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Analyzing the Morphophonological Structure of Broken Plurals in Najdi Arabic: A Descriptive and Analytical Approach

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ABSTRACT

This study explores the patterns of broken plurals in Najdi Arabic (NA) and analyzes their morphophonological characteristics. Data were collected from native NA speakers, and the accuracy of broken plural forms was judged by three additional native speakers. The analysis is framed through the theory of prosodic morphology, which posits that morphological templates are shaped by prosodic structures such as the syllable and foot. The study identifies three primary broken plural patterns in NA: trisyllabic, disyllabic, and monosyllabic. The trisyllabic pattern is formed through melodic overwriting, a process in which vowels in the first two syllables are replaced, and the third syllable adds the high front vowel /i:/. The disyllabic patterns are formed via techniques such as vowel substitution, infixing, consonant deletion, and melodic overwriting; four main forms of this pattern have been identified (CVV.CVVC, CV.CVC, CVC.CVVC, and CV.CCV). In monosyllabic patterns, consonants remain unchanged. This study provides insights into the structural patterns and morphophonological processes of the broken plural formation in NA. Although the study is limited by its exclusive focus on broken plurals and its small sample of native NA speakers, it nonetheless offers practical implications in fields such as computational linguistics, in which natural language processing tools can benefit from this enhanced understanding of broken plural formation. Future research is recommended to extend the study of broken and sound plural patterns across Arabic dialects and consider how to integrate this knowledge into computational representations of Arabic dialectal morphology and our understanding of developmental language acquisition.

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Keywords: Najdi Arabic; Morphophonology; Broken Plural; Sound Plural

1. Introduction

Arabic, a Semitic language, utilizes broken plurals as a distinctive form of pluralization. Unlike regular plurals, which involve adding suffixes such as "-s" or "-es" in English, broken plurals are formed by altering the internal structure of the root word, often changing vowels and, occasionally, consonants[1, 2]. Arabic is characterized by unique morphological and phonological features, governed by specific rules and structures. A prominent aspect of Arabic, shared with some other Semitic languages (e.g., Hebrew), is its use of root-and-pattern morphology. This system relies on a fixed consonantal root, typically consisting of two or more consonants, into which vowels are systematically inserted to create various word forms[3–5]. For instance, the consonantal roots *ktb* and *nfs*, which form the singular words *kita:b* 'book' and *nafs* 'soul', are transformed into the plural *kutub* 'books' and *nufuus* 'souls' through internal vowel modification. This morphological process varies across Arabic dialects, each following unique rules for these internal transformations. In contrast to the relatively straightforward suffix-based pluralization in many languages, broken plurals involve complex structural changes to the noun and require familiarity with specific patterns associated with different noun classes. Notably, these broken plural patterns are numerous and often lack systematization, as many are learned aurally[1, 6].

Arad explained that roots act as minimally specified lexical and phonological cores, capable of being realized in different forms[3]. Patterns, in turn, provide the structural framework that shapes roots into specific linguistic categories, such as nouns, adjectives, or verbs. According to the work by Ryding, Arabic roots and patterns have distinct roles but are bound morphemes and cannot function independently[7]. The root serves as a stable base, regardless of vowel quality or length, and can have two consonants (e.g., /t-m/ 'done'), three consonants (e.g., /r-s-m/ 'draw'), four consonants (e.g., /t-r-dʒ-m/ 'translate'), or five consonants (e.g., /b-r-n-m-dʒ/ 'program'). In contrast, the pattern, referred to as wazn in traditional Arabic grammar, is a discontinuous morpheme that incorporates slots for root consonants and vowels. As McCarthy and Prince explained, patterns define the arrangement of consonants and vowels, forming a template that shapes the root into specific words[8]. For instance, the root /r-s-m/ 'draw' can combine with various patterns to create related words within the same semantic domain, such as *drawing*. **Figure 1** illustrates how the root and pattern are associated.

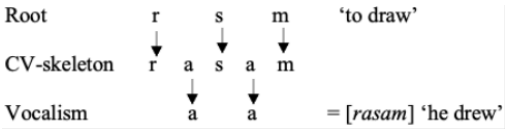

Figure 1. Root and Pattern Association.

As mentioned above, Arabic broken plurals are based on root-and-pattern morphology, with two main pluralization methods: the sound plural, which adds suffixes depending on case (e.g., nominative: laʕibuun, genitive/accusative: laʕibiin 'players'), and the broken plural, which modifies the root pattern. For example, the noun tˤaalib 'student' becomes tˤullaab 'students' by applying the same root (tˤ-l-b) with a different pattern.

Arabic dialects, although derived from Modern Standard Arabic (MSA), display distinct linguistic features, particularly in the formation of broken plurals[9–13]. Few studies, however, have investigated the broken plural among Arabic varieties[14, 15]. For example, in Urban Jordanian Arabic (UJA), the singular noun *bɪs.se* 'cat' becomes *bɪ.sas* 'cats' by altering the vowel in the second syllable rather than the first. Similarly, in Moroccan Arabic, the singular noun *muʒa* 'wave' transforms into *mmwaʒ* 'waves' by geminating the first consonant. The diversity of these broken plural patterns among Arabic dialects, along with the rarity of the phenomenon globally, its presence in Semitic languages, and its resemblance to English irregular plurals, highlight the significance of this study[16]. This study, therefore, focuses on Najdi Arabic (NA), specifically the variety spoken in the Qassim region, which is classified as Mixed Northern-Central NA[17]. This study aims to describe and analyze the broken plural patterns in NA by exploring their morphophonological foundations through the following questions:

- What specific patterns characterize broken plurals in NA?

- How do morphophonological processes shape the formation of broken plurals in NA?

This paper is organized into six sections, starting with an introduction that provides background information, research questions, and objectives. Section two outlines the theoretical framework. Section three reviews prior studies on broken plurals analyzing different morphophonological patterns. Section four describes the methodology, including data collection and analysis. Section five presents the analysis, which classifies broken plurals into trisyllabic, disyllabic, and monosyllabic patterns while exploring their morphophonological structures. Finally, section six summarizes the key findings, discusses their implications, and suggests areas for future research.

2. Theoretical Framework

Arabic morphology can be categorized into two primary systems: concatenative and nonconcatenative [18]. Concatenative morphology relies on prefixation or suffixation, where morphemes are added linearly to either side of the base. For instance, Arabic verbal patterns such as /tɑfɑʕʕɑl/ and /tɑfɑːʕɑl/, seen in /tɑwɑqqɑʕ/ 'he expected' and /tɑqɑːtɑl/ 'he fought', are formed by prefixing ta- to the patterns /fɑʕʕal/ and /fɑːʕɑl/ [19]. In contrast, suffixation is also employed and is governed by grammatical aspects such as case, person, number, mood, and gender. For instance, the sound plural noun muslimuun 'Muslims' uses the suffix -uun to denote the nominative case, while muslimiin 'Muslims' takes the suffix -iin, indicating both the accusative and genitive cases.

In contrast, nonconcatenative morphology, characteristic of Semitic languages, modifies the internal structure of stems through processes such as infixation, subtraction, melodic overwriting, or ablaut [18, 20, 21]. Infixation is a nonconcatenative morphological process where a consonant or vowel is inserted into the base. For instance, in many Arabic diminutive forms, the phoneme -y- is infixed, as seen in ʃaʕir 'poet' becoming ʃwayʕir 'a small poet'. Subtraction involves removing specific vowels or consonants, such as in madinah 'city', which becomes mudun 'cities'. Melodic overwriting, a morphophonological process described by Bat-El, replaces the base vowels with a different vocalic pattern [22]. This process functions similarly to epenthesis, adding a vowel to one syllable while replacing it in another. For example, the singular word ʔasad 'lion' undergoes vowel changes to form the broken plural ʔusuud 'lions', highlighting the distinct complexity of this system compared to the straightforward external modifications in concatenative forms of Indo-European languages.

Ratcliffe expanded on McCarthy's work, proposing a two-level model for Arabic morphology [8, 23]. Level I deals with internal morphological changes, such as root vocalism adjustments, exemplified in broken plurals such as tˁullaab 'students' from tˁaalib 'student'. In contrast, Level II encompasses external morphology, including sound plurals formed through suffixation, such as mudarrisuun 'teachers' from mudarris 'teacher'. Ratcliffe emphasized that broken and sound plurals differ not merely in affixation but in their morphological levels—broken plurals operate within the stem boundary (Level I), while sound plurals function outside it (Level II). Level I inputs can consist of roots, vowel patterns, certain consonantal affixes, and prosodic templates (CV skeletons). Ratcliffe illustrated this with the example yastanfiʕu 'he puts to use' to explain this level (**Figure 2**).

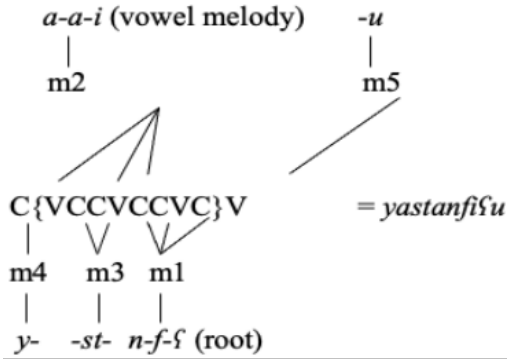

Figure 2. Morphological Structure of Arabic Verb *yastanfiʕu* 'he puts to use'.

Based on this structure, the initial consonant-vowel (CV) sequence in this template signifies the verb's imperfect aspect. The specific values assigned to the V positions within the template depend on the verb form. The first consonant is influenced by the person, gender, and number of the subject, while the verbal mood (e.g., indicative, subjunctive, or jussive) determines the final vowel in the structure. In addition, Level II applies the same autosegmental principles as Level I, but instead of roots, it uses stems as inputs. At this stage, inputs can include stems, vowel patterns, consonantal affixes, or the CV skeleton. Ratcliffe illustrated this with the example nisbatun 'relationship' (**Figure 3**) [23].

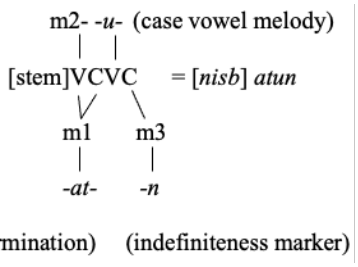

Figure 3. Morphological Structure of Arabic Noun *nisbatun* 'relationship'.

Ratcliffe utilized Arabic plural formation to demonstrate the application of his morphological categorization [23]. In his framework, broken plurals are categorized under Level I, whereas sound plurals are classified as Level II. The example he provided represents a sound plural, which falls under Level II (**Figure 4**).

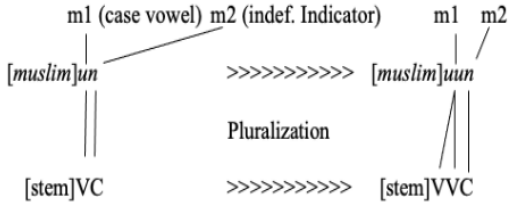

Figure 4. Example of Sound Plural Formation in Arabic.

Ratcliffe did not include a graphical representation of the broken plural in his analysis [23]. However, he concluded that the key difference between sound and broken plural morphology is not that one involves affixation and the other does not, but rather that sound plurals operate at Level II outside the stem boundary, whereas broken plurals function at Level I within the stem boundary. This framework further illustrates the intricacy of Arabic pluralization processes, which blend internal and external morphological strategies. Nonconcatenative methods, especially in broken plurals, reflect internal alterations to the base structure, which distinguish them from the additive suffixation seen in sound plurals. The study of these systems enriches our understanding of Arabic's linguistic complexity and the underlying principles governing its morphology.

3. Literature Review

The broken plural is a defining feature of Arabic morphology, showcasing its unique nonconcatenative structure. Although the phenomenon is extensively documented in MSA, its variations across Arabic dialects reveal fascinating linguistic diversity. The following subsections explore the characteristics and formation patterns of broken plurals in both MSA and various Arabic dialects. By examining these systems, we gain deeper insight into the morphological and phonological intricacies that distinguish MSA from its dialectal counterparts.

3.1. Broken Plural in MSA

Several linguists have agreed that the broken plural signifies quantities greater than two, regardless of gender or whether the referents are human or nonhuman [11, 12, 24]. This plural type involves internal stem changes that result in irregular morphological forms [23]. As Salem and Najem Aldein noted, Ibn Alssaraj described it as "broken" due to the significant structural alteration of the singular noun, as if it were broken and reconstructed [11, 25]. Broken plurals are categorized into two types: the plural of paucity, referring to quantities of three to ten [11, 26], and the plural of multiplicity, whose range is debated. Salem and Najem Aldein suggested that it spans from three to infinity [11], whereas Ratcliffe limited it to quantities exceeding ten [10, 11]. The multiplicity broken plural kubar 'the largest', derived from the singular kubra 'the largest', exemplifies the second type of broken plural. Given the inconsistencies in Arabic broken plural forms, linguists have identified various patterns to determine the singular forms most commonly associated with specific plural patterns. For further details on the plural of paucity, refer to **Appendix A**.

Ratcliffe categorized seven types of singular-plural patterns based on medieval grammarians' classifications [10]. He confirmed, supported by statistical studies, that these patterns and their allomorphs account for over 90% of plurals [27, 28]. For instance, the CaCuuC singular pattern rasuul 'messenger' transforms into the CuCuC plural rusul 'messengers'. **Appendix B** provides an overview of these plural patterns. The appendices highlight the significant internal changes between singular and broken plural forms, which warrant further investigation. Sharif and Mohammed identified five specific internal modifications that characterize these transformations as in **Table 1** [12, 29].

In 1979, McCarthy examined how broken plurals form in MSA through a CV structure framework [30]. His analysis classified nouns by their phonological structure, specifically distinguishing between quadriliteral (four-consonant) and

Table 1. Internal Modifications of Broken Plurals.

Singular Noun	Broken Plural	Internal Change
1. *ʔasad* 'lion'	*ʔusud* 'lion'	Vowel quality of the singular noun is changed.
2. *tuhmah* 'accusation'	*tuham* 'accusations'	The plural is formed by shortening the singular noun through sound deletion.
3. *radʒul* 'man'	*ridʒaal* 'men'	The plural is lengthened by adding sounds and modifying the singular noun's vowels.
4. *sˁenw* 'palm'	*sˁenwan* 'palms'	The plural form is lengthened by adding sounds to the singular form.
5. *madinah* 'city'	*mudun* 'cities'	The plural is altered by modifying vowels and shortening the form.

triliteral (three-consonant) structures, such as CVVCV(V)C, CVCVVC, CVC(V)C, CVVCVC, and CVCVVC patterns. He introduced a redundancy rule linking the prosodic templates of singular and plural forms, illustrating that singular nouns with a CVCCV(V)C pattern shift to a CVCVVCV(V)C structure in their plural form. This transformation was demonstrated with examples such as Sultaan 'sultan' becoming Salaatiin 'sultans' and Jundab 'locust' becoming Janaadib 'locusts'. The rule also suggests that when the last syllable's vowel is long in the singular, it remains long in the plural.

Later, Sharif refined this analysis by identifying two phonological conditions governing broken plural formation[12]. First, he introduced the concept of a plural vocalic melody, where /i/ attaches to the last syllable and /a/ to the others. Second, he highlighted the role of syllable structure, emphasizing that Arabic syllables can take one of three forms: simple (CV), long (CVV), or closed (CVC). These phonological constraints shape the transformation of singular nouns into broken plurals. McCarthy's work contributed significantly to understanding Arabic morphology by establishing a systematic relationship between singular and plural noun structures based on prosodic rules. For quadriliteral singular nouns and their plural forms, syllabification follows specific patterns. For example:

- The singular form *Jundab* 'locust' [CVCCVC] changes to the plural form *Janaadib* 'locusts' [CVCVVCVC].
- The singular form *Sultan* 'sultan' [CVCCVVC] transforms into *Salaatiin* 'sultans' [CVCVVCVVC].

Since the final consonant in some stems does not belong to a syllable, McCarthy proposed a rule inserting a long vowel (VV) after the first syllable to create a valid plural form. The process follows the template: *Plural Template VV-Insertion*: ∅ → VV / [σ] / Plural. This transformation ensures the plural form maintains prosodic structure while accommodating extra consonants. In cases where nouns contain five or six consonants, only the first four are retained in the plural form, with extrametrical consonants being omitted, for instance:

- *ʕankabuut* 'spider' changes to the plural form *ʕanaakib* 'spiders'.
- *ʕandaliib* 'nightingale' changes to the plural form *ʕanaadil* 'nightingales'.

This structural constraint ensures that the plural template remains within the four-consonant limit imposed by Arabic's prosodic rules.

Triliteral and quadriliteral nouns exhibit notable similarities in their prosodic templates, melodic structures, and association rules. However, a key difference lies in the plural prosodic template, which includes an additional consonant slot that triliteral singular nouns do not naturally fill. To address this gap, a new rule is introduced assigning the consonant /w/ to occupy the extra slot in the plural form, as demonstrated in the following examples:

- *dʒaamuus* 'buffalo' changes to the plural form *dʒawaamiis* 'buffalos'.
- *Xaatam* 'signet' changes to the plural form *xawaatim* 'signets'.

Although most triliteral nouns use /w/ insertion to fill an additional consonant slot in their plural forms, a small subset instead relies on gemination of the medial radical, as in *diinaar* 'dinar' → *danaaniir* 'dinars'.

Moreover, most feminine nouns, whether marked with the feminine suffix -at or considered grammatically feminine, along with some masculine nouns, follow a different pluralization pattern. Examples include:

- *Jaziirat* 'island' changes to the plural form jazaaʔir 'islands'.
- *ʕajuuz* 'old woman' changes to the plural form *ʕajaaʔiz* 'old women'.
- *dˁamiir* 'pronoun' changes to the plural form *dˁamaaʔir* 'pronouns'.

In these cases, unlike other pluralization patterns, there is no /w/ insertion. Instead, the glottal stop /ʔ/ replaces /w/ in the penultimate consonantal slot when it follows a long vowel

and precedes a short vowel. McCarthy presented various CVC(V)C singular noun patterns and their corresponding plural forms[30].

As illustrated in **Table 2**, the majority of these nouns follow either the CVCVVC or CVCCVVC broken plural patterns. When the plural form contains the vowel /a/ in the first syllable, the prefix /ʔ/ must be added at the beginning, as given in example (d). Additionally, broken plurals display three distinct vowel patterns: u, a, and i-a. Notably, the i-a melody is exclusive to trisyllabic plural forms and is not applicable to disyllabic plurals. These patterns highlight the systematic nature of vowel distribution in Arabic broken pluralization.

Table 2. CVC(V)C Singular Nouns.

Pattern	Singular Form	Plural Form
a. CaCC	*nafs* 'soul'	*nufuus* 'souls'
b. CuCC	*rumħ* 'spear'	*rimaaħ* 'spear'
c. CiCC	*qidħ* 'arrow'	*qidaaħ* 'arrows'
d. CVCVC	*qadam* 'foot'	*ʔaqdaam* 'feet'

Another type of broken plural identified by McCarthy applies to CVVCVC nouns that function as the active participle of the first binyan[30]. Examples include Saadʒid 'prostrating oneself' changing to the plural form sudʒdʒad 'prostrating themselves' and dʒaahil 'ignorant' changing to the plural form dʒuhhaal 'ignorants'. These plurals follow vocalic melodies *u* and *a*, with specific phonological modifications. In this pluralization process, one vowel from the singular form is omitted and replaced by gemination of the medial consonant. Additionally, in some cases, the vowel in the second syllable of the plural form is lengthened, as seen in dʒuhhaal. Furthermore, the vowel ***a*** in the first syllable is deleted, whereas the second consonant undergoes gemination to maintain the prosodic structure.

The type of broken plural represented by CVCVVC nouns was examined later by McCarthy[30]. In this category, human and nonhuman referents follow different pluralization patterns, as demonstrated in **Table 3**.

Nonhuman nouns take the *-at* suffix in their plural forms, whereas human nouns adopt the *-aaʔ* suffix. Additionally, human and nonhuman referents are differentiated by distinct vowel melodies, with human nouns following [u, a] and nonhuman nouns following [a, i]. McCarthy also formulated two additional rules for this broken plural type. First, the final vowel of the singular form is shortened before the feminine suffix is attached. Second, the /CaCVC/ structure undergoes metathesis, resulting in /ʔaCCVC/ through the insertion of a glottal stop, which ensures the correct plural form for nonhuman nouns.

Table 3. Human vs. Nonhuman Pluralization in CVCVVC Nouns.

Human	
Singular	**Broken Plural**
Waziir 'vizier'	wuzaraaʔ 'viziers'
baχiil 'greedy person'	*buχalaaʔ* 'greedy people'
Nonhuman	
ʕamuud 'pillar'	*ʔaʕmidat* 'pillars'

Following this groundwork, McCarthy and Prince introduced a prosodic morphology theory based on templates of segmental slots, which include sequences of consonants and vowels[31]. The core idea of this theory is that morphological units and prosodic elements—such as the mora (a unit determining syllable weight), syllable (a basic speech unit), foot (a rhythmic structure typically containing two syllables), and prosodic word (a lexical unit)—serve as the foundation for template formation, rather than traditional linguistic structures. They utilized a metrical (moraic) framework to explain the process of broken plural formation. Their model suggests that broken plural patterns can be systematically predicted from singular forms with three or more moras by following three key steps:

1) The first two moras of the singular are structured into an iambic template (Fi).
2) The singular vowel melody is replaced by the plural vowel melody, which aligns with the plural template's moraic slots.
3) The remaining part of the singular is reintegrated into the iambic foot within the plural template. This framework provides a structured, predictive model for broken plural formation.

To form the broken plural noun janaadib 'locusts' from its singular form jundub 'locust', the first two moras of the singular [jun] are aligned with an iambic template [janaa] (μ μμ), resulting in the structure (jμnμμ), as illustrated in **Figure 5**.

Then, the templatic melody /a_i/ is associated by spreading the /a/ to the moraic slots of the iambic template, which causes the delinking of the stem vowel, thereby pro-

ducing (*janaa*), as seen in **Figure 6**.

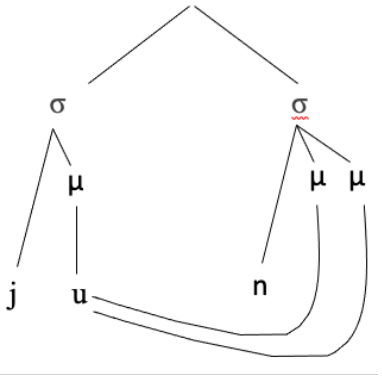

Figure 5. Broken Plural Formation (*jundub* 'locust' to *janaadib* 'locusts'): Mora Alignment with Iambic Template.

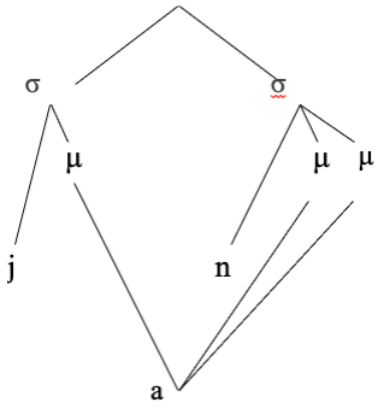

Figure 6. Broken Plural Formation (*jundub* 'locust' to *janaadib* 'locusts'): Movement of /a/ from Templatic Melody /a_i/ to Moraic Slots.

The residue of the singular noun (*-dub*) is attached as a suffix to the iamb and is subsequently subject to melodic overwriting by /i/, which substitutes the stem vowel /u/, resulting in *dib*. The output of this process is *janaadib,* as represented in **Figure 7**.

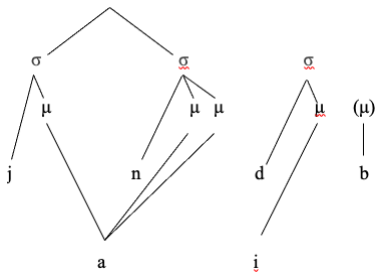

Figure 7. Broken Plural Formation (*jundub* 'locust' to *janaadib* 'locusts'): Suffixation to the Iamb and Melodic Overwriting.

For many years, research has mainly focused on the formation of broken plurals in MSA. However, as previously mentioned, Arabic dialects vary significantly, each following its own set of pluralization rules. Therefore, it is essential to explore these dialects and the linguistic approaches used to analyze broken plural formation across different Arabic varieties.

3.2. Previous Studies on the Broken Plural in Arabic Dialects

Due to the variation among Arabic dialects, each dialect follows distinct morphological and phonological processes in forming broken plurals, leading to diverse pluralization patterns. Three significant studies have examined broken plural formation in different Arabic dialects: Moroccan Arabic [15], Urban Jordanian Arabic (UJA) [14], and the Muscat dialect of Omani Arabic [32].

Lahrouchi and Ridouane conducted a morphosyntactic analysis of broken plural patterns in Moroccan Arabic [15]. However, since syntactic aspects of broken pluralization fall outside the scope of this study, the focus will be limited to morphological processes. They illustrated examples of broken plurals in Moroccan Arabic (**Table 4**).

Table 4. The Broken Plural in Moroccan Arabic.

No.	Singular Form	Broken Plural	Translation
1	*muʒa*	*mmwaʒ*	'waves'
2	*ʕdˤəm*	*ʕdˤam*	'bones'
3	*gamila*	*gwaml*	'bowls'
4	*blasˤa*	*blajəsˤ*	'places'

These examples highlight the morphological processes involved in forming broken plurals (**Table 4**). In example 1, the plural is created through gemination, while example 2 involves a change in vowel quality. Example 3 forms the plural by inserting the *-wa-* infix, whereas example 4 uses *-jə-* infixation.

Unlike Moroccan Arabic, UJA shares some broken plural patterns with MSA, while others differ [14]. Ben-Meir analyzed commonly used broken plural structures in UJA, identifying the trisyllabic pattern Ca.Caa.CiC as a fundamental form [14]. This pattern maintains a consistent vowel melody, with low vowels in the first two syllables and a high front vowel in the final syllable. Variations of this structure include Ca.Caa.CiC (ʕa.ˈnaa.kɪb, 'spiders'), Ca.Ca.CiiC (ʕa.wa.ˈmiid, 'columns'), and Ca.Caa.Ci

(ʔa.ˈɣaa.ni, 'songs'). For example, the singular noun ʒun.dub ('locust') takes the broken plural ʒa.naa.dib ('locusts'), maintaining a stable vowel melody with /a/ in the first two syllables and /i/ in the final syllable. Moreover, singular nouns with more than three root consonants are more likely to take this structure Ca.Caa.CiC, as shown in **Table 5**.

Table 5. Singular Nouns with More than Three Root Consonants and Broken Plural Patterns in UJA.

No.	Singular Form	Broken Plural	Translation
1	ʕan.ka.ˈbut	ʕa.ˈnaa.kɪb	'spider'
2	ˈmas.d͡ʒad	ma.ˈsaa.d͡ʒɪd	'mosque'
3	ʔoɣ.ni.e	ʔa.ˈɣaa.ni	'song'
4	ˈsan.dal	saˈnaa.dɪl	'sandal'

Ben-Meir observed that these instances do not display any distinctive or unifying feature that would explain the variation within the singular-plural group [14]. In contrast, singular nouns with a long vowel in the initial syllable insert /w/ into their plural forms, which serves as a second consonant in the iambic template. Consequently, the plural takes the form Ca.waa.CiC, as illustrated by the examples: *ˈħaa.mɪl* 'pregnant woman' and *ħa.ˈwaa.mɪl* 'pregnant women'.

Notably, the examples *ʕa.ˈmuud* 'column' and *ʒa.ˈmuus* 'buffalo' exemplify the Ca.Ca.CiiC plural pattern, as they transform into *ʕa.wa.ˈmiid* and *ʒa.wa.ˈmiis*, respectively, while preserving the length of the second vowel from the singular form [14]. Similarly, singular nouns with a geminated second consonant adopt this plural pattern once the consonants are redistributed between the second and third syllables. This is evident in examples such as *ten.ˈnuu.ɾa* 'skirt' becoming *te.na.ˈniiɾ* and *ʃub.ˈbææk* 'window' converting to *ʃa.ba.ˈbiik*. Collectively, these cases underscore a systematic pluralization mechanism in Arabic that maintains specific vowel qualities of the singular form.

In UJA, the second most frequently employed broken plural pattern is represented by the monosyllabic template CCVVC. This pattern applies to singular nouns conforming to the templates CVCC, CVVC, and CV.CVC. The examples in **Table 6** illustrate this pattern in detail.

As shown in **Table 6**, the plural vowel quality is either a long low vowel [a] or a long vowel that differs in frontness or height from the singular vowel. Singular nouns with two consonants insert a glide into the plural form, determined by the conditioned long vowel, as shown in No. 3. Additionally, consonants that signify gemination are split in the plural form to preserve paradigm consistency, as demonstrated in No. 4.

Table 6. Second Most Frequent Broken Plural Pattern (CCVVC) in (UJA).

No.	Singular Form	Broken Plural	Translation
1	*tæ.xɪt*	txuut	'bed'
2	*gelb*	gluub	'heart'
3	*diik*	djuuk	'rooster'
4	*timm*	tmaam	'mouth'

According to Ben-Meir, the third plural pattern is represented by the template CV.ˈCVVC, and it applies to the same categories of singular nouns as the CCVVC plurals [14]. Typically, these plural forms commence with either the glottal stop /ʔ/, such as *wa.lad* 'boy' becoming *ʔu.ˈlaad* 'boys', or the pharyngeal fricative /ʕ/, such as *ˈʕa.bɪd* 'slave' becoming *ˈʕa.bɪɪd* 'slaves'. Notably, the formation of these patterns is not governed solely by phonological rules, as the singular nouns involved may also occur in other pluralization groups.

In UJA, there is a plural template beginning with the initial sequence [ʔV-] that does not occur in singular forms: ʔaC.CaaC (e.g., *ruuħ* 'soul'→ *ʔar.ˈwaaħ* 'souls'). Notably, the ʔaC.CaaC pattern, considered the fourth plural pattern, shares the same singular form as the CCVVC pattern. This template applies to singular nouns with biliteral forms that maintain a consistent vowel melody. For example, the singular *ˈruuħ* ('soul') becomes *ʔar.ˈwaaħ* in the plural, and *ˈħææl* 'condition' transforms into *ʔaħ.ˈwææl*.

The fifth plural pattern, ʔVC.Ci.Ca, maintains a stable vowel structure while also preserving the consonants from the singular form in its plural counterpart. Additionally, this pattern is predominantly linked to masculine nouns, which typically share similar semantic traits. Examples illustrating this pattern includeˈɣe.bi 'stupid' changing to ʔeɣ.ˈbi.ja 'stupids' and *ɣe.ni* 'rich' transforming into *ˈʔeɣ.ni.ja.*

Al-Aghbari examined the formation of the broken plural in the Muscat dialect of Omani Arabic [32]. She classified the broken plural patterns into four distinct types: the typical (canonical) broken plural, the broken plural with a default glide, the plural with medial geminates, and the plural with even iambs. A summary of the first category is provided in **Table 7**.

One major observation from **Table 7** is that singular and broken plural forms maintain consistent syllable weight and length. A glide is often inserted into the broken plural following a long vowel in the singular. Specifically, when

Table 7. Typical (Canonical) Broken Plurals in the Muscat Dialect.

No.	Singular Forms	Plural Forms	Translation
1	(CVC).CV.C (daf).ta.r	(CV.CV:).CV.C (da.fa:).ta.r	'notebook'
2	(CVC).CV.C-ah (mal).ʕa.q-ah	(CV.CV:).CV.C (ma.la:)ʕa.q	'spoon'
3	(CVC).(CV:).C (qan).(di:).l	(CV.CV:).(CV:).C (qa.na:).(di:).l	'lantern'
4	(CVC).CV (mak).si	(CV.CV:).CV (ma.ka:).si	'dress'
5	(CV.CV:).C-ah (ma.ki:).n-ah	(CV.CV:).jV.C (ma.ka:)jin	'machine'
6	(CV:).CV.C (ʃa:).ðа.r	(CV.wV:).CV.C (ʃa.wa:).ðа.r	'bed blanket'

the second syllable of the singular is long /i/, the glide /j/ is added to fill the onset of the third syllable. This phenomenon is evident in words such as ma.ki:.n-ah 'machine' and *ħa.di:.q-ah* 'park', which pluralize as ma.ka:.jin and *ħa.da:.ja.q*, respectively.

Another pattern concerns geminated consonants, which are preserved in broken plurals. However, their final form is constrained by syllabification rules. The first half of the geminate aligns with the first foot of the singular, while the second half fills the onset of the next syllable, for example, sak.ki:n 'knife' becoming sa.ka:.ki:n.

Additionally, broken plurals with even iambs originate from singular forms beginning with a consonant cluster followed by a long vowel. Since Arabic nouns must end in a consonant, these broken plurals acquire an extra consonant absent in the singular form. Examples include t.ra:b 'sand' pluralizing as tur.ba:n and b.la:d 'countryside' changing to bil.da:n.

In sum, various linguists have analyzed the Arabic broken plural in different ways. McCarthy classified it as nonconcatenative due to its nonlinearly concatenated morphemes[18], while Ratcliffe argued that it involves internal morphological alterations[23]. The broken plural in MSA has been studied by McCarthy, Hammond, and McCarthy and Prince[30, 31, 33]. McCarthy focused on the CV structure of singular and broken plural nouns[30], while Hammond proposed a unified approach using a single template and specific rules[33]. McCarthy and Prince applied prosodic morphology to explain the formation[31]. The broken plural has also been examined in various Arabic dialects, such as Moroccan Arabic, UJA, and the Muscat dialect of Omani Arabic. In Moroccan Arabic, broken plurals are formed through gemination, vowel insertion, or infixation[15]. In UJA, Ben-Meir suggested that broken plurals follow syllabic patterns (monosyllabic, disyllabic, or trisyllabic)[14]. McCarthy analyzed the Muscat dialect's broken plural based on syllabification, syllable weight and length, and gemination[32].

4. Methodology

This study offers a descriptive and explanatory analysis of broken plural formation in NA using a data-driven analytical approach. The research aims to identify the patterns that native NA speakers use when forming broken plurals and to examine the phonological and morphological characteristics of these patterns. To ensure accuracy, the researchers, who are native NA speakers, collected common broken plural patterns and verified them with three additional native speakers. These participants were asked to convert singular words into plurals, and only forms with consensus were included in the study.

The broken plural patterns were classified based on syllable count, revealing three primary types: trisyllabic, disyllabic, and monosyllabic. Trisyllabic and monosyllabic patterns have a single form, while disyllabic patterns exhibit four variations. The study analyzed broken plural patterns in NA using a structured dataset categorized by syllable structure and CV patterns. The corpus includes trisyllabic patterns with two structural variations (4 words per pattern, totaling 8 words), disyllabic patterns with four structural variations (4 words per pattern, totaling 16 words), and monosyllabic patterns with three structural variations (4 words per pattern,

totaling 12 words), resulting in a total of 36 words analyzed. The selection of words was based on frequently occurring broken plural forms in NA, validated by three native speakers. Each plural pattern was analyzed in relation to its morphophonological characteristics to ensure a comprehensive representation of the language's pluralization processes.

The analysis incorporated insights from previous studies on broken plural formation identifying key morphological processes such as infixation, deletion, and melodic overwriting. Additionally, phonological processes related to syllable weight and vowel characteristics were observed. Each plural form was examined through prosodic structure graphs, following the framework proposed by McCarthy and Prince for establishing templates [31].

5. Description and Analysis

This section investigates how native speakers of NA form broken plurals, focusing on the morphophonological processes involved. Using a descriptive analytical approach, the study identifies three main broken plural patterns—trisyllabic, disyllabic, and monosyllabic—each with distinct CV structures. The analysis is structured sequentially, starting with trisyllabic patterns, followed by disyllabic, and concluding with monosyllabic patterns.

5.1. Trisyllabic Broken Plural Pattern

The first major broken plural pattern in NA follows a trisyllabic structure (CV.CVV.CVVC), resembling vowel qualities found in quadriliteral nouns, as described by McCarthy [34], and aligning with the Ca.Caa.CiC pattern in UJA [14]. For instance, *bi.ʕi:r* 'camel' changes to *ba.ʕa:.ri:n*, *θoʕ.ba:n* 'snake' becomes *θa.ʕa:.bi:n*, and *ʔeb.ri:g* 'pot' transforms into *ʔa.ba:.ri:g*. These examples show that this pattern consistently includes long vowels in the second and third syllables.

Similarly, *radʒ.el* 'man' shifts to *ra.dʒa:.dʒi:l*, and *ʔa.dʒwe.di* 'nobleman' is pluralized as *ʔa.dʒa:.wi:d*. These transformations illustrate a consistent pattern in which the vowel structure of the singular nouns is altered while maintaining the original consonantal framework. The second and third syllables of the plural forms always contain long vowels, thereby demonstrating a systematic application of this broken plural pattern in NA.

Moreover, the examples indicate that while vowel variations exist in singular forms, the plural forms maintain a consistent vowel melody: /a/, /a:/, and /i:/. The first syllable contains the short vowel /a/, the second has the long vowel /a:/, and the third incorporates the long high front vowel /i:/. When forming broken plurals, the vowels in the first two syllables of the singular noun are replaced, while the long /i:/ is consistently added in the third syllable. Consonants from the singular forms remain unchanged in their plural counterparts.

The analysis of each form will be presented following the framework proposed by McCarthy and Prince, which emphasizes using morphological units and prosodic elements—such as mora, syllable, foot, and prosodic word—to construct templates [31]. As depicted in **Figure 8**, the prosodic word in this pattern comprises two feet: the first foot contains two syllables, while the second foot consists of a single syllable. The first syllable carries one mora, the second syllable has two moras, and the final syllable contains three moras. **Figure 8** illustrates how the trisyllabic broken plural pattern in NA is structured prosodically. Specifically, the first syllable is classified as light, the second as heavy, and the final syllable as superheavy.

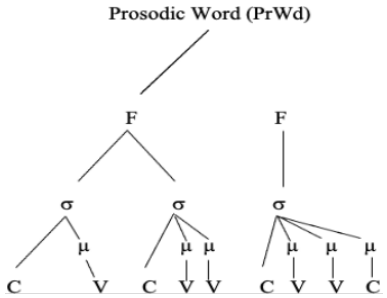

Figure 8. Prosodic Structure of the Trisyllabic Pattern CV.CVV.CVVC in NA.

The second variation of the trisyllabic broken plural pattern follows the structure CV.CVV.CVC. In this pattern, the first syllable is classified as light, while the second and third syllables are considered heavy. The vowel length in singular nouns remains unchanged when forming broken plurals. However, the melodic overwriting process modifies the vowel quality in the plural forms. Specifically, the first syllable contains the low front vowel /a/, the second syllable features the long low front vowel /a:/, and the third syllable includes the high front vowel /i/. For instance, *fe.ni:.leh* 'shirt' is pluralized as *fa.na:.jil*, representing the CV.CVV.CVC bro-

ken plural pattern. **Figure 9** illustrates its structural framework.

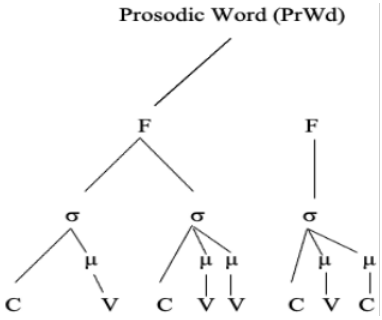

Figure 9. Prosodic Structure of the Trisyllabic Pattern CV.CVV.CVC in NA.

Thus, the analysis of the CV.CVV.CVC broken plural pattern in NA reveals a consistent morphophonological structure, demonstrating the systematic nature of vowel modification and prosodic organization in plural formation.

5.2. Disyllabic Broken Plural Pattern

The second primary broken plural pattern in NA follows a disyllabic structure, consisting of two syllables. This pattern includes four distinct forms, each with a unique CV structure: CVV.CVVC, CV.CVC, CVC.CVVC, and CV.CCV.

The first type of disyllabic broken plural in the CVV.CVVC pattern features a heavy first syllable and a superheavy second syllable. Examples include *θo:r* 'ox' to *θi:.ra:n*, *fa:r* 'mouse' to *fi:.ra:n*, and *ka:s* 'glass' to *ki:.sa:n*. This pattern consistently maintains two vowels, /i:/ in the first syllable and /a:/ in the second. During plural formation, the first vowel undergoes melodic overwriting, while /a:/ is inserted into the second syllable. The consonantal root remains unchanged, and the singular noun follows a CVVC structure with a single syllable. As demonstrated by the given examples, the broken plural pattern consistently ends with an additional consonant, specifically the alveolar nasal /n/. Similarly, Al-Aghbar noted that broken plurals with even iambs in the Muscat dialect also terminate in /n/, which is absent in the singular forms [32]. According to Al-Aghbari, this occurs because Arabic nouns must end with a consonant. **Figure 10** provides a prosodic representation of the disyllabic CVV.CVVC pattern.

According to Ben-Meir, the second variant of the disyllabic broken plural in NA is based on the CV.CVC template—a structure also found in NA and UJA [14]. In NA, most singular forms following this pattern begin with a glottal stop /ʔ-/, a feature that is notably absent from their corresponding plural forms. Current data indicate that this pattern is predominantly associated with adjectives and features a consistent vowel melody across both forms. For example, the singular *ʔaħ.mar* 'red' and *ʔas.mar* 'light brown or tan' are pluralized as *ħu.mur* and *su.mur*, respectively. In these singular forms, the low front vowel /a/ occupies the nucleus of both closed syllables, whereas in the plural forms, the nucleus of the first open syllable and the second closed syllable is taken by the high back vowel /u/, thus altering the vowel quality. Additionally, the final syllable in both singular and plural forms exhibits equivalent weight and length, while the first syllable in the plural forms is designated as light, followed by a heavy syllable. **Figure 11** provides a prosodic representation of the disyllabic CV.CVC pattern.

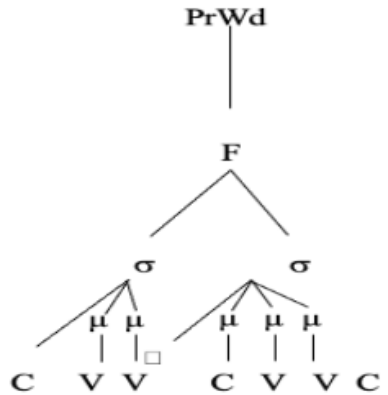

Figure 10. Prosodic Structure of the Disyllabic Pattern CVV.CVVC in NA.

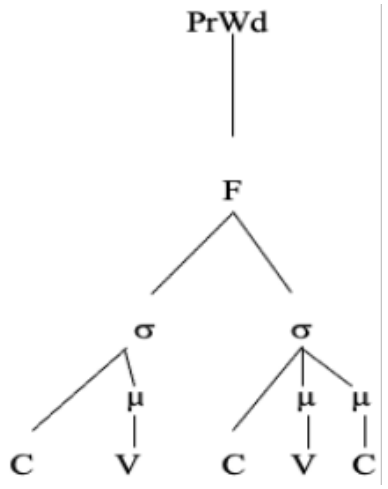

Figure 11. Prosodic Structure of the Disyllabic Pattern CV.CVC in NA.

The third disyllabic broken plural form in NA is designated as CVC.CVVC. Similar to the first disyllabic pattern (CVV.CVVC), its first syllable is considered heavy, while the subsequent syllable is classified as superheavy. This pattern preserves the singular noun's root when forming the broken plural. However, the plural's CV structure contains an extra consonantal slot that is not present in the singular form, necessitating the insertion of an additional consonant through epenthesis. For example, *dʒa.na:ħ* 'wing' and *ðа.hab* 'gold' transform into *dʒin.ħa:n* and *ðih.ba:n*, respectively. In contrast to other dialects—Moroccan, which inserts the epenthetic /wa-/; UJA, which adds /w/; and the Muscat dialect, which employs /j/— NA inserts the alveolar nasal /n/ in the coda of the final syllable. Additionally, the vocalic melody of singular nouns is completely transformed in the plural to a regular pattern comprising /i/ and /a:/. Specifically, the first syllable features a short high front vowel /i/, while the second syllable contains a long low front vowel /a:/. **Figure 12** illustrates this broken plural pattern.

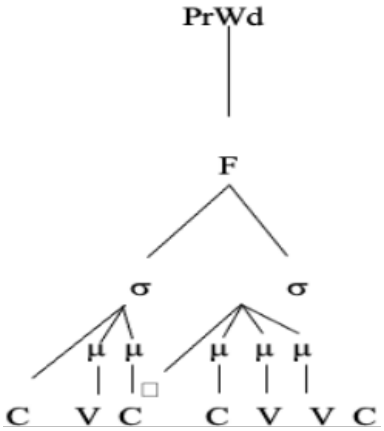

Figure 12. Prosodic Structure of the Disyllabic Pattern CVC.CVVC in NA.

The fourth disyllabic broken plural pattern in NA follows a CV.CCV template, with both syllables classified as light. Unlike many Arabic varieties, NA does not consistently follow the rule that nouns must end with a consonant[32]. In this pattern, both singular and plural forms contain short vowels; however, the vowel quality differs. In singular nouns, the first syllable features /a/ and the second /i/, whereas in the broken plural, the first syllable's /a/ is replaced by /u/ and the second syllable employs /a/. For example, *ʔa.mir* 'prince' becomes *ʔu.mra* 'princes', and *ra.ʔis* 'president' transforms into *ru.ʔsa* 'presidents'. This change reflects a melodic overwriting process: The singular vowel in the first syllable shifts from /a/ to /u/ and the nucleus of the second syllable is removed, resulting in a consonant cluster, all while preserving the underlying consonantal root. **Figure 13** represents the prosodic structure of the broken plural CV.CCV.

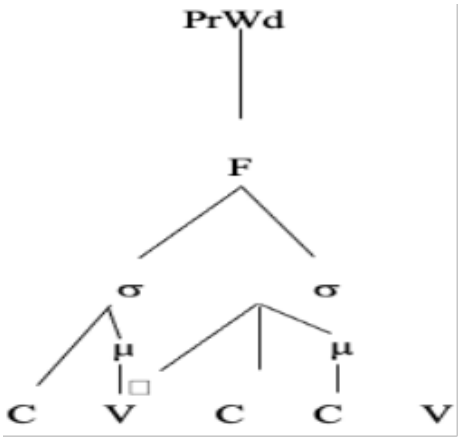

Figure 13. Prosodic Structure of the Disyllabic Pattern CV.CCV in NA.

5.3. Monosyllabic Broken Plural Pattern

The third fundamental broken plural pattern is the monosyllabic form, comprising four primary structures: CCVVC, CCVVC, CVCC, and CVVC. The first two versions share the same underlying CV structure (e.g., CCVVC) but are distinguished by the quality of their long vowels, as illustrated by the transformations where *dʒi.bal* 'mountain' becomes *dʒba:l* 'mountains' and *galb* 'heart' becomes *glo:b* 'hearts'. Moreover, the CCVVC pattern in NA mirrors the monosyllabic CCVVC pattern observed in UJA, as noted by Ben-Meir[14].

In NA, however, the first form of this monosyllabic broken plural features a distinctive pattern marked by a common vowel—a long low front vowel /a:/—which renders the syllable superheavy. For instance, *dʒi.bal* 'mountain' becomes *dʒba:l* 'mountains' and *ħa.dʒar* 'stone' becomes *ħdʒa:r* 'stones'. In these examples, the onset of the broken plural includes a consonant cluster, and its formation follows a morphophonological process known as melodic overwriting. During this process, the vowel in the first syllable of the singular form shifts from /a/ or /i/ to /a:/, while the vowel in the second syllable is deleted in the corresponding plural forms. **Figure 14** represents the prosodic structure associated with the monosyllabic broken plural pattern CCVVC.

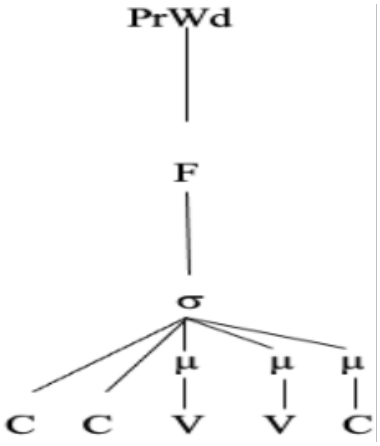

Figure 14. Prosodic Structure of the Monosyllabic Pattern CCVVC in NA.

The second type of the monosyllabic broken plural pattern in NA differs from the first primarily due to its distinct vowel. This pattern features a superheavy syllable, with both the singular and plural forms maintaining a single-syllable structure. In singular nouns, the vowel is either the high front /i/ or the low front /a/. However, in their corresponding broken plural form (CCVVC), these vowels shift to the long high-mid back vowel /o:/, as seen in examples such as *satˁħ* 'roof of the house' becoming *stˁo:ħ* and *ridʒl* 'leg' changing to *rdʒo:l*. These examples reveal that in singular nouns, a consonant cluster appears in the coda position of the syllable. In contrast, broken plural forms shift this consonant cluster to the onset position. Despite these changes, the consonantal root remains consistent in both singular and plural forms. The prosodic structure related to this monosyllabic broken plural pattern is the same as in **Figure 14**.

The third and fourth variations of the monosyllabic broken plural pattern follow the CVCC and CVVC structures, both of which feature superheavy syllables. For instance, the singular noun *ʔaz.rag* 'blue' forms its plural as *zurg* 'blues' in the CVCC pattern, whereas *ʔab.jaðˁ* 'white' takes the plural form *bi:ðˁ* 'whites' in the CVVC pattern. In the transformation from singular to plural forms, the consonantal structure remains largely consistent, except for the deletion of the glottal stop in both forms and the omission of the glide /j/ in the CVVC pattern. Additionally, the vowel in the first syllable of the singular form undergoes a shift, changing to the high back vowel /u/ in the CVCC pattern and to the long high front vowel /i:/ in the CVVC pattern. **Figures 15** and **16** illustrate the internal structure of these monosyllabic broken plural patterns, providing a visual representation of their phonological transformations.

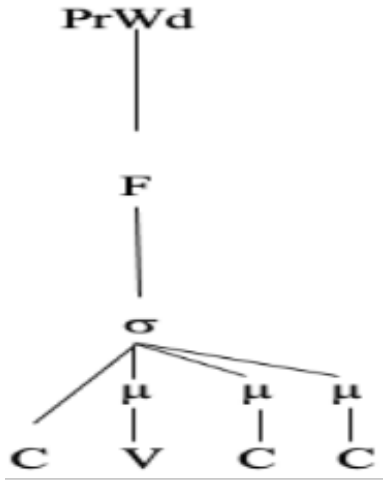

Figure 15. Prosodic Structure of the Monosyllabic Pattern CVCC in NA.

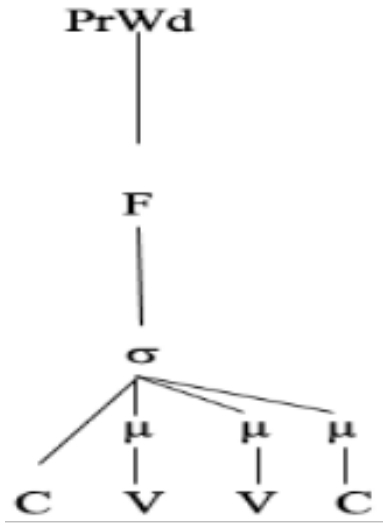

Figure 16. Prosodic Structure of the Monosyllabic Pattern CVVC in NA.

In sum, this study identifies two key characteristics of NA. First, NA exhibits a complex morphophonological system with diverse broken plural patterns that involve processes such as infixation, deletion, and melodic overwriting. The analysis follows a prosodic framework, as recommended by McCarthy and Prince, integrating the analysis of morphological units in conjunction with prosodic concepts such as mora, syllable, foot, and prosodic word to establish templates [31]. Second, the variation in broken plural patterns in NA reflects broader dialectal differences within Arabic. While some plural patterns align with those in other dialects, such as UJA, significant structural differences highlight the linguistic di-

versity across Arabic dialects. The variation in broken plural patterns across Arabic dialects can be attributed to multiple linguistic and sociocultural factors. Historically, Arabic dialects have evolved due to migration, language contact, and regional influences, leading to diverse morphophonological structures. Additionally, sociolinguistic factors such as urbanization and language standardization have influenced dialectal divergence, contributing to systematic yet distinct pluralization patterns.

This study investigated the formation of broken plurals in NA, addressing two key research questions. The first research question aimed to identify the specific patterns that characterize broken plurals in NA. The analysis classified these patterns into three main categories: trisyllabic (e.g., CV.CVV.CVVC and CV.CVV.CVC), disyllabic (e.g., CVV.CVVC, CV.CVC, CVC.CVVC, and CV.CCV), and monosyllabic (e.g., CCVVC, CVCC, and CVVC), each adhering to distinct morphophonological structures. The second research question examined the morphophonological processes involved in the formation of broken plurals in NA. The findings indicate that broken plurals emerge through several key processes, including melodic overwriting, vowel substitution, infixation, consonant deletion, epenthesis, and syllable weight adjustment. These processes systematically alter vowel qualities while preserving root consonants, highlighting the role of prosodic morphology theory in shaping broken plural formation[31].

6. Conclusions

This study investigated the broken plural patterns in NA, focusing on their morphological and phonological properties. The analysis identified three primary patterns: trisyllabic, disyllabic, and monosyllabic. The trisyllabic pattern follows a CV.CVV.CVVC structure and undergoes melodic overwriting, in which vowel replacements and infixation of the long high front vowel /i:/ occur. The disyllabic pattern includes four structures—CVV.CVVC, CV.CVC, CVC.CVVC, and CV.CCV—each exhibiting processes such as melodic overwriting, infixation, and vowel substitution. Some forms involve the insertion of a consonant, while others undergo glottal stop deletion. The monosyllabic pattern follows a CCVVC structure with two variations, one featuring the low front vowel /a:/ and the other incorporating the high-mid back vowel /o:/, both formed through melodic overwriting while maintaining the consonantal root.

This study contributes to the prosodic morphology approach proposed by McCarthy and Prince by analyzing broken plural templates using prosodic concepts such as mora, syllable, foot, and prosodic word[31]. The findings provide insights into the structural patterns governing broken plural formation in NA and their broader morphophonological implications. However, the study is limited in scope, focusing exclusively on broken plurals without considering sound plural patterns. Additionally, its findings are restricted to NA and are based on a small sample of native speakers, limiting their generalizability to other Arabic dialects.

This study has practical applications in linguistic and computational fields. Understanding broken plural formation in NA can improve Arabic Natural Language Processing (NLP) tools, particularly in morphological analyzers and text-to-speech systems, which often struggle with irregular pluralization. Additionally, insights from this study can enhance Arabic language pedagogy, aiding learners in acquiring non-concatenative morphology more effectively. Future research could explore the integration of these findings into Arabic speech recognition technologies and digital corpora development to improve computational representations of Arabic dialectal morphology.

Future research should examine broken plural patterns across Arabic dialects, compare broken and sound plurals in NA, and investigate children's acquisition of broken plurals for a developmental perspective.

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Data Availability Statement

Data can be given upon a reasonable request.

Conflicts of Interest

The author declares no conflict of interest.

Appendix A

Patterns of the Plural of Paucity (Wright, 1967)

No.	BP Pattern	SG Pattern	Translation
1	ʔafʕul '*ʔabħur*'	faʕl '*baħr*'	'sea'
2	ʔafʕal '*ʔadʒmal*, *ʔaʕnab*, *ʔaʕnaq*, *ʔaqfal*'	faʕal '*dʒamal*'	'camel'
		fiʕal '*ʕinab*' fuʕul '*ʕunuq*' fuʕl '*qufl*'	'grape' 'neck' 'lock'
3	ʔafʕilat '*ʔaħmirat*'	Any quadriliteral noun in which the penultimate letter is *-a-*, e.g., '*Ħimar*'	'donkey'
4	fiʕlat '*wildat*, *Θirat*, *ɣizlat*, *ɣilmat*, *sˁibiat*'	faʕal '*walad*' faʕl '*Θawr*' faʕaal '*ɣazaal*' fuʕal '*ɣulam*' faʕiil '*sˁabii*'	'boy' 'ox' 'gazelle' 'boy' 'slave'

Note. BP refers to the broken plural and SG to the singular.

Appendix B

The Broken Plurals and Their Singular Patterns (Ratcliffe, 1998)

No.	Pattern	Arabic BP	Singular	BP
1	CaCC CvCC CvCvC	CuCuuC, ʔaCCaaC, ʔaCCaaC, CuCuuC ʔaCCaaC, CuCuuC, CiCaaC	*nadʒm 'star'* *Ħukm 'judge'* *dʒabal 'mountain'*	*ʔandʒum* *ʔaħkaam* *dʒibaal*
2	CvCCa(t) CaCCat	CvCaC, CvC(a)Caat, CiCaaC CaCCaat, CiCaaC	*ɣurfat 'room'* *Ħalqat 'circle'*	*ɣuraf* *Ħalqaat*
3	CvCCvC CvCCvvC	CaCaaCiC CaCaaCiiC, CaCaaCiCat	*ʕaqrab 'scorpion'* *sultˁaan 'sultan'*	*ʕaqaarib* *salaatˁiin*
4	CvCvvC(at) CvvCvC(at) CvvCvvC(at)	CaCaaʔiC CawaaCiC CawaaCiiC, CaCaaCiC	*Risaalat 'letter'* *sˁaaʕiqat* 'thunderbolt' *Qaanuun 'law'*	*rasaaʔil* *sˁawaaʕiq* *qawaaniin*
5	CaaCiC (n.) CaaCiC (adj.)	CuCCaaC, CaCaCat, CuCaat CuCCaC	*tˁaalib 'student'* *ʃaamiχ 'lofty'*	*tˁullaab* *ʃummaχ*
6	CvCaaC CaCuuC	ʔaCCiCat, CuCuC CuCuC,ʔaCCiCat	*dʒanaaħ 'wing'* *Rasuul 'messenger'*	*ʔadʒniħat* *rusul*

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