

An Optimality-Based Analysis of the Morphophonemics of Diminutives in Bani Sakhar Arabic

Manal H. Abu-Odeh

College of Foreign Languages, University of Jordan, Amman, Jordan

Radwan S. Mahadin

College of Foreign Languages, University of Jordan, Amman, Jordan

Abstract—This study aims to elucidate the underlying patterns governing noun diminutive formation in Bani Sakhar Arabic (BSA), a dialect spoken by the Bedouins of central Jordan, and to analyze them from an Optimality Theory (OT) perspective. The results of the study reveal that diminutivization in BSA follows specific patterns. Tri-consonantal nouns with strong roots are guided with the pattern /CCe:C/ for masculine nouns and /CCe:Ca/ for feminine nouns. Tri-consonantal nouns with weak roots are governed by the pattern /CCajjiC/ for masculine nouns where the patterns /Cwe:Ca/ and /CCe:Ca/ shape diminutive forms of feminine nouns. Quadri-consonantal noun roots, on the other hand, exhibit the patterns /CCe:Ci:C/ and /CCe:CiC/. The derivation of these patterns is attributed to the active application of various phonological processes, including vowel syncope, vowel epenthesis, and glide insertion. Moreover, the study proves that these processes arise from an inherent conflict between markedness constraints and faithfulness constraints.

Index Terms—constraints, diminutive, Bani Sakhar Arabic, Optimality Theory

I. INTRODUCTION

Diminution has gained widespread attention in the literature. It is a crosslinguistic phenomenon through which different language functions can be achieved at both the word and root levels. Interestingly, it establishes the framework for understanding many phonological and morphological changes, and it serves as a rich area to illuminate the interface between phonology and morphology. It has garnered the interest of scholars since the early stages of linguistic research (Brame, 1970; Watson, 2006; Rashid, 2010; Azieb & Mahadin, 2015; Abalkheel, 2020; Arabiat & Al-Momani, 2021; Mashaqba et al., 2022; Schleh, 2022).

Diminutive, as an English word, simply means "very small." However Arab linguists use the word 'taSy i:r' to refer to this phenomenon. In morphology, the term "diminutive" is typically defined as an affix that generally conveys the meaning of "little," which can be used both literally and metaphorically as a term of endearment. It is often contrasted with the concept of an augmentative (Crystal, 2008, p. 145). Diminutives play various pragmatic roles, such as expressing endearment, conveying intimacy, and showing appreciation. However, they can also be employed as a strategy of negative politeness to minimize imposition, soften negative statements, convey sarcasm, and express contempt (Badarneh, 2010; De Blasio, 2023). In general, diminutive forms are primarily derived from nouns, with adjectives, adverbs, and verbs also being used (Watson, 2006).

Remarkably, Arabic is well-known for its templatic morphology, which is considered a hallmark characteristic of Semitic languages. Semitic languages are characterized by phonological variation and a unique root and pattern morphology (McCarthy, 1981, 1990). McCarthy (1981) describes the Semitic morphological structure as "non-concatenative" since Semitic languages have a distinct morphological structure without stringing morphemes. This morphology is based on word roots that consist of a set of consonants that remain unchanged across different derivations (Watson, 2002). Conversely, the vocalic pattern varies across various derivations. Affixes (like suffixes, prefixes, and infixes) along with vowels, are commonly used in these languages. Variation between these languages and languages and dialects arises from the interplay between morphological and phonological alternations, a phenomenon known as morphophonemics. Morphophonemic studies provide valuable insights into the "intricate relationship between morphology and phonology in Semitic languages" (Katamba, 1989, p. 140). Overall, the root and pattern morphology, along with the interaction between morphological and phonological processes, contributes to the rich and complex nature of Semitic languages like Arabic (Mahadin, 1982).

Siibawaih like most other Arab scholars, considers diminutive formation as a mapping process, the root consonants of a word are mapped onto specific positions within predefined diminutive patterns. In Standard Arabic (SA), three major patterns are utilized: 'fuʕayl' is used for a triconsonantal noun, 'fuʕayʕil' is employed in the case of a quadriconsonantal noun with a short-voweled second syllable, and 'fuʕayʕiil' is utilized for a quinquiconsonantal noun with a short-voweled second syllable (Fayez, 1990, p. 27). In addition to Arab scholars, McCarthy and Prince (1990) state that "diminutive

formation in SA follows a templatic pattern, consistently starting with the iambic sequence: Cu.Cay, in which the first syllable is light and the second syllable is heavy” (p. 222). Proposing that the derivation process in Arabic diminutives is word-base governed rather than a root-oriented process. At this point, it is important to highlight that the formation of diminutives in Bani Sakhar Arabic (BSA) can be effectively accounted for within the framework of Optimality Theory (OT).

OT marks a significant milestone in the realms of phonology and linguistics. It was introduced by Alan Prince and Paul Smolensky in 1991. OT's core foundation rests upon the notion that Universal Grammar provides a repertoire of highly generalized and violable constraints (Prince & Smolensky, 2004, p. 4). The constraints are classified as Markedness Constraints and Faithfulness Constraints, these constraints play distinct roles in ensuring the well-formedness of linguistic output and the preservation of input-output identity within grammatical processes. The conflict between these markedness and faithfulness constraints results in different constraints rankings and thus different types of grammar of different languages. Aside from the constraints, the architecture of OT grammar comprises three main components: the lexicon or input, the generator (GEN), and the evaluator (EVAL). The role of the GEN is to generate potential output candidates based on the given input. The EVAL then, assesses these candidates in light of a set of universal constraints and selects the most optimal output.

II. LITERATURE REVIEW

Since diminutive formation has been associated with various linguistic fields like morphology, phonology, pragmatics, and syntax, a considerable amount of literature has been written on the topic. This section is devoted to presenting several studies that shed light on the phenomenon of diminutive.

In their study, Azieb and Mahadin (2015) examine the patterns involved in noun diminutive derivation in Jijilian Spoken Arabic (JSA), a dialect of Algerian Arabic. They investigate this derivation process within the framework of OT. Through data analysis, the researchers conclude that diminutivization in JSA is based on specific patterns: /CCi:jVC/ and /CCi:CV/ for triconsonantal noun stems, and /CCi:CVC/ and /CCi:CCV/ for quadriconsonantal noun stems. These patterns arise from the application of various phonological processes, such as vowel syncope, vowel epenthesis, vowel shortening, glide insertion, degemination, and metathesis. OT is employed to provide an explanatory framework for the phonological processes involved in the linguistic phenomenon of noun diminution in JSA.

Following similar lines of inquiry, Abalkheel (2020) provides an explanation for exceptional diminutive forms in Arabic dialects. She utilizes data from MSA and Qassimi Arabic, which is one of the Najd dialects ([ʔaa.ʕir] [ʔiʕ.wij.ʕir] ‘poet’). Syllable weight is the main factor she considers while analyzing the data using OT as a framework. This research shows that words with the root [w] are not just biconsonantal words with an emphatic segment ([w]) inserted to fill the empty onset. Instead, the root is triconsonantal, with [w] constituting a necessary component. Furthermore, the analysis reveals that the constraint of syllable weight is universally respected in Arabic dialects, without exceptions.

In a similar vein, Aziz et al. (2020) describe various forms and meanings of diminutive lexemes in Arabic. They use a descriptive-qualitative method in their study. The sources of research data are Arabic dictionaries like Mu’jam al-Lughat al-Arabiyyah al-Mu’ashirah, poetry collections, and novels. The study provides an informal analysis of different derivative forms in SA. Notably, they emphasize the point that the insertion of the diminutive morpheme does not affect the presence of the feminine suffix (ah) [ʔadʕar-ah] ‘tree’ > [ʔudʕayr-ah] ‘small tree’. Additionally, feminine nouns that do not end up with the feminine suffix include this suffix in the derived diminutive forms, like the lexeme [ʔayn] ‘eyes’ > [ʔuyayn-ah] ‘small eye’. Another important observation of this study is the presence of the sound /w/ as a basic sound in the root of the lexeme, such as [ba:b] ‘door’ < [bawab], which also appears in the diminutive form [buwayb] ‘small door’. The consonant [w] appears when the word is changed into a diminutive form, considering its existence in the root. The following rule accounts for the presence of /a:/ in the diminutive form:

[w] > Ø / a_a > a: Aziz et al. (2020, p. 328)

The researchers elucidate that the Arab tongue finds it difficult to pronounce the consonant [w] when it occurs between two vowels of [a]. The result of the study also indicates that diminutive in Arabic denotatively means “small” while connotatively it depends on the context to express the meaning of affection, closeness, intimacy, insult, or praise.

Interestingly, Mashaqba et al. (2022) investigate the morphology-phonology interface in the formation of diminutives in Jordanian Arabic (JA). The study represents both diminutives in Bedouin and urban varieties, the study informants were twelve Jordanian Arabic speakers (six were native speakers of Ammani Arabic and six of Bani Hassan Bedouin Arabic). The results show that JA adheres to a non-concatenative derivational process. Moreover, the results also reveal that JA dialects differ in stress assignment with diminutive structures: urban JA follows the iambic CVC.CVVC structure (an unstressed syllable followed by a stressed one), while the Bedouin dialect demonstrates a variety of trochaic (a stressed syllable followed by an unstressed one) and iambic patterns. Importantly, while transfer effects have been noted on the derivation of diminutives in Bedouin JA, no significant transfer effects have been observed between diminutive and non-diminutive structures in urban JA. As such, the study concludes that diminutive formation in urban JA favors the root-based approach over the stem-based one. It is clear from a thorough analysis of the body of literature that the phenomenon of noun diminutive formation in Bani Sakhar Arabic (BSA), a Bedouin Arabic dialect, has never been studied in the context of OT or any other phonological framework. Therefore, the purpose of this study is to fix this gap by employing OT to clarify the phonological processes that go into the formation of noun diminutives in JSA. This study aims to provide

an analysis and understanding of the mechanisms underlying noun diminution in BSA by utilizing OT.

III. METHODOLOGY

The study involves fourteen participants, consisting of seven males and seven females, all of whom are native speakers of BSA. The age of the participants is between 30 and 70 years old, and they all resided in Al-Jiza, Al Mwaqer, and Um-Alrasas (The mid regions of Jordan, where the Bedouin community resides). The participants were asked to pronounce words based on their dialect and provide the corresponding diminutive forms. To ensure the accuracy and reliability of the gathered data, the recorded material and the transcription (using IPA) of BSA diminutive data were reviewed by a linguist who is a native speaker of BSA. The researcher collaborated with native speakers to compile a word list that primarily represented the Bedouin language flavor. The researcher considered various criteria while compiling this list, including different types of consonantal roots, diverse syllable structures, and the inclusion of masculine and feminine nouns as well as singular and plural forms (refer to the Appendix for details).

IV. FINDINGS AND DISCUSSION

The study's results are divided into two sub-sections, which are determined based on the number of consonants in the roots of nouns. These sub-sections are as follows: (A) The formation of diminutives for nouns of tri-consonantal roots in BSA, and (B) The formation of diminutives for nouns of Quadri-consonantal roots in BSA.

A. The Diminutive Formation for Nouns of Tri-Consonantal Roots in BSA

The analysis of the data reveals that tri-consonantal nouns in BSA can be classified into two types: Nouns of Tri-consonantal Strong Roots (those that have three consonants in their roots, and Nouns of Tri-consonantal Weak Roots (those that exhibit two consonants and a vowel or a glide in their roots). The subsequent sections will present a detailed explanation of each type.

(a). Diminutive Nouns of Tri-Consonantal Strong Roots

Remarkably, the current research is based on the premise that the insertion of /e:/ or /aj/ between the second and the third consonant of the roots serves as a significant marker for diminutive formations in BSA. Distinctively, all diminutive patterns share the characteristic of having complex onsets in initial-syllable positions. An in-depth investigation of the data postulates that diminutive forms of tri-consonantal nouns with strong roots in BSA are of two types: The / C Ce:C/ pattern for masculine nouns and the / C Ce:Ca/ for feminine nouns. The manifestation of these surface patterns can be attributed to phonological processes, which can be explained by the interplay between markedness constraints and faithfulness constraints.

1. Diminutives of Masculine Nouns: The Pattern / C Ce:C/

The subsequent examples in Table 1 demonstrate the derivation of diminutive forms for masculine nouns by identifying two phonological processes: vowel syncope and glide/vowel epenthesis. Noteworthy, the examples also reveal that the diminutive pattern / C Ce:C/ can arise from words that exhibit different syllable shapes (monosyllabic and disyllabic): CV.CVC/ CVCC.

TABLE 1
THE DIMINUTIVE PATTERN / C Ce:C/

Root	Non-diminutive	Syllable	Dimnutive	Gloss
1. ʕ.s.l	'ʕa.sal	CV.CVC	ʕse:l	honey
2. ʃ.h.n	'ʃa.han	CV.CVC	ʃhe:n	dish
3. k.l.b	'kalb	CVCC	kle:b	dog
4. g.l.b	'galb	CVCC	gle:b	heart
5. g.ʃ.r	ga.'ʃir	CV.CVC	gse:r	palace

Evidently, in BSA, the diminutive pattern / C Ce:C/ emerges from words with the forms CV.CVC or CVCC. This involves the insertion of the long mid vowel /e:/ between the second and the third consonants which is considered a diminutive particle that distinguishes the formation of diminutives in BSA. However, this epenthetic process of the long vowel /e:/ violates the anti-epenthesis faithfulness constraint **DEP-IO**.

1. **DEP-IO: constraint prohibits phonological epenthesis by requiring that each segment in the input has a corresponding segment in the output (McCarthy & Prince, 1995).**

Nevertheless, the initial vowel (V) that serves as the nucleus of the first syllable, as seen in examples such as /'ʕa.sal/ and /'kalb/, undergoes syncope in the diminutive forms. The vowel deletion contravenes the faithfulness constraint of **MAX-V-IO**

2. **MAX-V-IO stipulates that input vowels must have corresponding counterparts in the output, thus prohibiting any instances of vowel deletion (McCarthy & Prince, 1995).**

The process of vowel deletion occurs due to the necessity to meet the requirement that the initial syllable of all diminutives in BSA must consist of two consonants. This requirement aligns with the empirical findings presented in the

study conducted by Azieb and Mahadin (2015, p. 150) regarding the realization of diminutive patterns in Algerian dialect. Furthermore, the investigation of the diminutive patterns in BSA as illustrated in Mashaqba et al. (2022, p. 1209) corroborates the same generalization. An intriguing phonological phenomenon that promotes the occurrence of complex onsets at the onset of words is discussed by Watson's (2002) analysis of Arabic dialects. In her description, she puts forward the proposal that syncope is not a strictly necessary repair process, it is commonly employed to minimize the occurrence of monomoraic syllables in the utterance and maximize the presence of optimal bimoraic syllables (Watson, 2002, p. 70).

Significantly, vowel deletion in initial-syllable positions results in a complex onset cluster and this violates markedness constraint *Complex ONS which prohibits onset clusters of all types. Consequently, it is possible to parameterize this constraint in a manner that accommodates the requirements of the dialect under investigation (Al-Mohanna; as cited in Benyoucef & Mahadin, 2013, p. 7; Azieb & Mahadin, 2015, p. 151).

3. *Complex ONS C (CC): bi-consonantal onsets are required in complex onsets (CC), while mono-consonantal and tri-consonantal onsets are not allowed.

Noticeably, syllables in all Arabic dialects have onsets, so the markedness constraint **ONSET** which obliged syllables to begin with onsets is unviolated in BSA.

4. ONSET: syllables must have onsets.

However, the insertion of the long vowel /e:/ in the second syllable in di-syllabic words, like the word /ʕa.sal /, will result in a vowel hiatus. In this case, syncope interferes as a repair strategy to avoid vowel hiatus by deleting the vowel in the second syllable, hence the markedness constraint **NO HIATUS** is brought up.

5. NO HIATUS: prohibits hiatus

Furthermore, the presence of the vowel /e:/ and the diphthong /aj/ is essential in all forms as it is a prerequisite for the formation of diminutives in BSA. Hence, the DEP-IO constraint is violated as a result of these **epenthetic processes**. Consequently, the markedness constraint *Complex ONS C (CC) takes precedence over both faithfulness constraints, DEP-IO and MAX-V-IO.

The preceding discussion can be summarized through the constraint hierarchy outlined in (1) and the findings presented in Tableau 1. These representations collectively elucidate the rationale behind the selection of [gle:b] as the optimal diminutive output for the input form /galb/. To put the phonological processes involved in deriving masculine nouns' diminutive patterns (vowel syncope/epenthesis) under the lens of optimality, the following constraint hierarchy (1) is postulated:

1. *Complex ONS C(CC) >> NO HIATUS >> MAX-V, DEP-V

TABLEAU 1
THE OPTIMAL CANDIDATE FOR /galb/

/galb/'heart'	*Complex ONS C(CC)	NO HIATUS	MAX-V	DEP-IO
a. \blacksquare . gle:b			*	*
b. ?gle:b	*!		*	*
c. ga.le:b	*!			*
d. glae:b		*!		*

Tableau 1 illustrates that candidate (a) emerges as the most optimal option (indicated by the index \blacksquare) due to incurring the fewest violations of constraints. Specifically, it satisfies the higher-ranked constraints and only violates MAX-V-IO and DEP-V. Candidate (b) is rejected as it fails to satisfy the higher-ranked constraint *Complex ONS C(CC) by including the impermissible tri-consonantal onset /?gl/, along with violating MAX-V-IO and DEP-IO by lacking the input segment /a/ and introducing the segments /?/ and /e:/ respectively. Similarly, candidate (c) is rejected because it violates a high-ranked constraint *Complex ONS C(CC) by including a single consonant in the onset. Candidate (d) is deemed unacceptable due to its violation of the high-ranked constraint NO HIATUS. This violation occurs as candidate (d) includes the impermissible nucleus /ae:/. Additionally, candidate (d) fails to satisfy the DEP-IO as it inserts segment /e:/ to the input.

Significantly, the constraint hierarchy (1) that elucidates the selection process for the optimal diminutive form of monosyllabic masculine words (CVCC), such as "galb," can effectively be applied to identify the optimal candidate for the diminutive form of disyllabic masculine words (CV.CV), as demonstrated in Tableau 2.

TABLEAU 2
OPTIMAL OUTPUT FOR THE WORD /'sahan/

'sahan	*Complex ONS C(CC)	NO HIATUS	MAX-V	DEP-IO
1. \blacksquare . 'she:n			**	*
2. ?'she:n	!*		**	**
3. 'sahae:n	!*	!*		*
4. 'shae:n		!*	*	*

2. Diminutives of Feminine Nouns: The Pattern/ CCe:Ca/

This specific pattern arises in disyllabic words and is characterized by the inclusion of the feminine marker /a/. Consistent with the previously examined diminutive patterns, it is distinguished by the presence of a complex onset cluster and a long mid vowel /e:/. The subsequent examples in Table 2 serve as illustrations of this pattern.

TABLE 2
DISYLLABIC WORDS WITH THE FEMININE MARKER

Root	Non-diminutive	Syllable	Diminutive	Gloss
ʃxl	'ʃxa.la	CCV.CV	'ʃxe:la	doeling
lqm	'luq.ma	CVC.CV	'lqe:.ma	bit
ʃdʒr	'ʃdʒa.ra	CCV.CV	'ʃdʒe:.ra	tree
tʃ	'tal.ʃa	CVC.CV	'tle:ʃa	hill
ʃlb	'ʃul.ba	CVC.CV	'ʃle:.ba	can
tmr	'tam.ra	CVC.CV	'tme:.ra	date

Significantly, the positioning of the feminine marker /a/ in the derivation of the feminine diminutive remains unchanged in BSA. It is preserved in its original position at the right edge of the grammatical word, suggesting the high ranking of the constraint "ALIGN-F-RIGHT". "ALIGN-F-RIGHT" belongs to the ALIGN family of constraints proposed by McCarthy and Prince (1993), which requires alignment between the boundary of a grammatical category and the corresponding boundary of a prosodic constituent. This constraint can be defined as follows:

6. ALIGN-FM-RIGHT: The feminine vowel [a] must be aligned with the right edge of the word.

This constraint plays an important role in the syllabification of the word in its diminutive form, and the feminine marker preserves the gender of the word, preventing it from being changed. The ALIGN-FM-RIGHT constraint prevents hiatus by placing the vowel on the rightmost edge of the word. To make it clear, the following constraint hierarchy will be adopted to derive the diminutive form of the word /tamra/ which is /tme:ra/.

2. *ComplexONS C(CC) >> NO HIATUS, ALIGN-F-RIGHT >> MAX-V >> DEP-V

TABLEAU 3
THE OPTIMAL CANDIDATE FOR THE WORD /tamra/

tam.ra	*ComplexONS C(CC)	NO HIATUS	ALIGN-F-RIGHT	MAX-V	DEP-V
a. tme:ra				*	*
b. tame:ra	!*				
c. tmae:ra		!*			
d. tme:ar		!*	*	**	

Tableau 3 provides evidence that the syncope of the vowel /a/ in the first syllable and the alignment of the feminine marker /a/ at the rightmost position in the word, support the high ranking of *ComplexONS C(CC) and prevent hiatus. Evidently, the markedness constraints *ComplexONS C(CC), NO HIATUS, and ALIGN-F-RIGHT are higher ranked than the faithfulness constraints MAX-V-IO and DEP-IO. As a result, candidate (a) emerges as the winning candidate as it only violates the two lower-ranked constraints by omitting certain input segments and introducing other segments in the output. Candidates (b), (c), and (d) are eliminated from consideration as they both incur fatal violations of the higher-ranked constraints.

(b). *Diminutive Nouns of Tri-Consonantal Weak Roots*

1. *Diminutives of Masculine Nouns: The Pattern /CCaj.jiC/*

The Pattern/ CCaj.jiC/ of masculine Noun diminutives is a productive pattern in BSA, this pattern requires complex onset and glid insertion, it is characterized by having the high short vowel /i/ as the nucleus of the last syllable. Vowel syncope and vowel epenthesis as well as glide insertion are the main phonological processes that affect the emergence of this pattern. The following example clarifies these points.

TABLE 3
PATTERN /CCaj.jiC/ OF MASCULINE NOUN DIMINUTIVE

Root	Non-diminutive	Syllable	Diminutive	Gloss
dʒwd	dʒa.'wa:d	CV.CVVC	'dʒwaj.jid	proper name
ʃwr	'ʃu:r	CVVC	'ʃwaj.jir	fence
zjd	'za:.jid	CVV.CVC	zwaj.'jid	proper name
hwr	hwa:r	CCVVC	hwaj.jir	calves

The syncope of the high vowel /a/ violates the faithfulness constraint MAX-V and preserves the high ranking of the markedness constraint *ComplexONS C(CC). Syncope of the long vowel /a:/ skips the violation of the high ranked markedness constraint NO HIATUS. Interestingly, all the Arabic dialects demand syllables to have onset which is a strong indicator of the high ranking of the markedness constraint ONSET. In the case at hand, the glid insertion fills the onset of the second syllable, causing a violation of the faithfulness constraint DEP-IO. The constraint ranking in (3) accounts for these phonological processes:

3. *ComplexONS C(CC), ONSET >>NO HIATUS >>MAX-V, DEP-IO

TABLEAU 4
THE OPTIMAL CANDIDATE FOR THE WORD /dʒa.wa:d/

dʒa.'wa:d	*ComplexONS C(CC)	ONSET	NO HIATUS	MAX-V	DEP-IO
a. 'dʒwaj.jid				*	**
b. dʒwaj.id		*!		*	*
c. ?dʒwa.a:d	*!		*		

As shown in Tableau 4, candidate (a) emerges as the successful candidate in Tableau 4 as it is the only option that remains free from violating the higher-ranked constraint *Complex ONS C(CC), ONSET and NO-HIATUS. Conversely, candidates (b) and (c) are deemed unsuitable for selection due to their significant violation of the undominated constraint *Complex ONS C(CC) an ONSET, with candidate (b) additionally violating MAX-V-IO and DEP-IO.

Even though the optimal candidate, (a), possesses a similar number of violations compared to candidate (b), the latter is eliminated from consideration while the former remains viable. This outcome can be attributed to the principle that lower-ranked constraints cannot collectively override a higher-ranked constraint. Therefore, the dominance of the higher-ranked constraint *Complex ONS C(CC) takes precedence over the cumulative effect of violations, resulting in the selection of candidate (a) as the winning option.

2. Diminutives of Feminine Nouns: The Patterns /Cwe:Ca / and /CCe:Ca /

Table 4 illustrates the derivation of diminutives for feminine nouns with weak tri-consonantal roots by identifying two vocalic patterns that characterize diminutive formation in BSA. The /Cwe:Ca /pattern emerges from feminine words that surface with two consonants, while the /CCe:Ca /pattern emerges from feminine words with a base of three consonants. Both patterns are distinguished by having the feminine marker on their diminutive forms as well as having the long-mid vowel as a diminutive marker. As clearly illustrated in the examples provided in Table 4.

TABLE 4
DERIVATION OF FEMININE NOUN DIMINUTIVES WITH WEAK TRI-CONSONANTAL ROOTS

Root	Non-diminutive	Syllable	Diminutive	Gloss
ʃjn	ʃe:n	CVVC	'ʃwe:na	eye
zwn	'ze:na	CVV.CV	'zwe:n/a	beautiful
swʃ	sa:ʃa	CVVCV	'swe:ʃa	watch
Swr	sa:ra	CVVCV	'swe:ra	proper name
dwr	da:r	CVVC	'dwe:ra	House
frw	'far.wa	CVC.CV	'fre:wa	scalp
qhw	'qha.wa	CCV.CV	'qhe:wa	coffee
hʃj	'has.wa	CVC.CV	'hʃe:wa	stone
ʃjʃ	'ʃa:j.ʃa	CVVC.CV	'ʃwe:ʃa	proper name

Considering the first pattern /Cwe:Ca / and as can be noted from the examples above, many phonological processes are displayed in the formation of this pattern, vis: glide/vowel epenthesis and vowel syncope. The long low vowel /a:/ is deleted to prevent hiatus and the glide /w/ is inserted to preserve complex onset cluster, which is a prerequisite of diminutive patterns in BSA, along with mid-vowel insertion. These phonological processes result in violation of the faithfulness constraints MAX-V-IO and DEP-V-IO (no vowel insertion), and high ranking of the markedness constraint *ComplexONS C(CC) and NO HIATUS. The remaining question is, why is it the glide /w/ that is inserted not another segment? The answer would be that it is part of the underlying form as explained in Mahadin (1982) that bi-consonantal nouns possess an underlying glide, which often surfaces in certain derived forms such as diminutives. The constraint hierarchy in 4 and Tableau 5 summarize the previous discussion and illustrate why ['swe:ʃa] is the preferred diminutive output for.

*ComplexONS C(CC) >> NO HIATUS >> MAX-V-IO >> DEP-V-IO

TABLEAU 5
THE OPTIMAL CANDIDATE OF THE WORD /sa:ʃa/

sa:ʃa	*ComplexONS C(CC)	NO HIATUS	MAX-V-IO	DEP-V-IO
a. swe:ʃa			*	*
b. ?swe:ʃa	*!		*	*
c. swa:e:ʃa		*!		*

Tableau 5 demonstrates that candidate (a) stands out as the most optimal choice due to its minimal violations of constraints. It only violates the two lower-ranked constraints, MAX-V-IO and DEP-V-IO. Candidate (b) has a tri-consonantal onset /ʃsw/ and so it violates the higher ranked constraint *Complex ONS C(CC), it also violates MAX-V-IO and DEP-IO constraints by the deletion of the segment /a:/ and inserting the segments /ʃ/, /w/, and /e:/ respectively. Similarly, Candidate (c) is disqualified as it violates the higher-ranked constraint NO-HIATUS by having two vowels in

the first syllable. It is worth noting that in this strict dominance relationship, the fulfillment of lower-ranked constraints cannot make up for the violation of a single higher-ranked constraint, as emphasized by Kager (1999).

The pattern /CCe:Ca/ observed in the present type of weak-rooted triconsonantal feminine nouns, as exemplified by forms like (/far.wa/... /fre:.wa/), do not involve glide insertion as the previous one. Furthermore, it can be analyzed using an OT framework by applying the same constraint hierarchy (2) and by following the same analysis outlined in section (b) 2.

B. The Diminutives Formation for Nouns of Quadri-Consonantal Roots in BSA

Distinct patterns for forming diminutives from Quadri-consonantal noun stems are observed in the structure /CCe:Ci:C/ and /CCe:CiC/. These patterns arise from the application of two key phonological processes: vowel syncope, and vowel insertion. What is particular about these patterns is the insertion of the long /short high front vowel /i,i:/ in the final syllable and the preservation of syllable weight between input and output (diminutive form vs non-diminutive form). The following examples in Table 5 serve to illustrate these points:

TABLE 5
DERIVATION OF FEMININE NOUN DIMINUTIVES WITH WEAK TRI-CONSONANTAL ROOTS

Consonantal root	Non-diminutive	Syllable shape	Diminutive	Pattern	Gloss
ḍḡḡfr	'ḍḡaḡ.far	CVC.CVC	'ḍḡḡe:.fir	CCe:.CiC	proper name
xndḡr	'xin.ḍḡar	CVC.CVC	'xne.ḍḡir	CCe:.CiC	dagger
qrts	qir.'ta:s	CVC.CVC	'qre:.ti:s	CCe:.Ci:C	bag
qndl	qin.'di:l	CVC.CVVC	'qne:.di:l	CCe:.Ci:C	lamp
s n s l	sin.'sa:l	CVC.CVVC	sne:'si:l	CCe:Ca:C	necklace

Definitely, the insertion of the long mid-vowel vowel /e:/ and the high front vowel /i,i:/ violate the faithfulness constraints DEP-V-IO. Additionally, the constraint MAX-V-IO is low-ranked due to the deletion of the vowel /a/ to allow for a complex onset cluster to satisfy the high-ranked constraint *ComplexONS C(CC). Examples above manifest change in vowel feature, as in the example [qir.'ta:s] and its diminutive form ['qre:.ti:s]. This change in the vowel feature brings to our discussion the violated constraint IDENT-IO (F) which postulates that:

7. IDENT-IO (F): The output correspondents of an input [γF] segment are also [γF]. This means that the features of segments in the input should be maintained in the output as well.

The identity of the weight of syllables within diminuted and non-diminuted forms can be clarified by the high-ranked faithfulness constraint MAX_μ-IO.

8. MAX_μ-IO: Every mora in S1 has a correspondent in S2. (no mora deletion) (Moren, 1999)

The following tableau will articulate this discussion using the lens of optimality theory and the constraint ranking accounts for these phonological processes:

4. *ComplexONS C(CC)>> NO HIATUS, MAX-_μ-IO>> MAX-V-IO, IDENT-IO (F), DEP-V-IO

TABLEAU 6
THE OPTIMAL CANDIDATE FOR THE WORD /'ḍḡaḡ.far/

'ḍḡaḡ.far 'ḍḡ _μ .fir	*ComplexONS C(CC)	NO-HIATUS	MAX- _μ -IO	MAX-V-IO	IDENT-IO (F)	DEP-V-IO
a. 'ḍḡḡe:.fir 'ḍḡḡ _μ .fir				*	*	*
b. ḍḡḡae:.far 'ḍḡḡ _μ .fir		*!	*			*
c. ?ḍḡḡe:.far ?ḍḡḡ _μ .fir	*!			*	*	*

In Tableau 6, candidate (a) emerges as the successful candidate as it is the only option that avoids violating the undominated constraints *ComplexONS C(CC), NO HIATUS, and MAX-_μ-IO respectively. In contrast, candidates (b) and (c) are eliminated due to their violation of the higher-ranked constraint *ComplexONS C(CC) as well as the high-ranked constraints NO HIATUS and MAX-_μ-IO.

V. CONCLUSION

In conclusion, this study has effectively explored and analyzed the underlying patterns governing noun diminutive formation in Bani Sakhar Arabic (BSA), a dialect spoken by the Bedouins of central Jordan. By adopting an OT perspective and conducting a thorough investigation of the available data, the research has brought to light specific patterns associated with diminutivization in BSA. The findings indicate distinct patterns for different types of nouns in BSA. Tri-consonantal nouns with strong roots exhibit the pattern /CCe:C/ for masculine nouns and /CCe:Ca/ for feminine nouns. On the other hand, tri-consonantal nouns with weak roots follow the pattern /CCaj.jiC/ for masculine nouns, while the patterns /Cwe:Ca/ and /CCe:Ca/ characterize diminutive forms of feminine nouns. Quadri-consonantal noun roots in BSA demonstrate the patterns /CCe:Ci:C/ and /CCe:CaC/. The derivation of these patterns can be attributed to the active

application of different phonological processes, including vowel syncope, vowel epenthesis, and glide insertion.

APPENDIX

Noun Diminutive Formation in Jordanian Bedouin Arabic

A) Tri-consonantal Nouns / Strong Root

1.1 Masculine with the pattern / CCE:C/

Root	Non-diminutive	Syllable Shape	pattern	Diminutive	Syllable Shape	Pattern	Gloss
š.g.r	ša.gir	CV.CVC	Ca.CiC	šge:r	CCVVC	CCe:C	falcon
f.r.n	fu.rən	CV.CVC	CuCuC	fre:n	CCVVC	CCe:C	oven
ʕ.dʒ.l	ʕi.dʒil	CV.CVC	CiCiC	ʕdʒe:l	CCVVC	CCe:C	calf
ʔ.s.n	ʔu.sun	CV.CVC	CuCuC	ʔse:n	CCVVC	CCe:C	branch
q.l.m	qa.lam	CV.CVC	CaCaC	qle:m	CCVVC	CCe:C	pen
f.r.x	farx	CVCC	CaCC	fre:x	CCVVC	CCe:C	a chick
n.h.r	na.hir	CV.CVC	CaCiC	nhe:r	CCVVC	CCe:C	river
q.r.š	qurš	CVCC	CuCC	gre:š	CCVVC	CCe:C	tablet
ʕ.s.l	ʕa.sal	CV.CVC	CaCaC	ʕse:l	CCVVC	CCe:C	honey
ħ.j.m	ħajim	CVCVC	CaCiC	ħje:m	CCVV	CCe:C	perfect
š.h.n	ša.han	CV.CVC	CaCiC	šhe:n	CCVVC	CCe:C	plate
klb	kalb	CVCC	CaCC	Kle:b	CCVVC	CCe:C	dog
glb	galb	CVCC	CaCC	gle:b	CCVVC	CCe:C	heart
gšr	qa.šir	CV.CVC	CaCiC	qše:r	CCVVC	CCe:C	palace

1.2 Feminine with the pattern / CCE:Ca/

Root	Non-diminutive	Syllable Shape	pattern	Diminutive	Syllable Shape	Pattern	Gloss
šxl	šxa.la	CCVCV	CCaCa	šxe:la	CCVVCV	CCe:Ca	doeling
lqm	luq.ma	CVC.CV	CuCCa	lqe:.ma	CCVV.CV	CCe:Ca	bit
ʃdʒr	ʃdʒa.ra	CCV.CV	CCaCa	ʃdʒe:ra	CCVV.CV	CCe:Ca	tree
tʃ	tal.ʃa	CVC.CV	CaC.Ca	tʃe:ʃa	CCVV.CV	CCe:Ca	hill
ʕlb	ʕul.ba	CVC.CV	CuCCa	ʕle:ba	CCVV.CV	CCe:Ca	can
frh	fer.ha	CVC.CV	CeCCa	fre:.ha	CCVV.CV	CCe:Ca	Proper name
xbz	xub.za	CVC.CV	CuC.Ca	xbe:.z	CCVV.CV	CCe:Ca	bread
tmr	tam.ra	CVC.CV	CaC.Ca	tme:.ra	CCVV.CV	CCe:Ca	dates
dmf	dam.ʃa	CVC.CV	CaC.Ca	dme:.ʃa	CCVV.CV	CCe:Ca	tear
dʒmr	dʒam.ra	CVC.CV	CaC.Ca	dʒme:.ra	CCVV.CV	CCe:Ca	cnder
ħrm	ħur.ma	CVC.CV	CuC.Ca	ħre:.ma	CCVV.CV	CCe:Ca	woman
yrf	yur.fa	CVC.CV	CuC.Ca	yre:.fa	CCVV.CV	CCe:Ca	room
Smr	sam.ra	CVC.CV	CaC.Ca	sme:ra	CCVV.CV	CCe:Ca	Proper name
qmr	qam.rah	CVC.CV	CaCCa	qme:ra	CCVC.CV	CCe:Ca	moonlit night

2. Tri-consonantal Nouns / Weak Root

2.1 Masculine with the pattern / CCajjC /

Root	Non-diminutive	Syllable Shape	pattern	Diminutive	Syllable Shape	Pattern	Gloss
nwr	nu:r	CVVC	Cu:C	nwaj.jir	CCVCCVC	CCaGiC	Proper name
dʒwd	dʒa.wa:d	CV.CVVC	Ca.Ca:C	dʒwaj.jid	CCVCCVC	CCaGiC	Proper name
šwr	šu:r	CVVC	Cu:C	šwaj.jir	CCVCCVC	CCaGiC	Proper name
ʕwz	ʕa.waʒ	CV.CVC	CaCaC	ʕwaj.jiʒ	CCVCCVC	CCaGiC	Proper name
zjd	za:.jid	CVV.CVC	Ca:.CiC	zwaj.jid	CCVCCVC	CCaGiC	Proper name
hwn	haj.jin	CVC.CVC	Ca.CiC	hwaj.jin	CCVCCVC	CCaGiC	easy
ħwr	ħwa:r	CCVVC	CCa:C	ħwaj.jir	CCVCCVC	CCaGiC	calves
ʕwd	ʕa:jid/ʕi:d	CVVCV	Ca:.CiC	ʕwaj.jid	CCVCCVC	CCaGiC	Proper name

2.2 Feminine with the pattern /Cwe:Ca /

Root	Non-diminutive	Syllable Shape	pattern	Diminutive	Syllable Shape	Pattern	Gloss
ʕjn	ʕe:n	CVVC	Ce:C	ʕwe:na	CCVVCV	Cwe:Ca	eye
zwn	ze:na	CVV.CV	Ce:Ca	zwe:n/a	CCVVCV	Cwe:C/a	beautifl
swʕ	sa:ʕa	CVVCV	Ca:Ca	swe:ʕa	CCVVCV	Cwe:Ca	watch
dwr	da:r	CVVC	Ca:C	dwe:ra	CCVVCV	Cwe:Ca	house
njr	na:r	CVVC	Ca:C	nwe:rah	CCVVCV	Cwe:Ca	fire
ʔwʕ	ʔa:ʕa	CVVCV	Ca:Ca	ʔwaj:ʕa	CCVCCV	Cwe:Ca	Cookig pot
Swr	sa:ra	CVVCV	Ca:Ca	swe:ra	CCVVCV	Cwe:Ca	Proper name
mwz	mo:z	CVVC	Co:C	mwe:za	CCVVCV	Cwe:Ca	banana
frw	far.wa	CVC.CV	CaC.Ca	fre:wa	CCVVCV	Cwe:Ca	scalp
qhw	qha.wa	CCV.CV	CCa.Ca	qhe:wa	CCVVCV	Cwe:Ca	coffee
hʕj	has.wa	CVC.CV	CaC.Ca	hʕe:wa	CCVV.CV	Cwe:Ca	stone
ʕjʕ	ʕa:j.ʕa	CVVC.CV	Ca:C.Ca	ʕwe:j.ʕa	CCVVCV	Cwe:Ca	Proper name

B) Quadri Consonantal Stem Noun / CCe:..CiC/

Number	Consonantal root	Noun	Syllable shape	Pattern	Diminutive noun	Syllable shape	Pattern	
187	dʕʕfr	dʕaʕ.far	CVC.CVC	CaC.CaC	dʕʕe:fir	CCVV.CVC	CCe:..CiC	Proper name
188	xndʕr	xin.dʕar	CVC.CVC	CiC.CaC	xne:dʕir	CCVV.CVC	CCe:..CiC	dagger
189	qrʕs	qir.ta:s	CVC.CVC	CiCCa:C	qre:ti:s	CCVV.CVVC	CCe:..CiC	bag
190	qndl	qin.di:l	CVC.CVVC	CiCCi:C	qne:di:l	CCVV.CVVC	CCe:..CiC	lamp
	s n s l	sin.sa:l	CVC.CVVC	CiC.Ca:C	sne:si:l	CCVV.CVVC	CCe:..CiC	necklace

REFERENCES

- Abalkheel, A. M. (2020). Exceptional Arabic Diminutive Forms of Nouns with [aa]: An Optimality-Theoretic Analysis. *International Journal of English Linguistics*, 10(5), 68-74.
- Arabiya, R. M., & Al-Momani, I. M. (2021). Diminution in Arabic: A suggested strategy to Mona Baker's non-equivalence problem "differences in form. *Journal of Language and Linguistic Studies*, 18(1). Retrieved on March 3, 2024, from <http://jlls.org/index.php/jlls/article/view/3003/955>.
- Azieb, S., & Mahadin, R. (2015). Noun diminutive formation in Algerian Arabic as used in Jijel: An optimality analysis. *International Journal of Humanities and Social Science*, 5(12), 148-157.
- Aziz, A., Gunawan, R., & Anwar, S. (2020). Various Forms and Meanings of Diminutive in Classical and Modern Arabic. *Jurnal Al Bayan: Jurnal Jurusan Pendidikan Bahasa Arab*, 12(2), 322-339.
- Badarneh, M. A. (2010). The pragmatics of diminutives in colloquial Jordanian Arabic. *Journal of Pragmatics*, 42(1), 153-167. Retrieved on February 25, 2024, from <https://doi.org/10.1016/j.pragma.2009.05.004>.
- Benyoucef, R., & Mahadin, R. (2013). Phonological processes in Algerian Arabic as spoken in Mostaganem: An optimality perspective. *Research on Humanities and Social Sciences*, 3(14), 85-100.
- Brame, M. (1970). *Arabic Phonology Implications for Phonological Theory and Historical Semitic*. Unpublished Doctoral Dissertation, Massachusetts University, Massachusetts.
- Crystal, D. (2008). *A Dictionary of linguistics and phonetics*. Oxford: Blackwell Publishing.
- De Blasio, E. (2023). Diminutives in Syrian Arabic. Rthesis. *International Journal of Linguistics, Philology and Literature*, 14(1), 5-23.
- Fayez, E. (1990). *Siibawaih's linguistic analysis of the diminutive in classical Arabic and its subsequent developments*. PhD Dissertation, Georgetown University, USA.
- Kager, R. (1999). *Optimality Theory*. Cambridge: Cambridge University Press. Cambridge Textbooks in Linguistics.
- Katamba, F. (1989). *An Introduction to Phonology*. Harlow, Essex: Longman.
- Mahadin, R. (1982). *The Morphophonemics of the Standard Arabic Tri-Consonantal Verbs*. Unpublished PhD Dissertation, University of Pennsylvania, Philadelphia.
- Mashaqba, B., Huneety, A., Guba, M. N. A., & Zeidan, Z. (2022). On morphology-phonology interface: Insights from Diminutives in Jordanian Arabic. *Theory and Practice in Language Studies*, 12(6), 1206-1213.
- McCarthy, J and Prince, A. (1995). Faithfulness and Reduplicative Identity. In *Jill Beckman, Suzanne Urbanczyk, and Laura Dickey (Eds.)*, University of Massachusetts Occasional Papers in Linguistics (pp. 249-384), Amherst, MA: GLSA Publications.
- McCarthy, J. J., & Prince, A. S. (1990). Foot and Word in Prosodic Morphology: The Arabic Broken Plural. *Natural Language and Linguistic Theory*, 8(2), 209-283.
- McCarthy, J. (1981). A Prosodic Theory of Non-concatenative Morphology. *Linguistic Inquiry*, (12), 373-418.
- Moren, B. (1999). *Distinctiveness, Coercion and Sonority: A Unified Theory of Weight*. Unpublished Doctoral Dissertation, University of Maryland.
- Prince, A., & Smolensky, P. (2004). *Optimality Theory: Constraint Interaction in Generative Grammar*. Malden: Blackwell Publishing.
- Rashid, B. (2010). Optimality of diminutive forms in Modern Standard Arabic. *Journal of Basrah Researches (Humanities Series)*,

34(1), 121-138.

[21] Schleh, L. (2022). Diminutives in Yangxin Gan. *Journal of Universal Language*, 23(1), 147-166.

[22] Watson, J. (2002). *The phonology and morphology of Arabic*. Oxford: Oxford University Press.

[23] Watson, J. (2006). Arabic morphology: diminutive verbs and diminutive nouns in San'ani Arabic. *Morphology*, 16(2), 189-204.

Manal Hussein Abu-Odeh is a Ph.D. candidate in Linguistics at the University of Jordan, Jordan. Her main areas of interest include Phonology, Phonetics, Sociolinguistics, and Language Acquisition Studies.

Radwan S. Mahadin is a Professor of Phonetics and Phonology at the School of Foreign Languages, University of Jordan, Jordan. Prof. Mahadin received his Ph.D. in Linguistics from the University of Pennsylvania-Philadelphia, USA in 1982. His main areas of interest include Phonetics and Phonology, Sociolinguistics, Historical Linguistics, The Contribution of the Arab Grammarians, Discourse Analysis, Semantics and Pragmatics.