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On Morphology-Phonology Interface: Insights From Diminutives in Jordanian Arabic

Bassil Mashaqba
The Hashemite University, Zarqa, Jordan

Anas Huneety
The Hashemite University, Zarqa, Jordan

Mohammed Nour Abu Guba
University of Sharjah, Sharjah, UAE

Zainab Zeidan
The Hashemite University, Zarqa, Jordan

***Abstract*—This study explores the morphology-phonology interface to be found in the formation of diminutives in Jordanian Arabic (JA). As evident in a corpus of diminutives in Bedouin and urban varieties, the results demonstrate that JA mainly depends on a non-concatenative (discontinuous) patterning of diminutive structures. Intriguingly, diminutives in JA not only are derived from nouns and adjectives, but also from perfective verbs. The diminutive verb adheres to the $C_1VC_2VC_3$-eet template and is produced by children and by adults addressing children. Based on a rough frequency test, the most frequently used diminutive pattern in urban JA is $C_1aC_2C_2uuC_3$ whereas Bedouin JA enjoys a variety of diminutive structures. It is also reported that JA dialects vary in stress assignment with diminutive structures: urban JA mainly prefers the iambic CVC.'CVVC structure, while the Bedouin dialect demonstrates a variety of trochaic and iambic patterns. More importantly, although residues of transfer effects on diminutives were reported in Bedouin JA, no significant transfer effects have been found between diminutive and non-diminutive structures in urban JA. As such, it is concluded that diminutive formation in urban JA supports the root-based approach over the stem-based one.**

***Index Terms*—diminutive, Jordanian Arabic, Trochaic, Iambic, transfer effects**

I. Introduction

The linguistic term 'diminutive' refers to the smallness of something, or the smaller version of what nouns refer to (De Belder et al., 2014). Diminutives are derived primarily from nouns, followed by adjectives, adverbs and verbs (Barbaresi, 2003; Dahl, 2006; Watson, 2006; Mashaqba, 2015). Pragmatically, many connotative meanings of diminutives apart from the meaning of dimensional smallness are reported, including endearment, contempt, non-seriousness, affection, approximation, pejorativeness, pretence, playfulness, jocularity, and intensification (Jurafsky, 1996; Watson, 2006). The present work is an attempt to report on the interface between morphology and phonology in the *formation* of diminutive structures in Jordanian Arabic (JA) as mainly spoken in two varieties (Bedouin and urban) within a wider cross-linguistic overview. The paper then gives empirical data in support of how the representation of diminutives in JA contributes to the debate between root- vs word/stem-based derivation in Arabic, such a debate which is expected to go well beyond Semitic languages.

A. Diminutives in World Languages

Cross-linguistically, diminutive words undergo different morphological processes such as infixation as in San'ani Arabic *ʤaahil* 'child' > *tʤajhal* 'to act like a child' (Watson, 2006, p.191) and Standard Arabic *ʤaʕ.far* > *ʤu.ʕaj.fir* [personal name] (Ismail, 2012, p.188), suffixation e.g., *-et*, *-ette* and *-ie* (*-i*, *-y*) in English (Hamid & Faiq, 2009, p.4), *-ino* in Italian, *-ito* in Spanish and *-on* in Modern Hebrew (De Belder et al., 2014, pp.151-154), prefixation e.g., *demi-*, *hemi-*, *micro-*, *mini-*, *mono-*, *semi-*, *sub-*, *under-*, *uni-* and *vice-* in English (Hamid & Faiq, 2009, pp.6-7), and reduplication as in Modern Hebrew *gezer* 'carrot' > *gzarzar* 'baby carrot' (Kreitman, 2003, p.102) and San'ani Arabic *dagg* 'to knock' > *dagdag* 'to knock lightly several times' (Watson, 2006, p.191). Data in (1), which was collected from a closed Facebook group called *Linguistics* (for details see Section II), give the diminutives of the noun '*dog*' formed through different morphological processes in over 26 languages:

(1)	Language	Non-diminutive form 'dog'	Diminutive form 'dog-dim.'
a)	Romanian	cățel	cățel-uș
b)	Modern Greek	skilos	skil-aki
c)	Italian	cane	cagn-etto
d)	Spanish	perro	perr-ito
e)	Turkish	köpek	köpek-çik
f)	Catalan	gos	goss-et
g)	Dutch	hond	hond-je
h)	German	hund	hünd-chen
i)	Austrian German	hund	hund-erl
j)	Armenian	shun	shun-ik
k)	Latvian	suns	sun-iitis
l)	Inuit	qimmiq	qimmi-ralaaq
m)	Galician	can	canc-iño
n)	Brazilian Portuguese	cachorro	cachorr-inho
o)	Lithuanian	šuo	šuni-ukas
p)	Hungarian	kutya	kuty-us
q)	Guarani	jaguar	jagua'i
r)	Polish	pies	pies-ek
s)	Cantonese	gou	gou-zai
t)	Yiddish	hunt	hint-ele
u)	Vietnamese	chó	chó con
v)	Modern Hebrew	kélev	klevlev
w)	Mandarin	gŏu	gŏu-gŏu
x)	Russian	sobaka	soba-chk-a
y)	Standard Arabic	kalb	kul-aj-b
z)	Chinese	gŏu	xiăo-gŏu

Examples (1a-1u) include diminutives produced by suffixation, examples (1v-1w) include diminutives produced by reduplication, examples (1x-1y) show diminutives produced by infixation, and example (1z) includes a diminutive produced by prefixation. Cross-linguistically, most diminutives are formed by suffixation. Some of them are formed by suffixation to unchanged stem and some of them involve reanalysis of the base. In examples (1d), (1g), and (1e); *perrito*, *hondje* and *köpekcik* are the diminutive forms of the nouns *perro*, *hond* and *köpek* respectively. The diminutive suffixes *-ito*, *-je* and *-cik* are added to the stem with no change on the stem. Ketrez and Asku-Koç (2007) argue that the behaviour of *-cik* with common nouns and proper names differs from adjectives. In other words, the grammatical category of the stem and the diminutive suffix *-cik* can affect the behaviour of the diminutive formation. For example, the use of *-cik* with the common noun *balik* 'fish' > *balık-çık* 'little fish' and the proper name *dilek* > *dilek-cik* does not result in any change on the stem. While, the use of *-cik* with the adjective *küçük* 'small' > *küçü-cük* 'small-diminutive (dim).' results in a stem alternation where the final /k/ is deleted (Ketrez & Asku-Koç, 2007, p.281).

In (1h), the diminutive form *hündchen* of the noun *hund* witnesses a sound change where the stem vowel /u/ umlauts to /ü/. This diminutive-formation property is referred to as umlauting. Ott (2011) found that 'the Standard German diminutive morphemes *-chen* and *-lein* and their dialectal variants consistently trigger umlaut on the stem they combine with' (p. 38). However, he argues that there is a difference between diminutive and purely hypocoristic (or ''endearment-conveying'') in using the suffix *-chen* in that it produces non-umlauted forms in hypocoristic structures. For instance, *katze* 'cat' > *kätz-chen* 'small cat' and *buch* 'book' > *büch-lein* 'booklet' are umlauted forms, while *Kurt* > *Kurt-chen* [proper name] is a non-umlauted form (Ott, 2011, p.39).

Kreitman (2003) found that the infixed reduplicant reduplicates the last syllable in the input in Modern Hebrew (p.125). Thus, the last syllable of the noun *kélev* 'dog' is reduplicated to form *klevlev* 'puppy' as shown in (1v). In example (1z), the prefix *xiăo-* 'little' in Chinese is added at the diminutive beginning with no change on the base. The word *gŏu* 'dog' can be diminuted by two more morphological processes: the first one is by reduplication in Mandarin (1w); *gŏugŏu* and the second one is by suffixation in Cantonese (1s); *gŏu-zai*. In example (1y), *ku.lajb* which is the diminutive form of the noun *kalb* 'dog' in Standard Arabic, there is a change in the base form. In the traditional root-and-pattern grammar of Arabic, it is important to take into account the consonantal root of the noun. For example, the noun *kalb* 'dog' has a triconsonantal root {k-l-b}. The pattern $C_1uC_2ajC_3$ (in traditional Arabic grammar *fuʕajl*) is the typical pattern used for triconsonantal roots to produce a diminutive form, hence *kalb* is diminuted as *ku.lajb* (Hamid & Faiq, 2009). Accordingly, a template is interdigitated within the discontinuous root of the noun; therefore, Standard Arabic is one of the languages that undergo prosodic patterning to produce diminutives. This system of prosodic interdigitating roots and patterns is well formalised by McCarthy (1979, 1981) where morphological processes in Arabic depend on three main elements: consonantal root, syllabic template, and vocalic melody (see subsection C below for more details).

B. Background on Arabic Morphological System

Arabic is a Semitic language with a rich system of inflectional root-plus-pattern structures (Mashaqba et al., 2020a). For a long time, there has been some disagreement with regard to which approach Arabic morphology depends on (see Mashaqba & Huneety, 2017). Three major proposals were presented to understand the behaviour of Arabic morphology.

The first one suggests that Arabic morphology is *root-based* in which the triconsonantal root (an abstract discontinuous morpheme) is the basic morphological unit shared by the base and all the derived forms (McCarthy, 1979, 1981; Davis & Zawaydeh, 1999; Prunet et al., 2000). Basic verb form and the derived verb patterns serve as excellent evidence in support of this claim. Recall that the work of McCarthy and Prince (1990) is very essential to understand the root-and-template model of Arabic morphology, in which the derivation process in Arabic depends on three grammatical elements: consonantal root, syllabic template, and vocalic melody. The second group suggests that Arabic morphology is *stem-based*. Proponents of this viewpoint argue that the fully vocalized word/stem is the minimal form in the lexicon based on empirical data from doubled verbs, broken plural, diminutives, and imperfective in Standard Arabic (McCarthy & Prince, 1990; Ratcliffe, 1997, 1998; Benmamoun, 1999). The third group suggests that Arabic allows both approaches; their proposal stems support from empirical data on diminutives in San'ani Arabic (Watson, 2006), hypocoristic formation and aphasic errors (Idrissi et al., 2008), comparative structures in Egyptian Arabic (Gadoua & Davis, 2019), and causative/anticausative verbs in JA (Mashaqba et al., 2020b).

C. An Outline of Arabic Diminutives with Reference to McCarthy and Prince (1990)

Arabic diminutives are one of the morphological processes that have been studied by scholars to determine whether Arabic derivational morphology is root-based or stem/word-based. In particular, diminutive formation in Standard Arabic (henceforth SA) is presented by McCarthy and Prince (1990) as evidence of productivity of the iambic pattern, supporting the word-based approach and showing that Arabic derivation is incompatible with the root-based approach. In word-based approach, phonological properties of the diminutive structure are dependent on the base of the non-diminutive word where transfer effects occur. Transfer effect refers to the notion that the phonological form of the word base affects the phonological form of the derived templatic word (Alshammari & Davis, 2019). Such effect can be ascribed to phonological properties (such as vowel length and word length), morphological components (such as prefixes). According to McCarthy and Prince (1990), three transfer effects between diminutive and non-diminutive were reported, as follows:

i. The syllable structure of the base noun affects the syllable structure of the diminutive form in that: a diminutive comprises three syllables (as in 2a) unless the base noun is either monosyllabic (as in 2b) or bisyllabic beginning with CVCV sequence (as in 2c) in which cases the diminutive would comprise two syllables.
ii. The second consonant of the diminutive form is /w/ if the base noun begins with a CVV sequence (2d).
iii. The vowel length of the base noun affects the final syllable of the diminutive in that; if there is a long vowel in the base noun, the diminutive has a long vowel in the final syllable (2e). If there is a short vowel in the base noun, the diminutive has a short vowel in the final syllable (2f).

(2)

	Non-diminutive	**Diminutive**	**Gloss**
a)	ki.taab	ku.taj.jib	'book'
b)	ġuṣn	ġu.ṣajn	'branch'
c)	qa.lam	qu.lajm	'pencil'
d)	xaa.lid	xu.waj.lid	Proper name
e)	faa.nuus	fu.waj.niis	'lamp'
f)	kaw.kab	ku.waj.kib	'planet'

Given a very brief outline of transfer effects in SA diminutives which support the word-based approach, it is worthy to ask whether the formation of diminutives in JA is based on the phonological features of the stem noun or on the underlying discontinuous consonantal root morpheme. This question has been raised as processing of Arabic derivation is still debatable as illustrated in the literature review above. The remainder of this study is outlined as follows: in Section II, an overview of the methods used in collecting the data has been described. Section III, presents the part of speech concerned in JA diminutives and the morphological processes they undergo, their templates, and the stress patterns involved, followed by an examination of JA diminutives as of whether they are a root-based or stem/word-based motivated, and a test of any observed transfer effects (if there any) is discussed in Section IV.

II. Methodology

Although the development of JA varieties contains a diversity of local patterning where each one developed its own socially featured variety (Mashaqba et al. 2020b), they share many linguistic characteristics in common including some diminutive patterns. Data were collected from twelve JA-speaking people (six males and six females) who participated voluntarily in this study. Six of them were native speakers of Bani Ḥassan Bedouin Arabic and six were native speakers of ᶜAmmani Arabic. The ages of the participants ranged from 65 - 75 years old (M=69) to ensure that they speak their original dialects. Three out of six of Bani Ḥassan Arabic participants were academically uneducated and all lived in Al-ʕAluuk, Az-Zarqa and Al Manshiyah, Al-Mafraq. Two out of the six Ammani Arabic participants were academically uneducated and all lived in Khalda, Shmaysani, and Tabarbour, Amman. None of the participants had any hearing or articulation problems or deficiencies. To avoid research-bias, at the end of data collection task, a linguist, a native speaker of Bani Ḥassan Arabic, double-checked the recorded material and the transcription of Bani Ḥassan Arabic

diminutive data, and another linguist, a native speaker of Ammani Arabic, double-checked the recorded material and the transcription of ᶜAmmani Arabic diminutive data.

A list of 80 words of different syllable weights (monosyllabic, disyllabic, and trisyllabic) were collected, transcribed, analysed qualitatively, and presented in tables according to their syllable weights, syllable shapes, and consonantal roots (See the Appendix). Only selected examples in the discussions were translated into English. All of the words from the 80-word list were randomized and embedded in the phrase [šuu taṣġiir ____] 'what is the diminutive form of ____'. It turned out that some words do not have a diminutive form. So, in addition to the list of words that the participants were asked to give the diminutive form for, five participants recorded for (5-7) minutes a spontaneous speech on a variety of topics, such as traditional dishes, life experiences, and family relations in order to help the researchers to generate more data. Naturally occurring conversations or (spontaneous speech) was an excellent method to generate such type of data as Jordanian people tend to use diminutives abundantly in their everyday language.

Moreover, the researchers used social media platforms to collect data in other languages to provide a cross-linguistic analysis. A question was shared online via a private Facebook group called *Linguistics*. This group was created 14 years ago for the purpose of discussing any topic related to linguistics (language as phenomenon of culture and society). The group members are linguists and graduate students of linguistics, and they are from diverse nationalities and cultures. Two questions were posted on the group: (i) 'what are the diminutive and non-diminutive forms of the following nouns: dog, cat, fish, and bird in your mother language?' and (ii) what is the diminutive form of your name in your mother language?' After four days, the post had reached over 350 responses covering over 30 languages. This method was useful as it enabled the researchers to view a large number of responses in a short period of time. However, not all the participants offered the diminutive and non-diminutive forms of the full list required. The researchers had employed some of the data in the Introduction and Discussion sections to compare and contrast the diminutive formation cross-linguistically.

III. Diminutives in JA

Diminutives in JA involve internal modification of the non-diminutive stem, as in *naaṣiḥ* > *naṣṣuuḥ* 'fat/dim.' and *samra* > *smeera* ~ *sammuura* 'swarthy/dim.'. In terms of parts of speech, diminutives are found with proper names (e.g., *xaalid* > *xweelid* ~ *xalluud* 'Khalid/dim.'), animate nouns (e.g., *naḥle* > *naḥuule* 'bee/dim.'), inanimate nouns (e.g., *šams* > *šmeesa* ~ *šammuuse* 'sun/dim.'), adjectives (e.g., *rxiiṣ* > *rxajjiṣ* 'cheap/dim.'), unassimilated loanwords (e.g., *bank* > *bnajjik*; 'bank/dim.'; *talafoon* > *tleefiin* 'telephone/dim.'; *bikam* > *bkajma* 'pickup car/dim.'), and verbs (e.g., *ʔakalit* > *ʔakal-eet* 'I ate/dim.'; *ġassalit* > *ġassal-eet* 'I washed/dim.'). The latter set of verbs is produced by children and by adults (women in particular) addressing children in certain contexts. The pattern produced takes place as *stem-eet*-(v) in structures comprising perfective verbs with first and second persons. Otherwise, no diminutive verbs are produced; for instance, perfective verbs marking third person, and imperfective verbs do not have a diminutive reflex, as shown in (3) where words with the consonants {š-r-b} entail the sense of 'drink'.

(3)		**Perfective**			**Imperfective**	
	a.	ʔana šarabeet	'I drank Dim.'	h.	ʔana ʔašrab	'I am drinking'
	b.	ʔiḥna šarabeena	'we drank Dim.'	i.	ʔiḥna nišrab	'we are drinking'
	c.	ʔintu šarabeetu	'you p. drank Dim.'	j.	ʔintu tišrabu	'you p. are drinking'
	d.	ʔinti šarabeeti	'you f.s. drank Dim.'	k.	ʔinti tišrabi	'you f.s. are drinking'
	e.	ʔinta šarabeet	'you m.s. drank Dim.'	l.	ʔinta tišrab	'you m.s. are drinking'
	f.	huwwe širib	'he drank'	m.	huwwe yišrab	'he is drinking'
	g.	hiyya širbat	'she drank'	n.	hiyya tišrab	'she is drinking'

JA use of the discontinuous pattern as a diminution device requires a degree of productivity. The examples below illustrate the prosodic structure of JA diminutive patterns and their actual lexical distribution. The urban dialect in (4) presents one pattern, while the Bedouin dialect in (5) includes nine patterns.

(4) **Urban Dialect**

a)	(Iambic) $C_1aC_2C_2uuC_3$	[ḥab.'buub] 'beloved-dim.'

(5) **Bedouin Dialect**

a)	(Trochaic) C1C2ajjiC3	['wlaj.jid] 'boy-dim.'
b)	(Trochaic) C1C2eeC1C2a	['mšeem.ša] 'apricot-dim.'
c)	(Trochaic) C1weeC2iC3	['ẓwee.biṭ] 'officer-dim.'
d)	(Trochaic) C1C2eeC3a	['ḥlee.wa] 'handsome-dim.'
e)	(Trochaic) C1aC2C2a	['xaj.ja] 'sister-dim.'
f)	(Trochaic) C1C2ajja	['bnaj.ja] 'daughter-dim.'
g)	(Iambic) C1C2eeC3 +aat	[ʕwee.'naat] 'eyes-dim.'
h)	(Iambic) C1C2eeC3iiC4	[bnee.'ṭiil] 'trouser-dim.'
i)	(Iambic) C1wajC3 +aat	[ʤwaj.'daat] 'good (plu.)-dim.'
j)	(Monosyllabic) C1C2ajj	[ṣbajj] 'boy-dim.'
k)	(Monosyllabic) C1C2eeC3	[gleeb] 'heart-dim.'

The iambic C1aC2.'C2uuC3(e) pattern is an overwhelmingly favoured diminutive pattern in the urban JA with stress being assigned to the ultimate syllable as in (4a). It includes different stem shapes (monosyllabic, disyllabic, and trisyllabic) as well as different consonantal root types (triliteral root, reduplicated root, and quadrilateral root). The singular feminine diminutive is further marked by suffixing the vowel /e/. This pattern will be discussed with more details in (Section IV).

In Bedouin JA, diminutives enjoy a variety of stress patterns. In patterns presented in (5a-f), stress falls on the initial syllable presenting a trochaic pattern. In (5g-h), the iambic pattern CCVV.'CVVC with its two distinct vocalizations $C_1C_2ee.C_3$ +aat and $C_1C_2ee.C_3iiC_4$ takes place, with stress is assigned to the final CVVC (Watson, 2011; Mashaqba & Huneety, 2018). The iambic patterns CCVV.CVVC and CCVC.CVVC arise only from plurals and trisyllabic loan words. In the Bedouin dialect, plurals are diminuted by suffixation of the sound plural feminine suffix (+aat) to the diminutive form as in (5g) and (5i), while plurals in the urban dialect are diminuted by suffixation of the sound plural masculine suffix (+iin) and to a minor extent the sound feminine plural suffix (+aat) to the pattern CVC.CVVC (as in *šaaṭṭuur+iin* 'clever-dim. m. p.' and *šaaṭtuur+aat* 'clever-dim. f. p.'). The monosyllabic patterns (5j-k) arise from monosyllabic and disyllabic stems. The trochaic CVCCV patterns in (5e-f) have a low level of frequency indicating their non-productivity. However, other trochaic patterns require a degree of productivity: CCVC.CVC and CCVV.CV patterns arise from monosyllabic and disyllabic stems. CCVVC.CV pattern is almost entirely limited to trisyllabic feminine nouns. CCVV.CVC pattern arises from disyllabic masculine nouns. CCVC.CV pattern arises from disyllabic and trisyllabic feminine stems. (See Appendix A for the complete list of data). In the next section, we offer a descriptive analysis of our data which contain different consonantal root types and different phonological features to show how diminutive formation is based on the underlying consonantal root rather than the phonological properties of the non-diminutive structures, and to note on the lack of systematic and significant transfer effects that McCarthy and Prince (1990) have indicated in their analysis for SA.

IV. Are There Transfer Effects in JA Diminutives?

In this section, the work considers the urban JA diminutive pattern $C_1aC_2C_2uuC_3$ as it exhibits a high level of productivity and predictability, and arises from non-diminutive words of different syllable structures, different parts of speech, and different consonantal roots (See Appendix B for the complete list of data). Diminutives illustrated in (6) are formed from triliteral roots. The root column in data in (6 and 8) is based on the traditional monolingual Arabic dictionaries (Mukhtar As-Sihah and Al-Mu'jam Al-Wasiṭ). Notice that the C-slots represent the three root consonants where the doubled second consonant of the root represents the geminate sound in the diminutive form $C_1VC_2C_2VVC_3$.

(6)

	Non-diminutive	Diminutive	Root	Gloss
a)	ḥa.biib	ḥab.buub	ḥ-b-b	'beloved'
b)	sam.ra	sam.muu.ra	s-m-r	'swarthy'
c)	naa.ṣiḥ	naṣ.ṣuuḥ	n-ṣ-ḥ	'fat'
d)	ta.maa.ra	tam.muu.ra	t-m-r	Proper name
e)	karš	kar.ruuš	k-r-š	'belly'
f)	ʕa.sal	ʕas.suul	ʕ-s-l	'honey'
g)	m-ʕaf.fin	ʕaf.fuun	ʕ-f-n	'smells bad'

First, with respect to vowel length, (6a) is an example where there is a long vowel in the base noun and its diminutive form has a long vowel in the final syllable. However, this cannot be considered as a transfer effect because other examples (6b-6f) do not witness any effects of vowel length. All non-diminutives having long or short vowels have the same vowel length in the diminutive form. Second, the feminine suffixation +a in (6b) and (6d) causes a three-syllable diminutive. Non-diminutives with one syllable (6e), two syllables (6a), and three syllables (6g) always have a two-syllable masculine diminutive or a three-syllable feminine diminutive or plural diminutive, as discussed previously in (Section III). Hence, the feminine suffix contributes to the resyllabification of the diminutive form. The word-final feminine suffix (typically a final vowel) can be found among different languages, consider the sequences in (7).

(7)

	Language	dog-dim. masc.	dog-dim. fem.	cat-dim. masc.	cat-dim. fem.
a)	Romanian	juklor(o)	juklor(i)	machkor(o)	machkior(i)
b)	Brazilian Portuguese	cachorrinh(o)	cachorrinh(a)	gatinh(o)	gatinh(a)
c)	[c]Ammani Arabic	kalluub	kalluub(e)	basbuus	basbuus(e)

Back to the data in (6), the consonants in the diminutive form are always a reflection of the underlying consonantal root. The CVV sequence in (6c) for example, does not predict any certain consonant in the diminutive form. A rather clearer case of reflection of the underlying consonantal root is illustrated in (8). Where non-diminutives in (8a-8c) have quadrilateral roots resulting in $C_1VC_2C_3VVC_4$ and non-diminutives in (8d-8e) have reduplicated roots resulting in $C_1VC_2C_1VVC_3$.

(8)

	Non-diminutive	Diminutive	Root	Gloss
a)	ḍif.daʕ	ḍaf.duuʕ	ḍ-f-d-ʕ	‘frog’
b)	ʔar.nab	ʔar.nuub	ʔ-r-n-b	‘rabbit’
c)	ṯaʕ.lab	ṯaʕ.luub	ṯ-ʕ-l-b	‘fox’
d)	dubb	dab.duub	d-b-b	‘bear’
e)	baṭ.ṭa	baṭ.buu.ṭa	b-ṭ-ṭ	‘duck’

One may argue that diminutive forms like (8d) and (8e) are formed by reduplication similar to some other Semitic languages which use reduplication in diminutives derivation. Consider the examples in (9).

(9) Diminutive in Modern Hebrew (De Belder et al., 2014, p.152).

	Non-diminutive	Diminutive	Gloss
a)	xazir	xazarzir	‘pig’
b)	bacal	bcalcal	‘onion’
c)	xatul	xataltul	‘cat’
d)	géver	gvarvar	‘man’

Modern Hebrew use of reduplication as a diminution device has high levels of frequency indicating productivity. The rule is to reduplicate the last syllable of the non-diminutive to form a diminutive. Some may think of this reduplication as a type of transfer effect between non-diminutive and diminutive as McCarthy and Prince (1990) consider the reduplication in broken plural formation as a transfer effect between the singular and the broken plural. For instance, in *zal.za.la* ‘earthquake sg.’ > *za.laa.zil* (McCarthy & Prince, 1990, p.219), they claim that the reduplication in the broken plural form results from the reduplicated root of the singular form and that the consonantal root of the base is /z-l/. However, our intention here is to indicate that the reflection they found in the broken plural is that of the underlying reduplicated consonantal root /z-l-l/ not /z-l/. Likewise; it is the reduplicated root /d-b-b/ and /b-ṭ-ṭ/ that are reflected in the diminutive form *dabduub* and *baṭ.buu.ṭa* respectively following the pattern $C_1VC_2C_1VVC_3$. Much work should be devoted to revise the reality of bilateral vs. triliteral roots since some serious arguments were in favour of the biliterality of $C_1C_2C_2$ and $C_1C_1C_2$ roots (e.g., Lowenstamm, 2010).

V. Conclusion

As a conclusion, diminutive discontinuous patterns are used in JA as a productive diminution device while the majority of other languages use suffixation and reduplication to form diminutives. The feminine diminutive in JA is further marked by a final vowel, and the plural diminutive uses the sound plural suffixes [iin] and [aat]. Diminutive verbs (CVCVC-eeC) in JA comprise a fixed structure as they are produced by children and by adults addressing children. In such a case, the diminutive pattern is produced in structures comprising perfective verbs with first and second persons. Different stress patterns are found in JA diminutive containing trochaic and iambic patterns. The pattern CVC.'CVVC indicates no transfer effects between diminutive and non-diminutive which supports the root-based approach.

Appendix

A. Bedouin Dialect Data

Root	Non-diminutive	Syllable shape	Pattern	Diminutive	Syllable shape	Pattern
w-l-d	wa.lad	CV.CVC	CaCaC	wlaj.jid	CCVC.CVC	CCaCCiC
f-ṭ-m	faaṭ.ma	CVVC.CV	CaaCCa	fṭaj.jim	CCVC.CVC	CCaCCiC
š-b-b	šabb	CVG	CaG	šbaj.jib	CCVC.CVC	CCaCCiC
ġ-z-l	ġa.zaal	CV.CVVC	CaCaaC	ġzaj.jil	CCVC.CVC	CCaCCiC
ḥ-b-b	ḥa.biib	CV.CVVC	CaCiiC	ḥbaj.jib	CCVC.CVC	CCaCCiC
ṯ-w-b	ṯoob	CVVC	CooC	ṯwaj.jib	CCVC.CVC	CCaCCiC
z-j-n	zeen	CVVC	CeeC	zwaj.jin	CCVC.CVC	CCaCCiC
ṣ-ḥ-n	ṣa.ḥan	CV.CVC	CaCaC	ṣḥaj.jin	CCVC.CVC	CCaCCiC
g-ṣ-r	gi.ṣiir	CV.CVVC	CiCiiC	gṣaj.jir	CCVC.CVC	CCaCCiC
r-x-ṣ	rixiiṣ	CCVVC	CiCiiC	rxaj.jis	CCVC.CVC	CCaCCiC
g-r-b	gi.riib	CV.CVVC	CiCiiC	graj.jib	CCVC.CVC	CCaCCiC
ṣ-w-t	ṣoot	CVVC	CooC	ṣwaj.jit	CCVC.CVC	CCaCCiC
loan w.	bank	CVCC	CaCC	bnaj.jik	CCVC.CVC	CCaCCiC
h-l-l	hi.laal	CV.CVVC	CiCaaC	hlaj.jil	CCVC.CVC	CCaCCiC
s-m-r	sam.ra	CVC.CV	CaCCa	smee.ra	CCVV.CV	CCeeCa
ʕ-j-š	ʕaaj.ša	CVVC.CV	CaaCCa	ʕwee.ša	CCVV.CV	CCeeCa
ḥ-l-a	ḥi.lu	CV.CV	CiCu	ḥlee.wa	CCVV.CV	CCeeCa
š-w-r	šaa.ra	CVV.CV	CaaCa	šwee.ra	CCVV.CV	CCeeCa
š-m-s	ša.mis	CV.CVC	CaCiC	šmee.sa	CCVV.CV	CCeeCa
z-j-n	zeen	CVVC	CeeC	zwee.na	CCVV.CV	CCeeCa
m-h-r	muh.ra	CVC.CV	CuCCa	mhee.ra	CCVV.CV	CCeeCa
f-l-l	fi.lifl.la	CV.CVC.CV	CiCiCCa	fleef.la	CCVVC.CV	CCeeCCa
m-š-š	mi.šim.ša	CV.CVC.CV	Ci.CiC.Ca	mšeem.ša	CCVVC.CV	CCeeCCa
s-m-m	sim.si.ma	CVC.CV.CV	CiCCiCa	smees.ma	CCVVC.CV	CCeeCCa

x-l-d	xaa.lid	CVV.CVC	CaaCiC	xwee.lid	CCVV.CVC	CCeeCiC
t-ʤ-r	taa. ʤir	CVV.CVC	CaaCiC	twee. ʤir	CCVV.CVC	CCeeCiC
ẓ-b-ṭ	ẓaa.biṭ	CVV.CVC	CaaCiC	ẓwee.biṭ	CCVV.CVC	CCeeCiC
š-ʕ-r	šaa.ʕir	CVV.CVC	CaaCiC	šwee.ʕir	CCVV.CVC	CCeeCiC
ʤ-ʕ-d	ʤaa.ʕid	CVV.CVC	CaaCiC	ʤwee.ʕid	CCVV.CVC	CCeeCiC
ṭ-r-b	muṭ.rib	CVC.CVC	CuCCiC	mṭee.rib	CCVV.CVC	CCeeCiC
ṯ-ʕ-l-b	ṯaʕ.lab	CVC.CVC	CaCCaC	ṯʕee.lib	CCVV.CVC	CCeeCiC
s-n-n	snaan	CCVVC	CCaaC	snee.naat	CCVV.CVVC	CCeeCaaC
ʕ-j-n	ʕjuun	CCVVC	CCuuC	ʕwee.naat	CCVV.CVVC	CCeeCaaC
w-l-d	wlaad	CCVVC	CCaaC	wlee.daat	CCVV.CVVC	CCeeCaaC
g-r-š	gruuš	CCVVC	CCuuC	gree.šaat	CCVV.CVVC	CCeeCaaC
ġ-r-ẓ	ġraaẓ	CCVVC	CCaaC	ġree.ẓaat	CCVV.CVVC	CCeeCaaC
loan w.	ta.la.foon	CV.CV.CVVC	CaCaCooC	tlee.fiin	CCVV.CVVC	CCeeCiiC
loan w.	ban.ṭa.loon	CVC.CV.CVVC	CaCCaCooC	bnee.ṭiil	CCVV.CVVC	CCeeCiiC
ʕ-m-m	ʕam.ma	CVC.CV	CaCCa	ʕmaj.ma	CCVC.CV	CCaCCa
ḥ-n-n	ḥa.nuu.na	CV.CVV.CV	CaCuuCa	ḥnaj.na	CCVC.CV	CCaCCa
loan w.	bi.kam	CV.CVC	CiCaC	bkaj.ma	CCVC.CV	CCaCCa
b-n-j	bi.nit	CV.CVC	CiCiC	bnaj.ja	CCVC.CV	CCaCCa
ṣ-b-j	ṣa.bi	CV.CV	CaCi	ṣbajj	CCVG	CCaG
b-n-j	ʔi.bin	CV.CVC	CiCiC	bnajj	CCVG	CCaG
š-j-ʔ	šajj	CVG	CaG	šwajj	CCVG	CCaG
g-l-b	ga.lib	CV.CVC	CaCiC	gleeb	CCVVC	CCeeC
š-w-g	šoog	CVVC	CooC	šweeg	CCVVC	CCeeC
ʤ-w-d	ʤaj.daat	CVC.CVVC	CaCCaaC	ʤwaj.daat	CCVC.CVVC	CCaCCaaC
s-n-n	snaan	CCVVC	CCaaC	snaj.naat	CCVC.CVVC	CCaCCaaC
ʔ-x-a	ʔuxt~ ʔaxt	CVCC	Cu/aCC	xaj.ja	CVC.CV	CaCCa

B. Urban Dialect Data

Root	**Non-diminutive**	**Syllable shape**	**Pattern**	**Diminutive**	**Syllable shape**	**Pattern**
n-ṣ-ḥ	naa.ṣiḥ	CVV.CVC	CaaCiC	naṣ.ṣuuḥ	CVC.CVVC	CaCCuuC
ʕ-f-n	mʕaf.fin	CCVC.CVC	CCaCCiC	ʕaf.fuun	CVC.CVVC	CaCCuuC
k-r-š	karš	CVCC	CaCC	kar.ruuš	CVC.CVVC	CaCCuuC
ʔ-r-n-b	ʔar.nab	CVC.CVC	CaCCaC	ʔar.nuub	CVC.CVVC	CaCCuuC
h-b-b	ḥa.biib	CV.CVVC	CaCiiC	ḥab.buub	CVC.CVVC	CaCCuuC
k-l-b	kalb	CVCC	CaCC	kal.buub	CVC.CVVC	CaCCuuC
ḍ-f-d-ʕ	ḍif.daʕ	CVC.CVC	CiCCaC	ḍaf.duuʕ	CVC.CVVC	CaCCuuC
ʕ-s-l	ʕa.sal	CV.CVC	CaCaC	ʕas.suul	CVC.CVVC	CaCCuuC
š-t-r	šaat.ra	CVVC.CV	CaaCCa	šat.tuu.ra	CVC.CVV.CV	CaCCuuCa
ḥ-z-r	ḥuz.zee.ra	CVC.CVV.CV	CuCCeeCa	ḥaz.zuu.ra	CVC.CVV.CV	CaCCuuCa
t-m-r	ta.maa.ra	CV.CVV.CV	CaCaaCa	tam.muu.ra	CVC.CVV.CV	CaCCuuCa
n-ṣ-ḥ	naaṣ.ḥa	CVVC.CV	CaaCCa	naṣ.ṣuu.ḥa	CVC.CVV.CV	CaCCuuCa
b-ṭ-ṭ	baṭ.ṭa	CVC.CV	CaCCa	baṭ.buu.ṭa	CVC.CVV.CV	CaCCuuCa
s-m-r	sam.ra	CVC.CV	CaCCa	sam.muu.ra	CVC.CVV.CV	CaCCuuCa
t-m-r	tam.ra	CVC.CV	CaCCa	tam.muu.ra	CVC.CVV.CV	CaCCuuCa
ṣ-b-r	ṣab.ra	CVC.CV	CaCCa	ṣab.buu.ra	CVC.CVV.CV	CaCCuuCa
n-t-f	nit.fe	CVC.CV	CiCCe	nat.tuu.fe	CVC.CVV.CV	CaCCuuCe
b-n-j	bi.nit	CV.CVC	CiCiC	ban.nuu.te	CVC.CVV.CV	CaCCuuCe
ʤ-d-l	ʤa.dii.le	CV.CVV.CV	CaCiiCe	ʤad.duu.le	CVC.CVV.CV	CaCCuuCe
š-m-s	šams	CVCC	CaCC	šam.muu.se	CVC.CVV.CV	CaCCuuCe
f-t-n	faa.tin	CVV.CVC	CaaCiC	fat.tuu.ne	CVC.CVV.CV	CaCCuuCe
ḥ-n-n	ḥa.niin	CV.CVVC	CaCiiC	ḥan.nuu.ne	CVC.CVV.CV	CaCCuuCe
ʔ-m-l	ʔa.mal	CV.CVC	CaCaC	ʔam.muu.le	CVC.CVV.CV	CaCCuuCe
ʔ-k-l	ʔak.le	CVC.CV	CaCCe	ʔak.kuu.le	CVC.CVV.CV	CaCCuuCe
ḥ-m-d	ʔaḥ.mad	CVC.CVC	CaCCaC	ḥam.muu.de	CVC.CVV.CV	CaCCuuCe
d-b-b	dub.be	CVC.CV	CuCCe	dab.duu.be	CVC.CVV.CV	CaCCuuCe

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Bassil Mashaqba earned his undergraduate studies in English Language & Literature at Yarmouk University, and his postgraduate studies in Linguistics at University of Salford Manchester in the UK. In 2015, he took up his current position at the Hashemite University. Dr. Mashaqba is currently an associate professor of linguistics. His research interests lie in general linguistic theory with particular focus on theoretical phonological and morphological approaches to language varieties. Recently, he developed an interest in acoustic and instrumental analysis of [child] speech, dialectology and lexicography. Between 2015 and 2022, he has published articles that fall within this scope.

Anas al Huneety earned his BA and MA degrees from Yarmouk University in Jordan with a very good average. In 2015, he completed his PhD on the phonology and morphology of Wadi Mousa Arabic. In 2015, he joined the department of English Language and Literature at the Hashemite University in Jordan as an assistant Professor of linguistics. Since that time, he has published around 20 peer-reviewed papers in reputed international journals and conferences. He has worked as a reviewer for some international journals, such as *Dirasat*: *Human and Social Sciences* and Jordan Journal of Modern Languages.

Mohammed Nour Abu Guba has a PhD in Linguistics from the UK. He is currently a faculty member at the Language Institute at Sharjah University in the UAE. His main interests are second language pronunciation, phonological theory, and phonetics.

Zainab Zeidan earned her BA in English Language and Literature and MA in Linguistics in from The Hashemite University in Jordan with an excellent average. She recently developed an interest in the Arabic phonology-morphology interface.