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Abstract:

The present study aims to investigate stress patterns in Bani Saxar Arabic (BSA), an Arabic dialect spoken by Bedouins of the center in Jordan, from an Optimality Theory perspective. The data have been collected via tape-recording and note-taking of the participants' spontaneous speech. The study shows that the foot in the phonological system of BSA is iambic which is parsed from left to right. Degenerate feet are strongly prohibited since content words obey the word bimoraic minimality condition. The study also shows that stress assignment patterns in BSA can be accounted for by a limited number of universal constraints.

Keywords: Optimality Theory, Stress, Bani Saxar Arabic, Bedouin Jordanian dialects.

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أنماط النبر في لهجة بني صخر في الاردن: تحليل وفق النظرية الأمثلية

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ملخص:

تهدف الدراسة الى البحث في أنماط النبر في لهجة بني صخر و التي تمثل لهجة قبائل بدو الوسط في الاردن وفق النظرية الامثلية(Optimality Theory). تم جمع بيانات الدراسة من خلال التسجيل الصوتي و اخذ الملاحظات لكلام المشاركين. أظهرت الدراسة أن وحدات تقسيم الكلمة في النظام الفنولوجي للهجة بني صخر و التي تدعى (foot) هي ثنائية يمينية الرأس ويتم تقسيمها من اليسار الى اليمين. كما أن وحدات تقسيم الكلام الاحادية (degenerate feet) غير موجودة و يظهر ذلك من خلال التزام الكلمات بكون الكلمات ثنائية كحد ادنى . كما أظهرت الدراسة امكانية تحليل انماط التنبير في لهجة بني صخر من خلال استخدام عدد محدود من الظوابط اللغوية الكونية(universal constraints).

الكلمات المفتاحية: النظرية الأمثلية، النبر، لهجة بني صخر، اللهجات الأردنية البدوية.

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1. Introduction

There are various degrees of stress: primary, secondary, tertiary, and quaternary. A stressed syllable is pronounced with higher intensity and longer duration. It varies from other syllables in terms of pitch, loudness, length, and quality. Stress systems of the world languages are divided into two types: fixed systems in which stress is predictable, and free systems in which stress assignment is unpredictable (Kager 1995). Arabic language is considered as an unbounded system since it allows long strings of unstressed syllables. In the Arabic language, only one primary syllable is assigned per word (Al-Jarrah 2002). In the literature, most investigated Arabic dialects are rule-governed in which stress assignment is highly predictable.

According to Al-Jarrah (2002), Arabic dialects share the general principles that govern the distribution of stressed and unstressed syllables. However, Bedouin dialects show some minor variations in the mechanism of stress assignment compared to other rural and urban ones.

Different studies have investigated stress assignment in a number of Bedouin Jordanian dialects as Bani Hasan Arabic (Irshied 1984), Abbadi Arabic (Sakarna 1999), Bani Saxar Arabic (El-Badarin 1994), Wadi Ramm Arabic (Al-Mashaqba 2015), and Wadi Mousa Arabic (Huneety 2015). However, none of these studies have utilized Optimality Theory (OT) in their account of stress assignment in the investigated dialects.

The present study, therefore, aims to investigate the stress assignment mechanism of a Jordanian Bedouin dialect that has never been investigated before from an optimality theory perspective. This investigation attempts to give more support to the claim of having Universal Grammar (UG) and language universals. Since OT assumes that UG provides a set of universal constraints, variations in the grammar of different languages or dialects then emerge from the different ranking of this set of universal constraints. The main aspect of OT is that Universal Grammar (UG) contains a universal set of faithfulness and markedness constraints. The markedness constraints are responsible for ensuring the well-formedness of an input, while faithfulness constraints are responsible of ensuring the faithfulness of an output to a given input. These constraints represent universal properties of language in general. Constraint ranking is language specific and is specified by the grammar of a given language. Hence one advantage of the OT model over other linear generative phonological models is that the observed variation among languages is attributed to differences in the constraint ranking of universal constraints.

2. Data Collection

The sample of the present study consists of thirty native speakers of BSA. The demographic factors of the participants such as age, gender, and level of education are not taken into consideration since the present study is a descriptive one.

The data of the study have been collected by means of tape-recording and note-taking of the participants' spontaneous speech. The recorded material mainly consists of natural conversations and old stories of wars and tribes. However, the data that has been phonetically transcribed is for words and phrases that display stress patterns in BSA.

In addition, six informants have been asked to pronounce certain words especially those that could not be found in the recorded material. The informants were three males and three females whose age ranged between thirty-five years and seventy-two years. All participants and informants of the present study are native speakers of BSA who live in Al-Jiza district in Amman.

3. Stress Patterns in BSA

Stress patterns in BSA are closely related to those found in other Arabic varieties with some minor differences. Stress assignment is highly driven by the weight of the syllable. Heavy syllables usually attract stress and are, therefore, considered stress bearers. Stress assignment is also affected by the position of the syllable within the prosodic word since in most Arabic varieties stress never falls on any syllable that precedes the antepenultimate syllable (AlJarrah 2002; AlJarrah 2008; Kabrah 2004; Prince and Smolensky 2004; Watson 2002). Only few studies (Brame 1974; and Abu-Salim 1980) on Palestinian Arabic and on San'ani Arabic (Watson 2002) reported that stress can surface on the pre-antepenultimate syllable.

The main stress, in BSA, is assigned to one of the last three syllables (ultimate, penultimate, or antipenultimte). The ultimate syllable receives stress if it is of the CCVC or CVVC shape as in [ʔis.ti.'ga:l] 'he resigned'. The penultimate syllable is usually stressed if it is heavy and the ultimate syllable is not of CCVC or CVVC type as in the word [miz.ra.'ʕat.ham]'their farm . The antepenultimate heavy syllable, on the other hand, receives stress when the penultimate syllable is not heavy and the ultimate syllable is not of CCVC or CVVC type as in the word ['ḥaẓ.ẓa.kam] 'your(pl.) luck'. Consider (1-4) below for further examples of stress assignment of monosyllabic, disyllabic, trisyllabic, and quadri-syllabic words in BSA;

1. Monosyllabic words — Gloss
   a. ['fi:] — 'in'
   b. ['gaal] — 'he said'
   c. ['širš] — 'root'
   d. ['bha:r] — 'cardamom'
2. Disyllabic words — Gloss
   a. [li.'ban] — ' yoghurt'
   b. [dʒi.'di:d] — 'new'
   c. ['sa:l.fah] — 'a story'
   d. [tam.'šu:n] — 'you (pl.) go'
3. Trisyllabic words — Gloss
   a. ['miz.ra.ʕa] — 'a farm'
   b. [yi.ru:.'ḥu:n] — 'they go'
   c. ['ḥaẓ.ẓa.kam] — 'your(pl.) luck'
   d. [ʔis.ti.'ga:l] — 'he resigned'
   e. [ni.'zal.tam] — 'you(pl.) settled down'
4. Qudrisyllabic words — Gloss
   a. [miz.ra.'ʕat.ham] — 'their(m.) farm'
   b. [ti.'na:.ga.raw] — 'they(m.) had a quarrel'
   c. [xa:.'la:.ti.kam] — 'your(pl.m.) maternal aunts'
   d. [ʕam.'ma:.ti.kam] — 'your(pl.m.) paternal aunts'

It is worth mentioning that the weight of CV syllables is always light whether it is stressed or not (e.g.,[li.'ban] 'yoghurt'). Syllables of the CVV type are always considered heavy since they are bimoraic(e.g., [gaa.law]'they(m.)said'). Syllables of the CVC type differ based on their position: they are considered heavy word-initially and word-medially, whereas they are considered light word-finally due to extrametricality (e.g., ['yak.tib] 'he writes'). In fact, the last consonant of CVC syllables is considered weightless or extrametrical. Thus, CVC syllables become monomoraic in word final position. Final CVC syllables are usually considered light as they fail to attract stress.

Extrametricality was first introduced to account for the fact that the syllable in final position needs more segments to be counted as heavy. Extrametricality states that a consonant in final position is weightless as it is illustrated by the following peripherality condition:

5. Peripherality Condition

"A constituent may be extrametrical only if it is at a designated edge (left or right) of its domain" (Hayes, 1995:57).

However, syllables of the CVC type are considered heavy and bimoraic word-initially and word-medially since the last consonant does not undergo extrametricality. The last consonant is moraic in word-non-final-position due to the application of Weight-by-position condition. The Weight-by–position condition assigns a mora to a consonant in the coda position in languages in which CVC syllables count as heavy. Generally speaking, it ensures that syllables are bimoraic (Watson, 2002).

4. Foot in BSA

Unlike other previously investigated dialects of rural (e.g., Ajlun Arabic, Maani Arabic) as well as Bedouin Jordanian dialects (e.g., Abadi Arabic) in which feet are trochaic, feet in BSA are iambic. Basically, in an iambic foot, syllables in a foot are right headed (right stressed). It might comprise two light syllables (L'L), a light syllable followed by a heavy stressed syllable (L'H), or a single stressed heavy syllable ('H). Our claim concerning having an iambic foot in BSA can be justified when disyllabic words that consist of two light syllables are investigated. Since in BSA a foot of the (LL) type receives stress on the second syllable (L'L) as in the word [ki.'tab] 'he wrote'. This in part agrees with Al-Jarrah's (2002) argument concerning Jordanian dialects. He has mainly argued that feet in urban as well as rural Jordanian dialects are trochaic (feet are left stressed ('LL)), whereas feet in Bedouin Jordanian dialects are iambic (feet are right stressed (L'L)).

However, some scholars who have investigated different Bedouin Jordanian dialects disagree with this argument through reporting the existence of trochaic feet in the foot inventory of the investigated dialects (Sakarna 1999). More importantly, this assumption concerning stress assignment contradicts El-Badarin's (1994) argument in his study of BSA which states that disyllabic words of LL shape receive stress on the penultimate syllable ('LL). He has also argued that there are no variations between stress rules in BSA and those of Standard Arabic.

The direction of footing in BSA is from left-to-right, since, in words that consist of three light syllables LLL as in the word /ba.'ṣa.la/ 'an onion', the penultimate syllable is stressed (L'L)L. When we parse syllables into feet from left to right, we get the actual output in which the right syllable of the foot is stressed (L'L)L. However, parsing syllables from right to left yields a wrong output in which the ultimate syllable is stressed L(L'L). However, words that consist of an odd number of light syllables do not provide clear evidence concerning the direction of footing in the given dialect since the final syllable is considered extrametrical. Thus, both ways of directions yield the same output (L'L)<L>. We had better investigate words that consist of an even number of light syllables as LLLL.

According to Al-Jarrah (2002:93), in Bedouin Jordanian Arabic, "polysyllabic words whose final syllable is not superheavy and whose penultimate syllable is not heavy, stress goes to either the penult or the antepenult whichever is separated from a preceding heavy syllable or word boundary by an odd number of syllables." Following Al-Jarrah's argument concerning Bedouin Jordanian dialects, words of LLLL type if ever exist are believed to be stressed on the antepenultimate syllable (L'L)LL. This supports our claim that the direction of footing in BSA is from left-to-right. Since footing this type of words from left-to-right yields the proposed actual surface form (L'L)L<L>. On the contrary, the other way of direction from right-to-left produces a wrong surface form L(L'L)<L> in which the penultimate syllable is stressed. However, words of LLLL type are not attested in the investigated dialect. This leaves us with no clear-cut evidence concerning the footing direction of syllables in BSA.

The existence of degenerate feet is another important issue to be discussed here. Basically, a degenerate foot is a foot that is composed of a single light syllable. A degenerate foot is therefore monomoraic which violates the bimoraic word minimality condition. The word minimality condition proposed by Hayes (1995) requires content words to be minimally bimoraic. According to Hayes (1995), languages show various degrees of prohibition of degenerate feet, strong, weak, or non prohibition. Hayes also argues that the prohibition of degenerate feet is directly based on the minimal size of words in a given language and its treatment of degenerate words.

Degenerate feet in BSA are strongly forbidden. This is due to the fact that BSA does not allow words which are composed of less than two moras. For instance, certain words of CVC type in Standard Arabic (SA) are believed to be of CVCC type in BSA. For instance, the word /sin/'tooth' in SA is realized as /sinn/ in BSA. This claim can be supported when we come to account for another instance which is composed of the word /sinn/ and an attached suffix as /sin.nah/'her tooth/her age'. Moreover, words which do not satisfy the word minimality condition undergo epenthesis. For instance, the imperative verb /ftaḥ/'you(s.m.) open' is produced as /ʔiftaḥ/ to satisfy the word minimality condition. Furthermore, loan words which are composed of one mora undergo vowel lengthening to be bimoraic and satisfy the word minimality condition as in the words /bar/, and /bus/ which are realized in BSA as well as in many Arabic varieties as [baar] and [baas], respectively (Watson 2002).

Since degenerate feet are prohibited in BSA and sub-minimal content words are not attested, the final syllable in words of LLL type will be left unparsed and considered extrametrical (L'L)<L>.

5. An OT Account of Stress Assignment in BSA

This section aims to provide an OT account of stress assignment rules in BSA. First of all, unlike linear and non-linear generative theories, OT can account for information related to stress assignment as syllable weight, syllable position within a word, and extrametricality through presenting a number of violable constraints. Such constraints do not only enhance our ability to account for stress patterns in one linguistic variety but also crosslinguistically. For instance, syllable extrametricality is no longer present in OT and it has been replaced by a NONFINALITY constraint as formulated in (6) below. The word head in this constraint refers to the stressed syllable within the foot or the stressed foot within the word. Consonant extrametricality has also been accounted for through the introduction of the *FINAL-C-μ constraint which bans mora assignment to the final consonant of a PrWd, as stated in (7) below.

6. NONFINALITY

No head of PrWd is final in PrWd. (Prince and Smolensky, 1993/2004)

7. *FINAL-C-μ

Word final coda consonant is weightless. (Hayes, 1989)

Furthermore, heavy syllables are considered as stress bearers as discussed earlier. This has been expressed in OT through the presentation of

WEIGHT-TO-STRESS PRINCIPLE (WSP) which states that all heavy syllables should be stressed as in (8).

8. WEIGHT-TO-STRESS PRINCIPLE (WSP)

Heavy syllables are prominent on the foot structure. (Prince and Smolensky, 1993/2004)

Therefore, in the coming discussion the interaction between various universal constraints will be presented to account for stress patterns in BSA. In fact, monosyllabic words in the investigated dialect take one of the following shapes, which are CVV, CVVC, and CVCC. Hence, it can be argued that monosyllabic words satisfy the *PrWd constraint which requires prosodic words to consist of at least two moras, as stated in (9), especially that consonants in the coda position satisfy the *FINAL-C-μ constraint and are considered weightless.

9. * PrWd

A prosodic word is minimally bimoraic.

Therefore, the analysis of words of the CVV type requires the adoption of MAXμ-IO and *MORA[v].

10. *MORA[v]

No mora is associated with a vowel. (Moren, 1999)

11. MAXμ-IO

Every mora in S1 has a correspondent in S2. (no mora deletion) (Moren, 1999)

The S1 and S2 stand for two strings or linguistic forms which correspond to one another and serve as input and output, base and reduplicant.

Since degenerate feet are absolutely prohibited in BSA and all words respect the word minimality condition, the MAXμ-IO constraint which prohibits deletion of moras should outrank the *MORA[v] which bans assigning mora to vowels as shown in tableau (12).

12. Tableau 12. *PrWd, MAXμ-IO >>*MORA[v]

/CVV/ /Cμμ/	*PrWd	MAXμ-IO	*MORA[v]
☛ a.[CVV] [Cμμ]			**
b. [CVV] [CμV]	*!	*	*

Though candidate (a) in tableau (9) violates the low ranked constraint *MORA[v], it is considered as the winner candidate since it satisfies the high ranked constraint MAXμ-IO. Candidate (b) loses since it incurs violations of all three constraints *PrWd, MAXμ-IO and*MORA[v] respectively.

Moreover, stress assignment of monosyllabic words of the canonical shape /CVVC/, as in the word /gaal/ 'he said', necessitates the adoption of the WEIGHT-BY-POSITION constraint (WBP). The WBP constraint states that consonants in coda position should be moraic. To satisfy the word bimoraic minimality condition, the *FINAL-C-μ constraint presented earlier should outrank the WEIGHT-BY-POSITION constraint as presented in (13) below.

13. WEIGHT-BY-POSITION (WBP)

Coda consonants are moraic. (Hayes, 1989)

14. Tableau 14. / gμμl / ['gμμl] →

/gaal/ 'he said' /gμμl/	*PrWd	* FINAL-C-μ	WBP
☛ a. ['gaal] [gμμl]			*
b. ['gaal] ['gμμμ]		*!	
c. ['gaal] [gaμl]	*!		*

As shown in tableau (14), monosyllabic words are usually stressed on the only syllable that they consist of. The pointing hand points at the winner candidate ['gaal] which satisfies the high ranked constraints *PrWd and * FINAL-C-μ, as it involves two moras and the final consonant is weightless. On the contrary, candidates (b) and (c) are ruled out since they incur fatal violations of * FINAL-C-μ and *PrWd respectively. The dashed line in tableau (11) indicates that the two constraints; *PrWd and * FINAL-C-μ are not ranked relative to each other. The constraint hierarchy proposed above can also account for words of the canonical shape /CVCC/ as shown in tableau (15).

15. Tableau 15.Words of CVCC type obey the word minimality condition

/širš/ 'root' /šμμš/	*PrWd	*FINAL-C-μ	WBP
☛ a. ['širš] ['šμμš]			*
b. ['širš] ['šμμμ]		*!	
c. ['širš] ['šμrš]	*!		**

Tableau (15) proves the dominance relation that holds between *PrWd, *FINAL-C-μ, and WBP (*PrWd, *FINAL-C-μ>>WBP).

Generally speaking, the analysis of words that consist of two or more than two syllables demands the introduction of the FTBIN constraint which requires feet to be bimoraic or disyllabic as stated in (16). Thus words that are composed of less than two moras such as those of the /CV/ type are considered as a violation of the FOOTBINARITY (FTBIN) constraint. According to Abu-Abbas (2012), this constraint is ranked high in JA since this dialect prohibits degenerate and ternary feet. This justifies the nonexistence of words of the /CV/ type in Jordanian dialects in general and in BSA in particular.

16. FOOTBINARITY(FTBIN)

Feet are binary at some level of analysis (μ, σ). (McCarthy and Prince 1993/2004)

Feet in BSA are iambic as we have mentioned earlier since in disyllabic words that consist of two light syllables the second syllable is stressed (L'L) as in the word [si.'miʕ] 'he heard' shown in tableau (17).

17. Tableau 17. Stressing the right syllable in words of (L'L) type

/si.miʕ/ 'he heard'	IAMBIC	FTBIN	NONFINALITY
a. ('si.miʕ)	*!		*
☛ b. (si.'miʕ)			*
c.si.('miʕ)		*!	*

As shown in tableau (17), the analysis of disyllabic words of the (LL) type requires the adoption of the IAMBIC constraint which states that the prominent foot including the stressed syllable should be aligned on the right edge as stated in (18) below. The adoption of the IAMBIC constraint serves to favor candidate (b) over candidate (a). Candidate (c) is ruled out through incurring a fatal violation of the FTBIN constraint since in BSA the final coda consonant is weightless. The choice of the actual candidate (b) as a winner candidate requires ranking the IAMBIC constraint and the FTBIN constraint higher than the NONFINALITY constraint. However, the dominance relation between IAMBIC and FTBIN has not been resolved yet.

18. **IAMBIC:**

Align the head-syllable with its foot on the right edge.

This also indicates that the foot in BSA is right headed requiring the right syllable of the foot to be stressed. This can be achieved through ranking the ALIGN (H-σ, Ft, R) constraint, which demands stressing the right syllable of the foot, above the ALIGN (H-σ, Ft, L) constraint which requires the left syllable of the foot to be stressed. For instance, ALIGN (H-σ, Ft, R) requires the right syllable of words of the (LL) type to be stressed and stand as the head of a given foot (L'L), while ALIGN (H-σ,Ft,L) requires the left syllable of words of the (LL) type to be stressed('LL).

19. ALIGN (H-σ, Ft, L)

Align the head syllable with the left edge of the foot. (McCarthy and Prince, 1993)

20. ALIGN (H-σ, Ft, R)

Align the head syllable with the right edge of the foot. (McCarthy and Prince, 1993)

Since ALIGN (H-σ, Ft, L) is low ranked and commonly violated in BSA, it will be excluded from the developed hierarchy of BSA.

In BSA, words of (LH) form receive stress on the second heavy syllable. This requires the adoption of WSP which states that heavy syllables should receive stress. This constraint is usually ranked high in the Arabic dialects in general since in Arabic heavy syllables attract stress. This also necessitates ranking the WSP constraint higher than the NONFINALITY one which prohibits having stressed syllables word-finally as in tableau (21).

21. Tableau 21. The failure of the developed constraint hierarchy to account for stress assignment in words of (L.'H) type

/dʒi.'di:d/ ‘new’	FTBIN	WSP	NONFINALITY
a. ☛ (dʒi.'di:d)			*'σ
b. ('dʒi.di:d)		*!	
c. ☛dʒi.('di:d)			*'σ
d. ('dʒi).di:d	*!	*	

As it is shown in tableau (21), ranking the WSP constraint higher than the NONFINALITY constraint favors candidate (a) and candidate (c) over candidate (b) which incurs a violation of the WSP constraint. Candidate (d) is also ruled out through incurring violations of the high ranked constraints FTBIN and WSP, respectively as it involves a light stressed syllable. This, in turn, leaves us with a contest between the actual candidate (a) and candidate (c) since both of them violate NONFINALITY, the low ranked constraint. It is worth mentioning that the constraints discussed so far are insufficient to derive the actual output. This requires resorting to the PARSEσ constraint which requires every syllable to be parsed into a foot. Particularly, PARSEσ assigns a violation mark for every syllable that does not belong to a foot. Therefore, it favors footing words of the LH form as (L'H) rather than L('H) since in the latter the light syllable is left unparsed. Hence, ranking PARSEσ higher than NONFINALITY will be adequate to account for footing the word /dʒa.di:d/as [(dʒi.'di:d)] rather than [dʒi.('di:d)] in tableau (23).

22. PARSEσ

All syllables must be parsed into feet. (Prince and Smolensky, 1993/2004)

23. Tableau 23. Stressing the heavy right most syllable in words of (L.'H) type

/ dʒa.di:d / ‘new’	FTBIN	WSP	PARSEσ	NONFINALITY
☛ a. (dʒi.'di:d)				*
b. ('dʒi.di:d)		*!		*
c. dʒi.('di:d)			*!	*
d. ('dʒi).di:d	*!	*		

As it is shown in tableau (23) above, PARSEσ should outrank NONFINALITY to choose candidate (a) as the optimal output. Also, up to this moment there is no dominance relation between the constraints FTBIN, WSP, and PARSEσ. The dominance relation that holds between the three constraints becomes clearer in the analysis of disyllabic words of the HL form as shown in tableau (24).

24. Tableau 24. Stressing the penultimate superheavy syllable in words of ('H.L) type

/saal.fah/ ‘a story’	FTBIN	WSP	PARSEσ	NONFINALITY
☛ a. ('saal).fah			*	
b. ('saal).(fah)	*!			*
c. saal.('fah)	*!	*	*	*

The choice of candidate (a) as the winner candidate requires ranking the FTBIN constraint higher than PARSEσ. Candidate (c), on the other hand, is a failure candidate since it violates the constraints FTBIN, WSP, PARSEσ and NONFINALITY respectively due to stressing a light word-final syllable. Candidate (b) also violates the FTBIN and NONFINALITY constraints as it involves a degenerate word final foot.

Words of (HH) form are the last form of disyllabic words that we are going to account for. Such types of words are usually stressed on the second right most syllable. This necessitates the presentation of the EDGEMOST (pk; L/R; Word) constraint. The EDGEMOST (pk; L/R; Word) states that the stressed syllable or foot should be aligned at the left or the right edge of the word. Therefore, every syllable or foot that intervenes between the prominent (i.e., stressed) syllable or foot and the edge will count as a violation of this constraint. Since in Arabic varieties in general the heavy right most syllable receives stress, it will be argued that the EDGEMOST (pk; L/R; Word) constraint is specified to the right edge EDGEMOST ('σ; R; Word). The EDGEMOST ('σ; R; Word) constraint that will be utilized in our upcoming analysis states that the stressed syllable lies at the right edge of the word. Thus, it penalizes any syllable that intervenes between the stressed syllable and the right edge of a given word as in tableau (26).

25. EDGEMOST (pk; L/R; Word)

A peak of prominence lies at the L/R edge of the word. (Prince and Smolensky, 1993/2004)

"Word" in the statement of the EDGEMOST constraint refers to any stress domain. L stands for left while R stands for right. A peak of prominence might stand for a head foot ('F) or a head syllable ('σ)

26. Tableau 26. The selection of [tam.'šuun] as the optimal output

/tam.šuun/ 'you(pl.) go'	FTBN	WSP	EDGEMOST ('σ; R; Word)	EDGEMOST ('σ; L; Word)	NON-FINALITY
a.('tam).šuun		*	*!		
☛ b.tam.('šuun)		*		*	*

As it is shown in tableau (26), both candidates satisfy FTBIN since they involve a binary foot. They also violate the WSP constraint as they contain an unstressed heavy syllable. However, candidate (b) is the optimal one as it satisfies the high ranked constraint EDGEMOST ('σ; R; Word). Taking into account the constraint ranking proposed above, candidate (b) violations of the EDGEMOST ('σ; L; Word) and NONFINALITY constraints do not affect its overall performance. Candidate (a) is then ruled out through incurring a fatal violation of the high ranked EDGEMOST ('σ; R; Word) constraint. This proves that specifying the EDGEMOST ('pk; L/R; Word) as EDGEMOST ('σ; R; Word) is needed to favor the actual output (b) over candidate (a).

Concerning trisyllabic words of (LLL) form, such type of words usually undergoes a low vowel elision and surfaces as a word of (LL) form. For instance, the word /ba.ṣa.la/'onion (s.)' surfaces as [b'ṣa.la] in the given dialect. This indicates that stress assignment precedes low vowel elision in BSA.

Words of HLL type, as the one shown in tableau (27), receive stress on their heavy syllable ('H)LL. This raises the need to rank the WSP constraint higher than the EDGEMOST ('σ; R; Word) constraint introduced earlier.

27. Tableau 27. The choice of ['ḥaẓ.ẓa.kam] as the optimal output of/ ḥaẓ.ẓa.kam/

/ ḥaẓ.ẓa.kam/ 'your(pl.) luck'	WSP	EDGEMOST ('σ; R; Word)	NONFINALITY
☛ a. ('ḥaẓ). ẓa.kam		**'σ	
b. ḥaẓ.(ẓa.'kam)	*!		*'σ *'F
c. ḥaẓ.('ẓa.kam)	*!	*'σ	*'F

The optimal candidate is candidate (a) which obeys the high ranked constraint WSP since the heavy syllable is stressed. Taking into account the constraint hierarchy above, the winner candidate's violation of the EDGEMOST ('σ; R; Word) constraint does not affect its overall performance. Candidates (b) and (c) are ruled out through invoking a fatal violation of the highest ranked constraint WSP and a violation of NONFINALITY, the low ranked constraint. Their violation of WSP is due to stressing a light syllable.

It is worth mentioning here that in BSA one primary stress which is headed by one prominent foot exists per word. To account for this argument, a further constraint will be introduced which is the HEADEDNESS (PrWd) constraint proposed by Walker (1997). This new constraint requires each word to have a single stressed syllable per word.

28. HEADEDNESS(PrWd)

A prosodic word has one and only one head. (Walker, 1997)

The word head in the above constraint refers to the syllable with primary stress. The effect of this constraint is evident in ruling out candidates which involve more than one stressed syllable. This constraint plays a crucial role in language varieties as BSA in which one stress is assigned per word. Accordingly, the HEADEDNESS (PrWd) constraint will hold an undominated high ranked position in the developed hierarchy of stress assignment in BSA. Thus, in words of the HLL type, HEADEDNESS (PrWd) favors parsing HLL as ('H)LL over ('H)(LL) as represented in tableau (29).

29. Tableau 29. / HLL/ ['HLL] ⟶

/ HLL/	HEADEDNESS (PrWd)	WSP	EDGEMOST ('σ; R; Word)	NON-FINALITY
☛ a. ('H)LL			**'σ	
b. ('H)(LL)	*!		**'σ	*

Tableau (29) demonstrates the important impact of the undominated HEADEDNESS (PrWd) constraint in the present study. It serves to rule out candidate (b) since this candidate involves two feet each of which involves a syllable that is assigned a stress. However, it will not be shown in the subsequent tableaux unless it is needed.

The developed constraint hierarchy can also account for stress assignment of words of the (LHL) type in which the antepenult heavy syllable is stressed. Moreover, ranking the EDGEMOST ('σ; R; Word) constraint higher than the NONFINALITY constraint is sufficient to account for stress assignment in words of the LHH type that involve two heavy syllables.

Words of the (HHH) form are the last type of trisyllabic words that we are going to account for. Such type of words is usually stressed on the right most heavy syllable. Thus the EDGEMOST ('σ; R; Word) constraint plays a crucial role in determining the optimal actual candidate as it is shown in tableau (30).

30. Tableau 30. HEADEDNESS, FTBIN>> WSP>> EDGEMOST ('σ; R; Word)>> NONFINALITY

/maẓ.lu:.mi:n/ ‘oppressed (m.pl.)	HEADEDNESS (PrWd)	FTBIN	WSP	EDGEMOST ('σ; R; Word)	NON-FINALITY
☛ a. maẓ.lu:.('mi:n)			**		*
a. maẓ.('lu:).mi:n			**	*!σ	
b. ('maẓ).lu:.mi:n			**	**!σ	
c. (maẓ).(lu:).('mi:n)	**!				*

Tableau (30) shows that the undominated high position of the HEADEDNESS (PrWd) constraint is important since it rules out candidates which involve more than one stressed syllable which are headed by separate feet such as candidate (d) above. The analysis of words of the HHH type also requires ranking HEADEDNESS (PrWd) higher than WSP which states that all heavy syllables should be stressed. Candidates (b) and (c) are ruled out due to a fatal violation of EDGEMOST ('σ; R; Word) the high ranked constraint as their stressed syllable is not right most. Giving the above constraint hierarchy, candidate (a) is considered the winner candidate since it incurs the least costly violations of WSP and NONFINALITYrespectively.

The developed constraint hierarchy can also account for polysyllabic words in which a heavy syllable is one of the final three syllables. However, the problem arises when we analyze words of the (HLLL) form since they receive stress on the second light syllables from the end (HL'LL) as in tableau (31).

31. Tableau 31. The failure of the proposed hierarchy to account for stress assignment of words of HLLL type

HLLL	FTBIN	ALIGN (H-σ, Ft, R)	WSP	EDGEMOST ('σ; R; Word)	NON-FINALITY
☛ a. ('H)LLL				***σ	
b. H(L'L)L			*!	*σ	
a. HL(L'L)			*!		*
b. H('LL)L		*!	*	**σ	

This, in turn, requires the adoption of the *LAPSE constraint which assigns a violation mark for each two consecutive unstressed syllables. *LAPSE serves to parse words of the HLLL type as H('LL)L or H(L'L)L. This indicates the undominated high ranking position of the *LAPSE constraint to rule out candidate (a) in which the heavy syllable is stressed in words of the HLLL type. Also, it rules out candidate(c) on which the ultimate light syllable is stressed HL(L'L) as it includes a sequence of two unstressed syllables. However, *LAPSE is commonly violated in BSA, a dialect which has one prominent stress per word as in words of the forms HH('H), LLH('H), or H('H)LL. This indicates the need to rank the WSP constraint higher than the *LAPSE constraint.

32. *LAPSE

Assign one violation-mark for each pair of adjacent unstressed syllables. (Kager, 2001)

Kager (2001) proposed the need to split the *LAPSE constraint to a number of constraints in order to avoid penalizing all lapses in the same way. He introduced two other constraints: LAPSE-AT-PEAK and LAPSE-AT-END. The LAPSE-AT-PEAK constraint prohibits every lapse that is not adjacent to the stress peak, whereas the LAPSE-AT-END bans every word non-final lapse.

33. LAPSE-AT-PEAK

Assign one violation mark for every lapse that is not adjacent to the word peak. (Kager, 2001)

34. LAPSE-AT-END

Assign one violation mark for every lapse that is not word-final. (Kager, 2001)

Kager (2001) also proposed the existence of another lapse constraint which is *EXTENDED-LAPSE (also known as *LONG-LAPSE). This constraint is more general since it assigns a violation mark for every sequence of three unstressed syllables.

35. *EXTENDED-LAPSE

Assign one violation mark for every unstressed syllable that is both preceded and followed by another unstressed syllable. (Kager, 2001)

LAPSE-AT-PEAK plays no role in the present study since in BSA one prominent stress is assigned per word. *EXTENDED-LAPSE is the most appropriate constraint to account for stress assignment in BSA especially that in most Arabic varieties stress is assigned to one of the three word- final syllables. The undominated high ranked position of this constraint can account for words of the HLLL form in which the penultimate light syllable is stressed. It also rules out candidates in which the preantepenultimate heavy syllable is stressed ('H)LLL. Moreover, the *EXTENDED-LAPSE should outrank the WSP constraint to derive the actual surface form H(L'L)L as shown in tableau (36).

36. Tableau 36. The choice of H(L'L)L as the optimal output

HLLL	FTBIN	ALIGN(H-σ, Ft ,R)	*EXTENDED -LAPSE	WSP	*LAPSE	EDGEMOST ('σ; R; Word)	NON-FINALITY
a. ('H)LLL			*!		*	***σ	
☛ b. H(L'L)L				*		*σ	
c.HL(L'L)				*	*!		*
d.H('LL)L		*!		*		**σ	

Tableau (36) shows that candidate (b) is the optimal candidate as it incurs the least costly violations of the constraints above; it only violates the constraints WSP and EDGEMOST ('σ; R; Word) respectively. Candidate (a) loses as it violates the undominated *EXTENDED -LAPSE constraint as well as the*LAPSE constraint by involving three consecutive unstressed syllables. It also severely violates EDGEMOST ('σ; R; Word). Candidate (c), in which the light right most syllable is stressed, is eliminated due to violations of the constraints WSP, *LAPSE, and NONFINALITY. Candidate (d) is also rejected since it violates the undominated high ranked ALIGN (H-σ, Ft, R) constraint as the left syllable of the foot is stressed. In addition, candidate (d) in which the light antepenultimate syllable is stressed violates the constraints WSP and EDGEMOST ('σ; R; Word) respectively.

The LAPSE-AT-END constraint can account for the choice of candidate (b) in tableau (36) as the optimal candidate. It also serves to rule out candidate (a) in which the preantepenultimate heavy syllable is stressed ('H)LLL. Since candidate (a) involves a sequence of two non-final unstressed syllables ('H)**LL**L.

Though the two constraints LAPSE-AT-END and*EXTENDED LAPSE are sufficient to solve the same problem of favoring H(L'L)L over ('H)LLL, we will opt for utilizing*EXTENDED LAPSE in the developed constraint hierarchy of BSA . This is due to the fact that the LAPSE-AT-END constraint is commonly violated in BSA as in words of the following types LL('H) , LH('H) , HL('H), HH('H) , LL('H)L, LH('H)L, and H(L'L)L which are either satisfied or vacuously satisfied by the *EXTENDED LAPSE.

However, the major problem arises when we analyze words of the HLL('H), HLH('H), and HHL('H) type. Words of these types receive stress on the right most heavy syllable and involve three consecutive unstressed syllables. Such words, therefore, violate the whole parsing constraints mentioned above including the *EXTENDED LAPSE constraint. They also demand ranking WSP higher than *EXTENDED LAPSE which contradicts our argument above concerning the dominance relation between the two constraints. Thus, a further constraint must be evoked to account for stress assignment in words of the HLLL form. The most adequate constraint is *'σσσσ which assigns a violation mark for syllables which are stressed on the fourth or more than the fourth syllable from the end of a word.

37. *'σσσσ

No stress on more than the fourth syllable from the end of a word. (Prince and Smolensky 1993 cited in Oh, 1998)

It will be argued that this constraint is undominated in the constraint hierarchy of BSA, a dialect in which stress does not exceed the antepenultimate syllable (the third syllable from the end).

38. Tableau 38. Stressing the penultimate syllable in words of HLLL type

HLLL	FTBIN	ALIGN(H-σ, Ft,R)	*'σσσσ	WSP	*LAPSE	EDGEMOST ('σ; R; Word)	NON-FINALITY
a. ('H)LLL			*!		*	***σ	
☛ b. H(L'L)L				*		*σ	
c. HL(L'L)				*	*!		*
d. H('LL)L		*!		*		**σ	

Tableau (38) demonstrates that candidate (b) is the optimal one as it incurs the least fatal violations of WSP and EDGEMOST ('σ; R; Word). The undominated position of *'σσσσ which is higher ranked than WSP is sufficient to rule out candidate (a) in which the pre-antepenultimate syllable is stressed. Candidate (c) is also eliminated due to violations of WSP, *LAPSE, and NONFINALITY respectively on which the right most light syllable is stressed. Ranking *LAPSE higher than EDGEMOST ('σ; R; Word) serves to favor candidate (b) over candidate (c). Candidate (d) loses due to violations of ALIGN (H-σ,Ft,R), WSP, and EDGEMOST ('σ; R; Word) respectively.

The *'σσσσ and *LAPSE will be sufficient to account for the whole problematic cases of stress assignment in BSA. It can also account for stress assignment of words of the LLHH type. Accordingly, the *EXTENDED–LAPSE constraint will be disregarded from the constraint hierarchy above because it is no longer needed in our discussion.

The developed constraint hierarchy can also account for cases which the *EXTENDED –LAPSE constraint failed to account for such as words of LLHH type presented in tableau (39).

39. Tableau 39. Selection of LLH('H) as the optimal output

LLHH	FTBIN	ALIGN(H-σ, Ft,R)	*'σσσ	WSP	*LAPSE	EDGEMOST ('σ; R; Word)	NON-FINALITY
a. ('LL)HH		*!	*	**	*	***σ	
b. (L'L)HH				**!	*	**σ	
c. LL('H)H				*	*!	*	
☛ d. LLH('H)				*	*		*

Candidate (d) in tableau (39) wins by incurring the least costly violations of the constraints above. This indicates the validity of the developed constraint hierarchy to account for stress assignment in BSA as presented in (40).

40. * PrWd, HEADEDNESS(PrWd), FTBIN, ALIGN(H-σ, Ft,R),*FINAL-C-μ, *'σσσ>> WSP>> *LAPSE>> EDGEMOST ('σ; R; Word), PARSE σ>>WBP, NONFINALITY

6. Conclusion

The present study has provided a thorough analysis of transparent stress assignment rules in BSA. It has been argued that the foot in the investigated dialect is iambic (right stressed) which is parsed from left-to-right. Degenerate feet are strongly prohibited since words in BSA respect the word minimality condition that requires words to be minimally bimoraic. The study has also focused on the way OT can account for transparent stress assignment rules through evoking a limited number of universal constraints. It has presented an OT account of stress assignment of monosyllabic, disyllabic, and polysyllabic words in BSA.

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Appendix 1: The Consonant and Vowel inventory of BSA

Table 1. The Consonant Inventory of BSA

		Bilabial	Labio-dental	Dental		Alveolar		Palato-alveolar	Palatal	Velar	Pharyngeal	Glottal
				plain	emphatic	plain	emphatic					
Stop	**voiceless**			t	ṭ					k		ʔ
	voiced	b		d						g		
Fricative	**voiceless**		f	θ		s	ṣ	š		x	ḥ	h
	voiced			ð	ẓ	z				ɣ	ʕ	
Affricate	**voiceless**											
	voiced							dʒ				
Nasal		m				n						
Liquid						**l**		**r**				
Glides		w							y			

Table 2. The Vowel Inventory of BSA

Description	IPA Symbols
Short high front unrounded	i
Long high front unrounded	i:
Long mid front unrounded	e:
Short low central unrounded	a
Long low central unrounded	a:
Short high back rounded	u
Long high back rounded	u:
Long mid back rounded	o:

*/e:/ and /o:/ which are attested in BSA are also found in most Arabic dialects (Al- Mashaqba 2015; Irshied 1984; Kabrah 2004; Sakarna 1999, among others). For example, the word [se:f]'a sword' involves /e:/and the word [ṣo:m] 'fasting' involves /o:/.