. | * |
| | * | * | | * |
| | (2) | (1) | | (2) |
| | d a r | a s | | d a r a s t |

Binary constituents are generally bounded and are divided into two possible types: they are either regular or degenerate as in (8) :

8. a. regular $\begin{pmatrix} * & * \end{pmatrix}$ b. degenerate $\begin{pmatrix} * \end{pmatrix}$

The binary constituents in MHA are constructed out of monosyllabic as well as multisyllabic words. The binary foot that is built on the words of a superheavy syllable is a metrical foot and it is bimoraic in terms of moras.

Monosyllabic words in MHA are nouns, verbs or adjectives, the following examples show different types of monosyllabic words:

9. a. /baab/ 'door'
b. /9aam/ 'he swam'
c. /gumt/ 'I stood'
d. /bard/ 'cold'

Each of the words in (9) constitutes a binary constituent by itself by projecting asterisks on line (0) and an extra asterisk on line (1) as shown below:

10. a. $\begin{matrix} * \\ * \\ (*) \\ b \ a \ a \ b \end{matrix}$ b. $\begin{matrix} * \\ * \\ (*) \\ b \ a \ r \ d \end{matrix}$

Unary feet, however, do occur in multi-syllabic words, for example:

11. a. /sukaan/ 'inhabitants of'
b. /darbeen/ 'two paths/routes'
c. /Saaruux/ 'rocket'
d. /miigaat/ 'timer'

The words in (11) consist of an initial heavy syllable and a final superheavy syllable. Each heavy syllable constitutes a degenerate foot if followed by a heavy or a superheavy syllable, and it constitutes

a regular binary constituent with the following light syllable. Unary syllables are represented as follows:

- | | |
|---|---|
| <p>12. a.</p> <div style="text-align: center;"> *
 * *
 (*) (*)
 S a a r u u x </div> | <p>b.</p> <div style="text-align: center;"> *
 * *
 (*) (*)
 s u k k a a n </div> |
|---|---|

Binary feet are also constructed in trisyllabic words, provided that the first two syllables are light and the last syllable is superheavy or extrametrical, as in (13):

- | | |
|-------------------|-----------------|
| 13. a. /T'alabak/ | 'your order' |
| b. /Talab-'aat/ | 'orders' |
| c. /w'aladak/ | your son/boy' |
| d. /walad-'een/ | 'two sons/boys' |

A bisyllabic binary foot would account for the placement of stress in (13) as shown below:

- | | |
|---|---|
| <p>14. a.</p> <div style="text-align: center;"> *
 *
 (2 1) .
 T a l a b a k </div> | <p>b.</p> <div style="text-align: center;"> *
 * *
 (3 2) (1) .
 T a l a b a a t </div> |
|---|---|

Some forms in MHA may contain two or three degenerate constituents. They are the words which consist of two or more heavy syllables in a sequence which carries such constituents, as in the following:

- | | |
|----------------------|------------------------|
| 15. a. /9all'am-hum/ | 'he taught them' |
| b. /katabt'al-kum/ | ' I wrote for you (pl) |
| c. /makaat'ibna/ | ' our offices' |
| d. / saaf'artu/ | ' you(pl.) travelled' |

Stress assignment in the above forms will be represented as follows:

16. a. * b. *
- * * *
- (*) (*) (*) (*) .
- 9 a l l a m h u m s a a f a r t u

In conclusion, Syllable types in MHA and their weight and position in the word play a crucial role in stress assignment. Light syllables are not stressed unless they are in antepenultimate position, while heavy penultimate syllables attract stress to them. Final light and heavy syllables are not stressed. Superheavy syllables, which always occupy final position in the word, are stressed. The binary bounded constituent in MHA has been shown to be left-headed. It has been shown that the degenerate foot structure is minimal foot , and the binary foot is the maximal one.

MHA Stress and the Optimality Theory

As mentioned above, MHA stress is quantity sensitive and looks from right to left with trochaic feet. Prince and Smolensky (1993), and McCarthy and Prince (1993a) claim that feet are subject to the constraint FT-BIN which demands that they be binary under syllabic analysis if the language in question is quantity-insensitive, or moraic if it is quantity-sensitive. The constraint is stated as follows:

17. FT-BIN

Feet are binary under syllabic or moraic analysis

This constraint is in conflict with the constraint PARSE- σ which requires that syllables must be parsed into feet.

18. PARSE- σ

Syllables must belong to a foot

A conflict here arises when the word concerned constrains an odd number of syllables. This conflict can be resolved by ranking FT-BIN above PARSE- σ , as shown below for the word ‘Darabu’ ‘they beat’:

19.

Darabu	FT-BIN	PARSE- σ
a. Da(ra.bu)		*
b. (Da.)(ra.bu)	*!	

The table above indicates that any form violating FTBIN is ruled Optimality Theory leads to situations in which some processes are blocked and some others are not.

We have shown above that MHA stresses one of the last two syllables of the word. This means that the foot which contains the stressed syllable must be at the right edge of the prosodic word. We also have showed that the directionality of footing is from right to left. According to McCarthy and Prince (1993b), generalized alignment theory, we propose the following constraint for MHA:

20. ALIGN-R (FT, PWD)

Align all metrical feet at the right edge of the prosodic word

ALIGN-FT-R is violated if we go under lower constituents, i.e., the syllable. In MHA, PARSE- σ should come before ALIGN-R (FT, PWD) to derive the correct foot structure, see the tableau below for the word ‘Šafahalaha’ ‘he saw it for here’:

21.

	FTBIN	PARSE- σ	ALIGN-R
√a. Ša(faha)(laha)		*	**
b. Ša.fa.ha.(laha)		***!*	
c.(Ša).(fa.ha)(la.ha)	*!		*****

The parse in (21b) is not optimal, though it observes ALIGN-Ft-R, because three of the syllables are not parsed. (21c) is also not optimal because a monomoraic syllable is parsed into a foot which violates FTBIN. (21a) is the optimal because it satisfies the FTBIN.

Hayes (1995) uses a set of feet types to organize the metrical structure of a language. Feet according to him are of two types; One is

trochaic and the other is iambic as mentioned above. The distinction between the two is a matter of headness. Iambic feet are right headed , i.e., the stressed syllable is located at the right periphery of the foot (Prince and Smolensky 1993, McCarthy and Prince 1993a, Hayes 1995, and Halle and Vergnaud 1987). Trochaic feet , on the other hand , are left headed and are distinguished into moraic trochees which consists of heavy bimoraic syllable or a sequence of two light syllables where the one on the left bear stress. Hayes (1995), states the following universal foot types:

- 22. a. Iamb LH', LL', or H'
- b. Moraic trochee L'L or H'
- c. syllabic trochee $\sigma' \sigma$

Since MHA stress is quantity sensitive, its feet must be trochaic and it is the final superheavy syllable of the word which receives stress; and the penultimate heavy syllable of the foot which is stressed, if the ultimate is not superheavy, stress falls on the antepenultimate syllable, whatever its weight is.

23. TROCHEE

Feet are left headed

In a word like /sama/ 'sky'sky' , the two syllables are light of the CVCV pattern, in which, stress is determined by the constraint TROCHEE as follows:

24.

sama	TROCHEE
a. (sa'.ma)	√
b. (sa.ma')	*!

The fact that MHA is quantity sensitive, that is heavy and super-heavy syllables attract stress; motivates the Weight-To-Stress (WSP) principle constraint shown below in (27):

25. WSP: (super) Heavy syllables attract stress

This constraint requires that a (super)heavy syllable be both the head of a foot, and dominated by an accentual grid mark indicating stress. WSP applies only at the foot level in order to rule out structures such as (CVC)(CV'.CVC) or (CVC.CV')(CVC), where the light instead of the heavy syllable of the foot is stressed. The ranking of the constraint in (27) with the other constraints mentioned above is shown as follows:

26.

9allamtu	FTBIN	ALL-FT-R	TROCHAIC	WSP
a. (9'al.lam.tu)	!*		*	*
b. 9al(l'am.tu)✓		*		
c. 9al.lam.(t'u)	!*		*	*
d. (9'al.lam)tu		*!	*	

Suboptimal candidates (28a) and (28c) violate the FTBIN constraint; Suboptimal (28d) fails to align the right edge of the foot at the right edge of the word and also violates the TROCHEE constraint. The optimal candidate (28b) is the one which violates only one constraint, so it is the right output.

Conclusion

I have argued that the stress system of MHA can be accounted for by the ranking of a small set of universal constraints. The analysis I have offered shows the location of stress and consequently the foot types. The binary constituents in MHA are constructed out of monosyllabic as well as multisyllabic words. The binary foot that is built on the words of a superheavy syllable is a metrical foot and it is bimoraic in terms of moras. The unitary account of stress in MHA proposed in this paper is based on the idea that both iambic and trochaic feet do occur in the language.

The results obtained show that MHA is a quantity sensitive system where trochaic foot are favored. The OT analysis has also shown that restricting stress to the last two syllables of a word is a result of the constraint ALIGN-R (F', PWD) demanding coincidence of the prosodic word and its head, i.e. the prominent foot. I also show that

one word will receive final stress and the others will receive final or no-final stress, depending on whether or not the final syllable is heavy. Consequently, the iambic feet are prior over trochaic ones and that this follows from ranking IAMB above TROCHEE. I also show that syllable parsing in MHA does not lead to the violation of higher-ranked constraints.

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