

Melodic Complexity Evidence from Arabic

By

Asst. Lec. Kareem Ashoush Mahdi
University of Al-Qadisiyah- College of Education

البريد الإلكتروني: Raedamarabe@gmail.com

طلب النشر ٢٠١٦/٩/٢١

تاريخ قبول النشر: ٢٠١٦/١٠/٤

ABSTRACT

In this paper, a new lenition trajectory and a new element are added to the Element Theory by John Harris 1990 to support its role in the phonological government. The new trajectory 'Deemphasisation' proposed by the researcher is used to throw some light upon the internal structure of four emphatic consonant sounds /t/, /d/, /ʔ/ and /s/ to be lenited into /t/, /d/, /ə/ and /s/ and the element 'E' is for the phonological representation of the mentioned sounds. Since both, the emphasized and deemphasized couple of the four Arabic consonant phonemes, are of the same place of articulation, manner of articulation and the same state of vocal cords, deemphasisation is considered a new phenomenon which is proposed as a new trajectory different from 'debuccalisation', 'spirantisation' and 'vocalisation' by John Harris and 'E' is a new element different from labial U, palatal I, none V, coronal R, occluded ʔ, noise h, nasal N, stiff vocal cords H and slack vocal cords L proposed by Kaye, Lowenstamm and Vergnaud (1985).

THEORETICAL BACKGROUND

In government phonology, phonological constituents are hierarchically organized and binary branching. The relationship between adjacent segments is asymmetrical and segment in governed position is no more complex than its governor, KLV.1985-1990. Element Theory by John Harris, 1990 expresses these segments in terms of univalent elements each of which has an independent phonetic interpretation and there is a direct relationship between the complexity of these segments and the governing role assumed by the position it occupies. Elements of a segment are of marked and unmarked attributes with charm values (+, -, 0) to specify their ability to occupy a particular position (U° labial , l° Palatal , V° none , R° coronal , ?° occluded, h° noise, nasal , H stiff vocal cords , slack vocal cords . The complexity of a segment is measured by calculating the number of elements a segment has. A governed segment may face some sort of pressure to reduce its complexity by losing elements from its internal structure, Decomposition or it may receive elements to increase its complexity which means Composition. The theory does not have redundant rules or underspecified values

INTRODUCTION

This paper is concerned with the role of Arabic segments in Government Phonology. Instead of rule-based approaches, the theory depends on the representation where all phonological phenomena are derived from certain principles and parameters. The theory argues that phonological constituents are hierarchically organized and within each constituent there is an asymmetrical relation between its binary branching members that substitutes "the distinctive feature theory" (Kaye et al.1985, 1990; Harris 1994). The head- dependent asymmetry within a constituent is reflected in licensing conditions (McCarthy 1979; Selkirk 1981; Ito 1986). The asymmetrical relations between these segments can be shown in prosodic structure whether they are inter or intrasyllabic position as positional asymmetry of segments is determined by their location within a certain prosodic domain and the syllable is the most suitable domain in the prosodic hierarchical structure (Harris, 1990). Head which the most important unit licenses dependent that is the least important unit so dependent according to complexity condition by Harris 1990 is no more complex than the head within each branching constituent. The "government" relation by Harris (1994) is characterized by the intimacy of a governor and a governee. The governor is more complex than its governee. It is reflected by the restrictions that the governor imposes on the governee. The notion of segmental complexity is used to determine the governing properties among those segments (Kaye, Lowenstamm and Vergnaud, 1985-1990). So segment associated with governed position may never be more complex than its

governor as there is a pressure on it to reduce its level of complexity and segments must be local/(adjacent) and directional. Moreover, it is composed of univalent elements each of which has its own phonetic representation (Harris, 1990) opposed to feature values that are arbitrary and redundant.

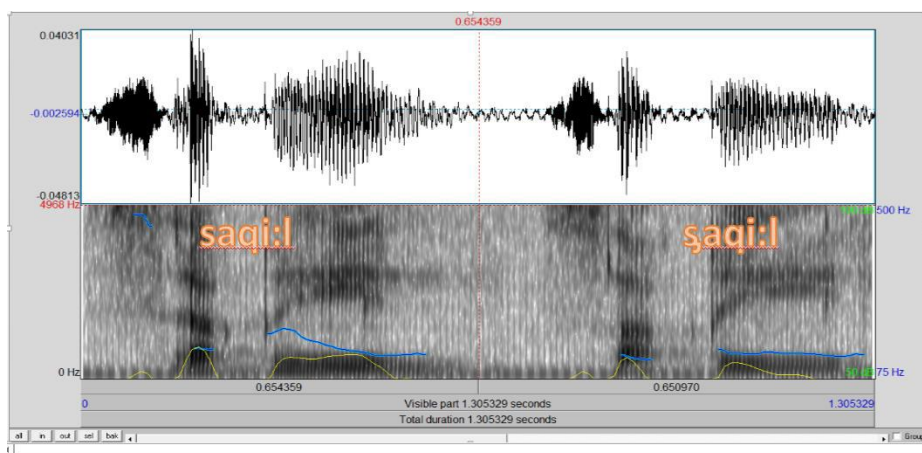
Lenition

Due to the impossibility of alternating two adjacent sounds at the same place or approaching place of articulation whether they are intrasyllabic or intersyllabic, all Arabic phonologists used the term 'substitution' for this phenomenon except Sibawayh who called it lenition, "This is an exceptional kind of what they lenited by their tongues" (Sibawayh, AH 180) . After Sibawayh, some Arab phonologists referred to this phenomenon in their books such as Alkhasaais and Almunisif by Ibn Ginny, Alfaiq by Alzamakhshari. They proved this phenomenon in all parts of speech whether they are isolated or in connected speech form depending on evidence taken from the dictionary of Koran readings, poetry and prose.

Deemphasisization

Lenition which is one of segmental reduction phenomena in phonology has three processes; debuccalisation of supraglottal segments, spirantisation of plosives and vocalization of consonant segments (Harris 1990). Four of twenty eight Arabic consonant segments that are called "emphatic" highlight lenition process in accordance with "Element-based Analysis" model by Harris. They are /t̤/ the voiceless alveo-dental emphatic stop sound, /d̤/ the voiced alveo-dental emphatic stop sound, /ð̤/ the voiced dental emphatic fricative sound and /s̤/ the voiceless alveolar emphatic fricative sound. Under this model, these segments undergo reduction in melodic complexity in order to be lenited. In the following reduction phenomena, the emphatic /s̤/ is lenited into /s/ as in ʃi.ra: t̤ → si.ra: t̤ ; way. The researcher proposes a new process called "deemphasisization" and a new element "E°" for the internal structure of this kind of segments to be added to that of Element Theory by Harris, 1990 (U° labial , l° Palatal, V° none , R° coronal , ?° occluded, h° noise, nasal , H stiff vocal cords , slack vocal cords) so as to be easy to analyze these segments of Arabic in case they are lenited. The proposed element is /E°/ whose salient property is increasing the size of oral resonant cavity as well as increasing in the degree of oral stricture, increasing the resistance to the air flow (Ni Chasaide 1989) and projecting more cues than un emphatic ones (Steriade.1999, 2001, Jun 2004, Harris and Eno-Abasi URUA 2001). Acoustically, any change in the shape of resonator means a change in the resonant frequency. Amphatic and deemphatic segments are of the same resonating portion of the

vocal tract, but emphatic are formed by curving down or squeezing the inner line of the tongue just behind that portion. It is this reason that makes it filter the noise of the vocal cords to be near whistling rather than hissing thereby the shape and size of the extended fissure made by emphatic element change the resonant frequency and in accordance with Fn formula by Ladefoged and Johnson, emphatic segments are of low frequency as the long the resonating portion is, the low the resonant frequency will be. The following spectrographic analysis of *ša.qil---* *sa.qil* will clear it off.



In accordance with the complexity condition, the low the resonant frequency, the more complex the segment is so emphatic is more complex than unemphatic as in the following phonological representation of this example

ša.qil--- sa.qil (sharp)

š →

s R°

R° h°

h° E°

Since it occupies a governed position, the emphatic voiceless stop segment š loses an element which is E° from its internal structure to become less complex than the deemphatic voiceless plosives, the governor, simply because of the difficulty of production that puts pressure on š to reduce its level of complexity, (Harris 1990). More examples are shown in the following table.

No	ξ	s→	Meaning
1	ruʃɣ	rusɣ	wrist
2	ʃ a.qi:l	Sa.qi:l	smooth
3	a.ʃi.qa	La.si.qa	stuck
4	Ba.ʃi.qa	Ba.si.qa	spat
5	?aʃ.ba.ɣa	?as.ba.ɣa	granted
6	?aʃ.ʃi.raʔ	?as.si.raʔ	The way
7	ʃi.ba:ɣ	Si.ba:ɣ	paint

If we take for instance the word sa.rɪ.ta → za.rɪ.da ; swallowed, the phonological representation of ʔ , d is;

ʔ → d

R° R°
ʔ° ʔ°

h°E°H

The segment 'ʔ' loses three elements from its internal structure, element of noise release 'h°', the emphatic element 'E°' and element of voicelessness in order to be lenited to the voiced stop 'd'.

Adjacent segments whether they are intrasyllabic or intersyllabic are related asymmetrically and construed in the governing relation. Onset cluster is interpreted in intra-constituent governing relation whereas coda cluster and coda-onset cluster are interpreted in inter-constituent governing relation (KLV 1990): a segment in the onset governs a preceding segment in the coda. This relation is local and directional. At the level of inter-constituent, the governed segment in the preceding coda should never be more complex than its governor which is the segment in the following onset. The local is the head final and the direction is right-headed (Harris 1990) as in the following phonological representation of qi ʔ – ta:..ʔih (cat lost)

t ----- t → tt

R O R O

R R R

? ? ?

E h h

H H H

The segment /t/ which is the coda of the preceding syllable has four elements; coronal R, occluded ?, emphatic E, and stiff vocal cords or voicelessness H whereas /t/, the onset segment of the following syllable is composed of four elements; coronal R, occluded ?, noise release h, and stiff vocal cords H. /t/ is an emphatic voiceless alveolar stop followed by /t/ the voiceless alveolar stop so the closure of /t/ is formed only at the same place of /t/ whereas /t/ is released with noise. This deemphasization trajectory of lenition highlights the process of gemination in which the onset segment /t/ is governing /t/, the coda governed segment, because of the zero complexity that /t/ gains due to the loss of all its elements and together with /t/ of the following onset to be geminated.

<u>T</u>	<u>T</u>	<u>meaning</u>
Ba.sat.ta	Ba.sat.ta	<u>E</u>
Far.raṭ.tum	Far.raṭ.tum	<u>m</u>
?a.haṭ.tu	?a.haṭ.tu	<u>ph</u>
Far.raṭ.tu	Far.raṭ.tu	<u>asi</u>

zation:

Since deemphasization involves losing an element or more from the internal structure of the governed position of a segment which is decomposition of that segment, emphasisization involves acquiring an extra element or elements spread from adjacent segments, ie, a governor undergoes a special pressure forcing it to emit an element or more from its structure to be added to that of the governed one so as to be more complex. This is called "composition of governee". Emphasisization can be clarified in a gemination process which can be shown in the phonological representation of the following example:

Ham.mat ----- ta: .?i. fa. tun (a group
stood by

/t/ /t̤/

/t̤ t̤/ R R

R

? ?

? H H

H

h h

E E

/t/ lacks two elements, the noise release /h/ because it is the coda of the last syllable so there is no noise release and the emphatic element /E/ as it is unemphasized. Under the pressure of assimilation and gemination t̤, the onset of the following word emits two of its elements to that of /t/ to be the same just like the process of emitter-collector of transistor in physics.

There is another example of the reversing process mentioned above which is fortition so instead of decomposition of elements. Fortition involves composition of elements. This process can be assimilation or gemination such as;

Root	prefix infix
- a- ša.ba.ra iṣ. t̤ a.ba.ra	? <u>i</u> ṣ.ta.ba.ra → ?
- b- ʕa.ra.ba	? <u>i</u> ʕa.ta.ra.ba → ? i ʕ. t̤ a.ra.ba
- C-ša.la.ħa	? <u>i</u> ṣ.ta.la. Ĥa → ? iṣ. t̤ a.la. Ĥa
- d- Ĥa.hi.ra	? <u>i</u> t̤.ta. hi.ra → ? iṭ. t̤ a. hi.ra

In 'a', 'b', 'c', and 'd' the infix segment 't' is emphasized into 't' in

the context of preceding emphatic segments 't' 'd' 'ð' 's', (Al Hamlaawi, 1965) and the phonological representation of this process is just like that of the preceding example.

All feature-based approaches starting from SPE's theory of processes by Chomsky and Halle(1968) failed to capture the notion of segmental reduction or

7

lenition as they dealt with lenition trajectories by arbitrary switches in feature

values (plus-minus) that are handled by redundancy rules as in $t \rightarrow d$ in Sa $t\text{--}da:fi? \rightarrow Sdda:fi?$. SPE theory proposed the following linear phonological representation $[-son, -cont.] \rightarrow [+voiced] / v\text{--}v$. The extended model of strength hierarchy (any weakening is predicted to affect any context ranked lower on the hierarchy(Lass and Anderson 1975,)) is an attempt at remedying the deficiency of those approaches, but it fails to code its scales in phonological representation. Kiparsky (1979) and McCarthy(1988) showed that the phonological representation of changing $t \rightarrow d$ mentioned above undergoes some modifications as follows:

t	d
[+con]	[+con] -cont.
	-son
	-son
	Phar
	y
	Glott
	+voiced

Though features arrangement is hierarchical but still binary and patterned in an arbitrary way as well as the redundant feature –cont. Sonorant Voice approach (Rice ,1992) specifies constituents by acquiring the two nodes "Air flow" and "Voice Sonorant". Though emphatic segments need more air flow in the vocal tract than deemphatic , the two are obstruent and her approach can not specify lenited segments in this case. In Feature Theory, the rule is arbitrary to value a combination of two features only whereas Element Theory handled processes with more than two features. In accordance with the element-based analysis, lenition is a process that involves a reduction in the elements of a segment or "a loss of elements from a segment's make-up"(Harris, 1990). In Element Theory, each element of a segment has its own phonetic free from redundancy and arbitrariness.

Table of Arabic Phonemes

Manner of articulation	Pla										
	Bi-labial	Labio-dental	Dental	Alvio-dental	Alveolar	Palate-alveolar	Palatal	velar	uvular	Pharyngeal	glottal
Stop normal	b			t d				k g	q		ʔ
emphatic				ṭ ḍ							
Nasal	m				n						
Fricative norm		f	θ ð		s z š ʒ			x ɣ	ħ	ʕ	h
Emphatic			ð								
Affricate						č ǰ					
Lateral					l						
Approximant	w				r			ɣ			

CONCLUSION

In this study, the researcher has seen that some couples of segments in some languages such as voiceless segments and emphatic voiceless segments in Arabic that are of the same place of articulation, manner of articulation and state of the vocal cords must be accounted for by assuming a new trajectory and a new element to solve lenition process of those segments through Element Theory by John Harris as there is no such couples of segments in Indo-European languages. The researcher has found that these couples can be studied through the difference in the geometry of oral resonator between them only and on the basis of this difference, he assumed a new trajectory and a new element.

REFERENCES

1. Addani, Abi Amrou. (444 H). Alidgham alkitabier: World of books 2003. Azzamakhshari. (538 H). Alfaiq fi gharieb Alhadieth: House of thought 1993. Assiyouti (911.H). Almuzhar in linguistics 263/1: House of heritage. .
2. Binil Alaa, Abi Amr. (154 H). Alidgham Alkitabier fil Koran. Kuwait: Centre of scripts, heritage and documents.
3. Chomsky and Halle (1968).The sound pattern of English. New York: Harper and Row.
4. Hamlaawi, Ahmad (1965). Shatha Alarf fi fan Alsarf: House of Alkiyan
5. Harris, J (1990). Segmental complexity and phonological government. Cambridge University Press.
6. Harris, J (1994).English sound structure. Oxford: Blackwell.
7. Harris and Eno-Abasi Urua. (2001).Lenition degrades information: Work in progress 13 (UCL). 72-105.
8. Ibn Ginny (392 H) Alkhasaais: Egyptian house of books, 1952.
9. Ito, Junko (1986).Syllabic theory in prosodic phonology. University of Massachusetts, Amherst.
10. Jun, J. (2004). Place assimilation, phonetically -based phonology, 58-86. Cambridge: Cambridge University Press.
11. KLV. (1985).The internal structure of phonological elements. Phonology Yearbook 2. 305-328.
12. KLV (1990). Constituent structure and Government phonology, Phonology 7.2, Cambridge, CUP.
13. Kiparsky, P (1979).Metrical structure is cyclic. Linguistic Inquiry L I 8:421-442
14. Ladefoged, P and Johnson, K (2011). A course in phonetics. Cengage Learning.

15. Lass, R and Anderson, J. M. (1975). Old English phonology. Cambridge: Cambridge University Press.
16. University Press.
17. McCarthy, J (1979b). On stress and syllabification. Linguistic Inquiry 10: 43-66
18. McCarthy, J (1988) .Feature geometry and dependency: a review. Phonetica 45: 84-108.
19. 108.
20. Ni Chasaide, A. (1989). Sonorization and spirantization. Ms. Trinity College, Dublin.
21. Rice, K, D (1992). On deriving sonority. Phonology 9. 91-100
22. Seaway's book (180 H) Investigated by Haroun, A.S.M 306/4: Cairo, Alkhanji. Selkirk, E. (1981). On the nature of phonological representation.
23. Steriade, D (1999). Phonetics in Phonology: Papers in Phonology 3. 25-146. Steriade, D. (2001). Directional asymmetries in place assimilation. Academic press.
24. Umar, A. Mukhtar and Makram, A Salim. (1988). Dictionary of Koran readings: University of Kuwait, 2nd Ed.