ABSTRACT

AN OPTIMALITY THEORETIC ANALYSIS OF STRESS IN GHAMDI ARABIC

Word stress in Ghamdi Arabic has never previously been studied in the existing literature on phonology. Thus, this thesis examines the word stress patterns and the syllable structures in Ghamdi Arabic. Moreover, this study presents an optimality theoretic framework analysis to analyze word stress (Prince & Smolensky, 1993). Every prosodic word of Ghamdi Arabic has only one primary stress, and syllable weight plays a major role in the placement of this stress. As the data show, stress falls on the rightmost heavy syllable or initial syllable if there are no heavy syllable. The paper shows the set of constraints, the interactions between them, and the relative ranking of this constraints.

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AN OPTIMALITY THEORETIC ANALYSIS OF STRESS IN GHAMDI ARABIC

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CHAPTER 1: INTRODUCTION

Many dialects of Arabic exist in Saudi Arabia. The major dialects are Najdi, Hijazi, Shargi, Shamali, and Janubi. Ghamdi Arabic (GA) is one of the most diffuse Janubi dialects, and is spoken in the southwest region of Saudi Arabia. Ghamdi is spoken by one of the biggest tribes, called Bani Ghamed, who live in the small city called Al-Baha. The phonological processes in GA have not been addressed and understood; GA has received little attention from linguists and is missing from the available literature in phonology.

This thesis is mainly descriptive, and is divided into two main sections. The first section provides word stress patterns in a constraint-based framework of Optimality Theory (OT) (Prince & Smolensky, 1993). The second section presents the interaction between the major constraints that contribute to GA syllable structure.

Ghamdi Arabic Phonemes

The consonant system of Ghamdi dialect is comprised of 27 core phonemes arranged at 11 places of articulation and in five manners of articulation. The vowel system in GA consists of seven short vowels and three long vowels. In addition, the vowels are pronounced slightly differently depending upon the phonetic environment. Tables 1 and 2 display the GA phonemes; an understanding of these phonemes is helpful for analyzing the data presented in the next chapters of this paper.

Table 1

Ghamdi Arabic Consonants

Place / Manner	Bilabial	Labio-Dental	Inter-Dental	Alveolar	Palato-Alveolar	Palatal	Velar	Labial-Velar	Pharyngeal	Glottal
Nasal	m			n						
Stop	b			d t tˤ			k g			ʔ
Fricative		f	θ ð ȶˤ	s z sˤ	ʃ ʒ		x ɤ		ħ ʢ	h
Approximant				l		j		w		
Trill				r						

Table 2

Ghamdi Arabic Vowels

	FRONT	CENTRAL	BACK
CLOSE	i i:		u u:
CLOSE - MID	e		
OPEN - MID	ɛ	ə	ɔ
OPEN	a a:		

CHAPTER 2: THEORETICAL BACKGROUND

Optimality Theory (OT)

Alan Prince and Paul Smolensky (1993) were the first to apply optimality theory to the study of phonology. OT is also applicable to other subfields of linguistics such as syntax and semantics. Over the years, the approach has been improved due to the extensive research done by the different scientists in those fields. OT identifies five fundamental principles: violability, ranking, inclusiveness, parallelism, and universality (Prince & Smolensky, 1993).

OT analyses are represented in a table with three primary constituents: GEN, CON, and EVAL. The first component GEN generates the diverse candidates. The second division CON is a set of constraints that helps pick out the winning candidate. The constraints are hypothesized to be universal but, crucially, are ranked differently from one language to another. Finally, the last stage EVAL is the actual choosing of the candidate best suited to the task in question. Table 3 shows the three constituents of OT.

Table 3

OT Constituents

/input/	Constraint 1	Constraint 2
☞ Candidate A		*
Candidate B	*!	

Table 3 shows the input form, the constraint ranking, selected candidates and their violations (marked with *), and the winning candidate (marked with a pointing hand). If a certain candidate has a fatal violation, it is represented by an exclamation mark (!). Moreover, solid lines between the constraints indicate crucial rankings, while dotted lines mean that constraints on either side are not mutually ranked. Finally, the grey shading shows where violations are irrelevant.

Syllable Structure and the Moraic Approach in Phonology

The general structure of a syllable consists of two constituents: the onset (On) and the rhyme (Rh). Consonants can fill the onset and the syllable that has no consonant in the onset position is called onsetless. The onset is obligatory in some languages and optional in others. Moreover, the rhyme is a combination of a nucleus (Nu) and a coda (Co). The nucleus is obligatory, and syllables must minimally consist of a nucleus. The coda is optional in some languages and prohibited in others. A syllable that has a coda is called a closed syllable while a syllable that has no coda is called an open syllable. If a constituent contains more than one segment, it is referred to as complex. The syllable can be structured hierarchically (Figure 1).

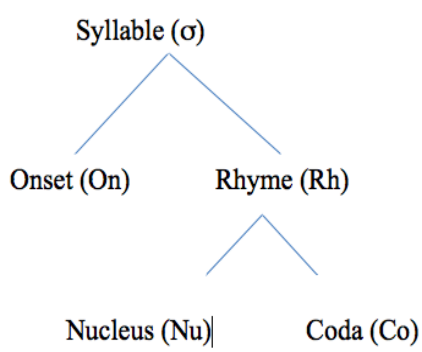


Figure 1. Syllable structure

The moraic approach focuses on the syllable weight structure (Hayes, 1989). In moraic theory, there are two types of syllables: light and heavy. A light syllable has a short vowel in the rhyme that has only one mora. A heavy syllable has a long vowel or diphthong in the rhyme that has two moras. Moreover, the only segments that are able to receive a mora are those in the syllable rhyme (Hayes 1989; Hyman 1985). In addition, filled codas are assigned one mora through weight-by-position (see Figure 2 in Hayes, 1989). For example, Latin assigns a mora in the coda position while Lardil does not assign any mora in the coda position (McCarthy & Prince, 1986).

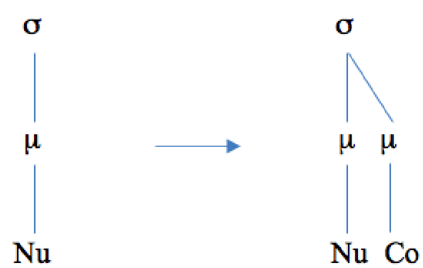


Figure 2. Weight-by-position

Arabic is a quantity sensitive language that distinguishes between light and heavy syllables when it comes to the stresses. Briefly, syllable weight plays a major function in stress assignment, as we will see in the next chapters.

Syllable Structure of Ghamdi Arabic

Syllables in GA are divided into two categories: open syllable with no consonant filling the coda position, and a closed syllable with a consonant filling the coda position. A GA syllable with a short vowel is light with one mora, while a syllable with a long vowel is heavy and has two moras. GA syllables are comprised of a compulsory onset and nucleus, and an optional coda. Onsetless syllables are prohibited in GA, as in most Arabic dialects. Complex codas and complex onsets are also prohibited. In addition, final consonants are not assigned a mora in word final position. Hence, the syllable weight for CVC will change according to the position of the syllable. The theoretical reason for considering CVC a light syllable in the final position is the extrasyllabic consonant is in the coda position of the syllable (Hayes, 1995). The same thing applies to the final CVXC in which the final consonant is extrasyllabic. Moreover, the syllable (CVC) is monomoraic in the final position, while a non-final CVC and a final CVCC are bimoraic and heavy. Extrametricality only affects consonants; thus the syllable (CVV) is bimoraic and heavy in any position.

Moreover, Arabic CV-dialect, considers the extrasyllabic consonant as extra-prosodic; that is, it counts as a prosodically invisible element because the final consonant does not have a mora (Kiparsky, 2003). Finally, the extrasyllabic consonant is attached directly to the higher level of prosodic node, as illustrated in Figure 3.

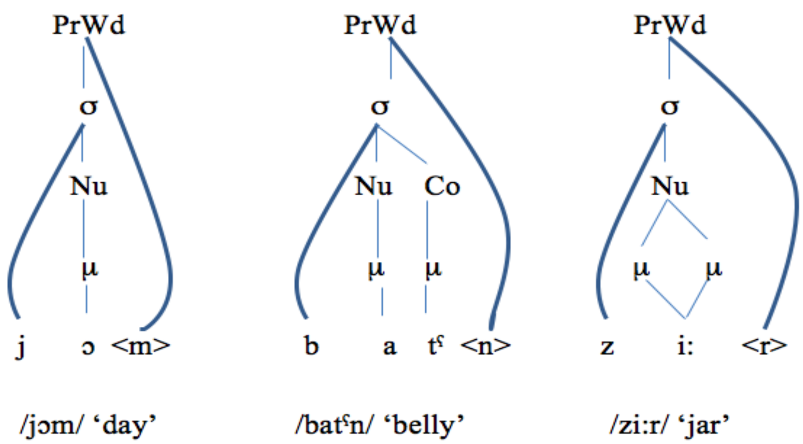


Figure 3. Extrasyllabic attached to PrWd

The GA Syllable in OT

According to Prince and Smolensky (1993, 2004), a syllable OT is produced in a similar way as any other grammatical feature. GA is a CV(C) language, as noted above, in which syllables require onsets and allow codas.

Therefore, no word starts with a vowel in GA. Syllable structure in GA leads to formulation of the following constraints:

(1) ONSET: A syllable must have an onset.

(2) *CODA: A syllable must not have a coda. (Prince & Smolensky, 2004)

Together these two constraints are presented in Table 4.

Table 4

CV.CV word: /ʔa.bu/ 'father'

/ʔabu/	ONSET	*CODA
☞ a. ʔa.bu		
b. ʔab.u	*!	*

Candidate (a) is optimal because it satisfies both constraints. Candidate (b) loses because it violates ONSET, and an onset is required in GA. Another example using different syllable shape is presented in Table 5.

Table 5

CV.CVC word: / ra.mad / 'ash'

/ ra.mad /	ONSET	*CODA
☞ a. ra.mad		*
b. ram.ad	*!	*

Candidate (a) is optimal because it satisfies ONSET and violates *CODA. Candidate (b) is ruled out by ONSET, because one of the syllables is onsetless.

As result, ONSET is a high ranking constraint in GA and it is clear that it ranks out the constraint *CODA.

Ranking 1: ONSET > *CODA

According to McCarthy and Prince (1995), the two faithfulness constraints belonging to the MAX and DEP constraints are MAX -IO and DEP-IO.

(3) MAX-IO: Every segment of the input has a correspondent in the output (prohibits deletion).

(4) DEP-IO: Every segment of the output has a correspondent in the input (prohibits epenthesis).

In Arabic, according to Boudlal (2001), and Gadoua (2000), syllables cannot start with a vowel, and when this situation appears an epenthetic glottal stop is inserted to satisfy ONSET. For example, the word ‘Armenia’ starts with a vowel in the first syllable, but in GA this is not allowed and thus a glottal stop is placed preceding the vowel [ʔar.me.nia]. However, as we saw in the previous ranking in GA, the constraint ONSET is undominated. Table 6 demonstrates the interaction between these constraints.

Table 6

CVC.CV.CVV word: / ar.me.nia / ‘Armenia’

/ armenia /	ONSET	MAX-IO	DEP-IO	*CODA
☞ a. ʔar.me.nia			*	*
b. ʔar.me.ni		*!	*	*
c. ar.me.nia	*!			*

In Table 6, candidate (a) is the winner because it obeys ONSET by providing a consonant to the onset of the first syllable. Also, it does not violate MAX-IO. Candidate (b) loses because it does not satisfy MAX-IO. Candidate (c) loses because onsetless syllables are prohibited in GA.

Based on the analysis so far, we can conclude the following ranking:

Ranking 2: ONSET, MAX-IO> DEP-IO> *CODA

As mentioned earlier, GA does not allow complex codas or complex onsets. Thus, two more constraints are formulated.

(5) *Complex^{ONS}: onsets are simple.

(6) *Complex^{COD}: codas are simple. (Kager 1999).

Table 7 illustrates the interaction between *Complex^{ONS} and *Complex^{COD} with ONSET, DEP-IO and *CODA.

Table 7

CV.CVCC word: / da.rast / ‘I study’

/da.rast/	ONSET	*Complex^{ONS}	DEP-IO	*Complex^{COD}	*CODA
☞a. da.rast				*	*
b. ʔda.rast		*!	*	*	*
c. dar.ast	*!				**

The first candidate (a) satisfies ONSET and *Complex^{ONS}. Candidate (b) loses because it has a complex onset and this is prohibited in GA. Candidate (c) is excluded because it violates ONSET. Table 8 demonstrates the interaction between all constraints considered so far.

Table 8

/afɤanistank / ‘your Afghanistan’

/afɤanistank /	ONSET	*Complex^{ONS}	MAX-IO	DEP-IO	*Complex^{COD}	*CODA
☞ a. ʔaf.ɤa.nis.tank				*	*	***
b. ʔa.fɤa.nis.tank		*!		*	*	**
c. af.ɤa.nis.tank	*!		*		*	***

The first candidate (a) satisfies ONSET, *Complex^{ONS} and MAX-IO. Candidate (b) loses because it has a complex onset and this is prohibited in GA. Candidate (c) is excluded because it violates ONSET.

The result of the interaction of the syllable constraints is represented in ranking (3):

Ranking 3: ONSET, *Complex^{ONS}, MAX-IO> DEP-IO,*Complex^{COD} >*CODA

CHAPTER 3: STRESS IN GHAMDI ARABIC

Before illustrating the stress pattern for GA, it useful to review unbounded stress patterns in general. Unbounded stress patterns are of two types: default-to-opposite side and default-to-same side. In the default-to-opposite side system, the main stress falls on the rightmost heavy syllable or, if there are no heavies, on the (light) initial syllable. In other languages, the main stress falls on the leftmost heavy syllable or if there are no heavies, on the (light) final syllable. In (7), the stress pattern shows the default-to-opposite side system. In the default-to-same side, the main stress falls on the rightmost heavy syllable or if there are no heavies, on the (light) final syllable. In others language, the main stress falls on the leftmost heavy syllable or if there are no heavies, on the (light) initial syllable. In (8), the stress pattern shows the default-to-same side system (see also Kager, 2007; Prince, 1985; Walker, 1997).

(7) Default-to-opposite

σσσσ'σσ OR 'σσσσσ

(8) Default-to-same

σσ'σσσσ OR 'σσσσσ

GA has an unbounded quantity-sensitive stress pattern and a default-to-opposite system. The dominant syllable in GA is on the left edge of a foot (trochaic feet), and every prosodic word has one primary stress and no secondary stress. In the following examples, the parentheses indicate the trochaic feet of GA. Also, as mentioned previously, the word-final C is extrasyllabic and is attached directly to a higher level of prosodic node so it will appear outside the parentheses. Examples of the stress patterns in GA:

(9) Stress falls on the rightmost heavy syllable

(jeʒ)(ˈri:)	‘run’
(da)(ˈfa:)	‘warm’
(me)(ˈta:)	‘when’
(θæ)(ˈlæ:)(θæ) h	‘three’
(tur)(ˈsɔm)(ha)	‘she draws it’
(ˈsiy)(ra)(ta) h	‘his car’
(je)(ˈgan) j	‘to sing’
(ʔij)(ˈzau) ʕ	‘to vomit’
(ra:)(ˈsi:) n	‘two head’
(ħam)(ma:)(ˈmi:) n	‘two bath’

(10) Stress falls on the initial syllable if the word has only light syllables

(ˈʔa)(bu)	‘father’
(ˈʔe)(ða)	‘if’
(ˈʃa)(ʒa)(ra) h	‘tree’
(ˈra)(ħa)(la)	‘he leaves’
(ˈje)(na)(fe) s	‘compete’
(ˈʃa)(na)(tˤa)(ti)	‘my bag’
(ˈʔe)(ðe) n	‘ear’
(ˈwa)(di)	‘river’

Prosodic and Stress Constraints in Ghamdi Arabic

This section presents the interaction between constraints in GA. The first constraint that is undominated in GA is CULMINATIVITY. GA has only one primary stress and there is no appearance of a secondary stress. Thus, CULMINATIVITY has the top constraint rank because it is never violated.

(11) CULMINATIVITY (CULM): Every prosodic word has one primary stress (Hayes, 1995). This can be seen in Table 9.

Table 9

CULMINATIVITY: /mar'suum/ 'it draw'

/marsuum/	CULM
☞ a. (mar)('suu) m	
☞ b. (mar)('suum)	
c. ('mar)('suum)	*!
d. (mar)(suum)	*!

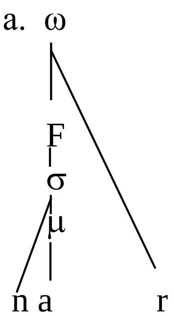
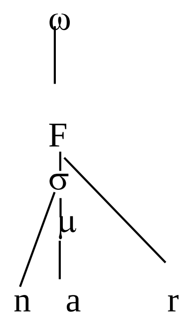
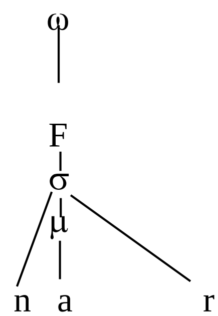
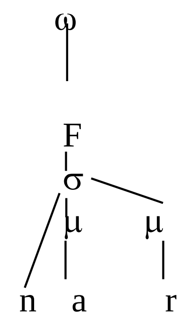
Candidates (a) and (b) are the optimal candidates because they each have only one primary stress. Candidate (c) loses because it has two primary stresses and thus incurs one violation of CULMINATIVITY. Candidate (d) also loses because it does not carry any stress at all. However, two candidates win the competition, when there should be only one winning candidate in OT. Therefore, we need another constraint in order to eliminate one of them. The second undominated constraint in GA is WEAKEDGE, and it determines the winning candidate.

(12) WEAKEDGE (WKE): The right periphery of the prosodic word should be empty (Spaelti, 2002).

WEAKEDGE requires that the structure of the right edge of a prosodic constituent be minimal (Spaelti, 2002). It advocates for representation with fewer prosodic nodes and association lines (Boudlal, 2001). Recall that the final consonant in GA is extrasyllabic and is attached directly to the prosodic word. Consequently, WEAKEDGE requires the right periphery of the prosodic word is linked directly to the prosodic node. According to Youssef (2004), the adjustment presented to this constraint is to make it assign no violation mark to any association line linked to the prosodic word. The effect of WEAKEDGE is illustrated in Table 10.

Table 10

WEAKEDGE: / 'nar / ‘fire’

☞ a. 	b. 	c. 	d. 
	*!	*!*	*!**

Candidate (a) satisfies the WEAKEDGE constraint with zero violation and the final consonant directly parsed onto the prosodic word (the extrasyllabic /r/ is attached directly to the higher level of the prosodic node). Candidate (b) is ruled out; it incurs one violation of WEAKEDGE because /r/ is attached to the foot node. Candidate (c) has one consonant parsed directly onto the syllable and assigned two violation marks (the /r/ is attached to the syllable node). In candidate (d) the final consonant has two mora and that creates several violations of WEAKEDGE.

However, both CULMINATIVITY and WEAKEDGE are inviolable constraints in GA. Table 11 illustrates the interaction between these two constraints to exclude one of the two winners of the example presented in Table 9.

Table 11

CULMINATIVITY and WEAKEDGE : /mar'suum/ 'it draw'

/marsuum/	CULM	WKE
☞ a. (mar)('suu) m		
b. (mar)('suum)		*!
c. ('mar)('suu) m	*!	
d. (mar)(suum)	*!	*

Candidate (a) is the optimal candidate because it satisfies both CULMINATIVITY and WEAKEDGE. Candidate (b) is ruled out by WEAKEDGE because the final consonant is not extrasyllabic. Candidate (c) loses because it has two stresses. The same is true for candidate (d); it lacks any primary stress and the right periphery of the prosodic word is not empty.

As pointed out earlier, GA has a default-to-opposite-edge system which makes the stress falls on the rightmost heavy syllable, otherwise on the initial syllable. The default-to-opposite-edge system requires an interaction between two constraints that shows the paradox of the directionality principle.

(13) ALIGN ($\acute{\sigma}\mu$, L, PrWd, L): A stressed light syllable (ˈL) must be PrWd-initial. (Walker, 1997)

(14) ALIGN-HEAD-R: The PrWd ends with the primary stress foot. (McCarthy & Prince 1993b)

The interaction between these two constraints is illustrated in Tables 12-14.

Table 12

ALIGN (σ́μ, L, PrWd, L) and ALHDR /'samakah/ 'fish'

/samakah/	ALIGN (σ́μ, L, PrWd, L)	ALHDR
☞ a. ('sama)(ka) h		*
b. (sa)('maka) h	*!	
c. (sama)('ka) h	*!	

Table 13

/ʒa'me:lah/ 'she is beautiful'

/ʒame:lah/	ALIGN (σ́μ, L, PrWd, L)	ALHDR
☞ a. (ʒa)('me:)(la) h		*
☞ b. ('ʒa)('me:)(la) h		*
c. (ʒa)(me:)('la) h	*!	
d. ('ʒa)(me:)(la) h		*!*

Table 14

/baʕa:'ri:n/ 'camels'

/baʕa:ri:n/	ALIGN (σ́μ, L, PrWd, L)	ALHDR
☞ a. (ba)(ʕa:)('ri:) n		
☞ b. ('ba)(ʕa:)('ri:) n		
c. (ba)('ʕa:)(ri:) n		*!
d. ('ba)(ʕa:)(ri:) n		*!*

As seen in Table 12, candidate (a) is the optimal candidate because it satisfies ALIGN ($\acute{\sigma}\mu$, L, PrWd, L). Candidate (b) and (c) ruled out by ($\acute{\sigma}\mu$, L, PrWd, L) because the stress do not fall in the PrWd-initial. However, in Table 13, candidates (a) and (b) are the optimal candidates because they each satisfied ($\acute{\sigma}\mu$, L, PrWd, L) and have only one violation for ALHDR. In Table 14, the first two candidates satisfied both ($\acute{\sigma}\mu$, L, PrWd, L) and ALHDR. Therefore, we need another constraint in order to eliminate one of them. However, ALHDR often fails when the stress does not fall in the last syllable. The constraint ALIGN ($\acute{\sigma}\mu$, L, PrWd, L) is more important than ALHDR because it is never violated with the winning candidate and it outranks ALHDR. Hence, ALIGN ($\acute{\sigma}\mu$, L, PrWd, L) is the third inviolable constraint in GA. The other constraint that eliminates one of winning candidates presents in the next paragraph.

GA has trochaic feet with unbounded stress patterns. Unbounded stress patterns allow stressless syllables with no secondary stress. According to Chris Golston in a classroom presentation (2015; California State University, Fresno), the two constraints *IAMB and *TROCHEE can help to revoke secondary stress in prosodic words. Moreover, they can capture any language that lacks stress or has two stresses in the foot. *IAMB avoids stress in syllable that have the form (LˈL) and *TROCHEE avoids stress in syllables that have the form (ˈLL).

(15) *IAMB: Stress does not fall on the last mora of a foot, i.e. no (μˈμ) (personal communication, C. Golston, 2015).

(16) *TROCHEE: Stress does not fall on the first mora of a foot, i.e. no (ˈμμ) (personal communication, C. Golston, 2015)

The data in Table 15 illustrate the ranking of the CULM constraint with *IAMB and *TROCHEE.

Table 15

**IAMB > *TROCHEE: /ˈwa.ra/ ‘back’*

/wa.ra /	CULM	*IAMB	*TROCHEE
☞ a. (ˈwa.ra)			*
b. (wa.ˈra)		*!	
c. (wa.ra)	*!		

Table 15 shows that candidate (a) is the optimal candidate even though it violates *TROCHEE because *IAMB dominates *TROCHEE. Candidate (b) loses because it violates *IAMB and it is more important to avoid (LˈL) than to avoid (ˈLL) in GA. However, candidate (c) loses because it lacks any stress.

Rank 1: Culminativity, Weakedge, Align (σ́μ, L, PrWd, L), * Iamb >*Trochee

In addition, mora counting is paramount when it comes to the stress analysis of GA. The constraint FOOT BINARITY captures the number of moras in every foot in the prosodic word.

(17) FOOT BINARITY: every foot must be binary under syllabic or moraic analysis (Prince & Smolensky, 1993).

This constraint can be violated in GA when we have a monosyllabic word with one mora. For example, a word with only a CVC syllable has one mora and the final consonant is extra-syllabic with no mora. Table 16 presents FOOT BINARITY and the interaction of the high ranking constraint CULMINATIVITY and WEAKEDGE in monomoraic syllable.

Table 16

CULMINATIVITY ,WEAKEDGE> FOOT BINARITY: /'nar/ 'fire'

/nar/	CULM	WKE	FtBin
☞ a. ('na) r			*
b. ('nar)		*!	
c. (nar)	*!		

Table 16 shows that candidate (a) wins because WEAKEDGE dominates FtBin. Candidate (b) violates WEAKEDGE but obeys FtBin because it has two moras. However, WEAKEDGE is higher-ranking constraint than FtBin because it is more important to have the right edge empty than to have two moras. Candidate (c) loses because it does not have a primary stress and the final consonant is not extrasyllabic.

Rank 2: CULMINATIVITY, WEAKEDGE, ALIGN (σ́μ, L, PrWd, L), *IAMB > *TROCHEE, FtBin

To sum up, the result of the interaction of all the above constraints gives the final ranking: CULMINATIVITY, WEAKEDGE, ALIGN (σ́μ, L, PrWd, L), *IAMB > *TROCHEE, FtBin > ALHDR.

Tables 17-19 present the final ranking accounts for the stress in disyllabic, trisyllabic, and tetrasyllabic words, respectively in GA.

Table 17

A Disyllabic Word /'raasah/ 'his head'

/raasah/	CULM	WKE	(σ́μ, L, PrWd, L)	*IAMB	*TROCHEE	FtBin	ALHDR
☞ a. (ˈraa)(sa) h					*	*	*
b. (raa)(ˈsa) h			*!		*	*	
c. (ˌraa)(ˈsa) h			*!		**	*	
d. (raa)(sah)	*!	*				*	

Table 18

A Trisyllabic Word /'samakah/ 'fish'

/samakah/	CULM	WKE	(σ́μ, L, PrWd, L)	*IAMB	*TROCHEE	FtBin	ALHDR
☞ a. (ˈsama)(ka) h					*	*	*
b. (saˈma)(ka) h				*!		*	*
c. (ˌsa)(ˈmaka) h			*!		**	*	
d. (sa)(makah)	*!	*				*	

Table 19

A Tetrasyllabic Word /'ʔiltˤawelah/‘table’

/ʔiltˤawelah /	CULM	WKE	(σ́µ, L, PrWd, L)	*IAMB	*TROCHEE	FtBin	ALHDR
☞ a. (ˈʔil)(tˤawe)(la) h					*	*	***
b. (ʔil)(ˈtˤawe)(la) h			*!		*	*	*
c. (ˈʔil)(ˌtˤawe)(la) h					**!	*	***
d. (ʔil)(tˤawe)(la) h	*!	*				*	

CHAPTER 4: CONCLUSION

This paper presents a framework analysis of optimality theory for GA. GA has an unbounded quantity-sensitive stress pattern, and thus syllable weight plays a major role in this language. Every prosodic word of GA has only one primary stress and no secondary stress. Also, GA has a default-to-opposite system, so that the stress falls on the right-most syllables or initial syllables if there is no heavy syllable. In addition, the analysis in this paper demonstrates four high-ranking constraints in GA that are undominated: CULMINATIVITY, WEAKEDGE, ALIGN ($\acute{\sigma}\mu$, L, PrWd, L), and *IAMB. However, the analysis also shows inviolable constraints that are outranked by the undominated constraints. GA has not previously been studied and this paper aims to bring attention to this language, with the hope of encouraging further phonology research on it in the future.

REFERENCES

Boudlal, A. (2001). Constraint interaction in the phonology and morphology of Casablanca Moroccan Arabic. *Unpublished doctoral thesis, Université Mohammed V*.

Gadoua, A. H. (2000). Consonant clusters in Quranic Arabic. *Cahiers Linguistiques D Ottawa*, 59-86.

Hayes, B. (1989). Compensatory lengthening in moraic phonology. *Linguistic Inquiry,* 20, 253-306.

Hayes, B. (1995). *Metrical stress theory: Principles and case studies*. Chicago, IL: University of Chicago Press.

Hyman, L. (1985). *A theory of phonological weight*. Dordrecht, Holland: Foris.

Kager, R. (1999). *Optimality theory*. Cambridge University Press.

Kager, R. (2007). Feet and metrical stress. In P. de Lacy (ed.), *The Cambridge handbook of phonology* (pp. 195-227). Cambridge, England: Cambridge University Press.

Kiparsky, P. (2003). Syllables and moras in Arabic. In C. Fery, & R. Vijver (eds.), *The syllable in optimality theory* (pp.147-182). New York, NY: Cambridge University Press.

McCarthy, J., & Prince, A. (1986). *Prosodic morphology*. Waltham, MA: University of Massachusetts at Amherst.

McCarthy, J., & Prince, A. (1993). *Prosodic morphology I*: *Constraint interaction and satisfaction*. Manuscript, University of Massachusetts, Amherst, and Rutgers University.

Prince, A. (1985). Improving Tree Theory. *Annual Meeting of The Berkeley Linguistics Society*, 11, 471-490.

Prince, A., & Smolensky, P. (1993). *Optimality theory: Constraint interaction in generative grammar*. Malden, MA: Blackwell.

Spaelti, P. (2002). *Weak edges and final geminates in Swiss German*. New Brunswick, NJ: Rutgers Optimality Archive.

Walker, R. (1997). *Mongolian stress, licensing, and factorial typology*. Retrieved from http://dx.doi.org/doi:10.7282/T3VD6WHR

Youssef, I. (2004). *An Optimality-Theoretic approach to extrasyllabicity in superheavy syllables*. *A typology of Cairene Arabic, English, and Kelkar's Hindi*. Retrieved from https://www.academia.edu/5363400/An_Optimality-Theoretic_Approach_to_Extrasyllabicity_in_Superheavy_Syllables

APPENDIX: THE DATA

Word	Syllable weight	Gloss
ˈsajʔ	ˈH	‘bad’
ˈbejtˤ	ˈH	‘egg’
ˈʕatˤm	ˈH	‘bone’
ˈbatˤn	ˈH	‘belly’
ˈħaj.wan	ˈHL	‘animal’
ˈʕasˤ.fɔr	ˈHL	‘bird’
ˈtaf.ʒir	ˈHL	‘to blow’
ˈʔas.wəd	ˈHL	‘black’
ˈjeg.tˤaʕ	ˈHL	‘to cut’
ˈjeħ.fɔr	ˈHL	‘to dig’
ˈgam.lah	ˈHL	‘louse’
ˈjeħ.reg	ˈHL	‘to burn’
ˈra.mad	ˈLL	‘ashes’
ˈwa.ra	ˈLL	‘back’
ˈlu.ħaʔ	ˈLL	‘bark(tree)’

ˈwa.lad	ˈLL	‘child’
ˈki.bir	ˈLL	‘big’
ˈsa.ħæb	ˈLL	‘cloud’
ˈje.mut	ˈLL	‘to die’
du.ˈwaaʔ	LˈH	‘good’
da.ˈrast	LˈH	‘I studied’
ga.ˈliil	LˈH	‘A few’
ti.ˈtˤiir	LˈH	‘To fly’
ˈjet.na.fas	ˈHLL	‘to breath
ˈʔar.ba.ʕah	ˈHLL	‘four’
ˈjin.ti.fix	ˈHLL	‘swell’
ˈtar.ʒa.mah	ˈHLL	‘translation’
ˈʔaa.di.mi	ˈHLL	‘human’
ˈwa.ra.gah	ˈLLL	‘leaf’
ˈma.sˤa.rin	ˈLLL	‘guts’
ˈfa.wa.kih	ˈLLL	‘fruit’

ˈsa.ma.kah	ˈLLL	‘fish’
ˈba.ʃa.ra	ˈLLL	‘skin’
fa.na.ˈgiil	LLˈH	‘cups’
ma.na.ˈdeel	LLˈH	‘tissue’
da.ʒa.ˈʒaat	LLˈH	‘chickens’
ba.ga.ˈrat.hum	LLˈHL	‘their cow’
ma.laa.ˈbis.na	LHˈHL	‘our clothes’
ma.zaa.ˈriʕ.na	LHˈHL	‘our farms’
mak.ta.ˈbat.na	HLˈHL	‘our library’
ʔil.ʔi.maa.ˈraat	HLHˈH	‘UAE’
batˤ.tˤaa.ˈnij.jah	HHˈHL	‘blanket’
ʔa.ˈmaa.na.tan	LˈHLL	‘honestly’
ˈʃa.ʒa.ra.ti	ˈLLLL	‘my tree’
ˈwa.ra.ga.ti	ˈLLLL	‘my paper’
ʔil.mus.taʃ.fa.ˈjaat	HHHLˈH	‘hospitals’

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