

# NOUN PLURALITY IN JEBBĀLI

By

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For Ahmed

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NOUN PLURALITY IN JEBBĀLI

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This is a morphophonological study of noun plurality in Jebbāli, a Modern South Arabian language spoken in the mountains and coastal plains of Dhofar, Oman. It has a twofold goal: (1) it documents the diverse shapes of noun plurals in Jebbāli and (2) provides a formal analysis of the most systematic plural shapes within Optimality Theory (Prince and Smolensky 1993/ 2004). It also examines the peculiar morphophonology of the exceptional plural shapes and discusses how they diverge from the systematic plurals. Finally, it investigates approaches to exceptionality and lexical marking in Optimality Theory.

Plurality in Jebbāli is expressed by two distinct mechanisms: suffixation and non-concatenative operations such as infixation of *Vb*, attachment of a suffixal *VC* template with fixed vocalism and a copy of the final base consonant, mapping geminated singulars onto a specific plural template and ablaut. Jebbāli also has irregular plural shapes whose exceptionality is not attributed to their singulars and which cannot be explained phonologically.

The analysis of the regular plural patterns reveals that well-motivated constraints can capture their regularity and address their diversity. For instance, the locus of the *Vb*

infix follows from an alignment constraint, a constraint placing restriction on syllable size and anchoring constraints, which together function in harmony with the prosody of the language as a whole. The vowel of the suffixal VC template is prespecified underlyingly and results from MAX-V-SUFFIX outranking MAX-V-ROOT. The final plural shape is reduced to a single syllable and determined by the markedness constraints NO-V (Baković 2005: 299). Plurals derived from geminated singulars map onto a specific template; this results from the interaction of constraints such as IDENT<sup>Q</sup> (Dell and Elmedlaoui 1992) and \*VGG# (Muller 2001). Finally, I offer three cogent analyses to the ablaut plurals: (1) positional faithfulness (Beckman 1998), (2) Anti-faithfulness (Alderete 1999a and 2001) and RealizeMorpheme (Kurusu 2001). The last chapter uncovers the exceptionality of the irregular plural shapes and justifies their failure to be captured by a unified Optimality Theoretic analysis. I finally list some of the approaches of dealing with exceptionality in Optimality Theory and apply them to the analysis of these shapes.

## CHAPTER 1 INTRODUCTION

### Statement of Intent

Jebbāli exhibits enormous diversity and rich intricacy in the shapes of noun plurals. Quite a large array of non-concatenative morphological mechanisms accompanied with numerous phonological alternations indicate plurality in the language. For example, the most systematic noun plurals are formed by *Vb*<sup>1</sup> infixation, attachment of a suffixal *VC* template with a fixed vocalism and a copy of the final consonant of the base, mapping singulars with gemination onto a specific plural template and ablaut. The following are representative examples of the most productive noun plurals in Jebbāli.

#### (1) Plurals with *Vb* infixation

- |            |                   |                            |
|------------|-------------------|----------------------------|
| a. mɪrɾ'un | mɪr <b>ɛb</b> ɾən | the top parts of legs      |
| b. mɪɣnam  | mɪɣ <b>ɛb</b> nəm | mattresses made of leather |

#### (2) Plurals attaching a suffixal *VC* template whereby *V* is invariably /ɔ/ and *C* is a copy of the final *C* of the base

- |        |              |          |
|--------|--------------|----------|
| a. dɪk | dk <b>ɔk</b> | roosters |
| b. kɔt | kt <b>ɔt</b> | towers   |

#### (3) Templatic plurals

##### (3.1) Plurals derived from geminated singulars

- |             |        |                   |
|-------------|--------|-------------------|
| a. məlɛ-ɛt  | mɪlɛl  | pots              |
| b. k'all-ɛt | k'elɛl | hilts (of swords) |

##### (3.2) Plurals taking the shape *CCVC*

- |            |      |             |
|------------|------|-------------|
| a. dɪmɕ-ut | dmaɕ | tears       |
| b. sɛkən   | skun | communities |

##### (3.3) Plurals taking the shape *CVCC*

- |            |      |         |
|------------|------|---------|
| a. ɣabz-ɛt | ɣɔbz | bread   |
| b. kəlθ-ot | kəlθ | stories |

#### (4) Plurals with ablaut

- |                         |                             |              |
|-------------------------|-----------------------------|--------------|
| a. ʔɔtim                | ʔɪ <b>ɔ</b> m               | orphans (m.) |
| b. s <sup>ɕ</sup> afɾɪr | s <sup>ɕ</sup> ə <b>ɾ</b> ɾ | flowers      |

In spite of the prevalence of these shapes, I observe that suffixation is the default plural marker in Jebbāli. It is usually utilized to pluralize loan words from Arabic, except

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<sup>1</sup> Pieces of morphology (morphemes) will be *italicized* throughout the dissertation.

when loan words relate to tools or gear. In such a case, they take the *Vb* infix in their plural form. There are three plural suffixes in Jebbāli:  $-t(V)$ , whereby  $V \rightarrow /i/$  or  $/ə/$ ,  $-Vn$  and  $-i$ . However, suffixation is not purely “sound” or “linear” as plurals with suffixation also exhibit noticeable internal phonological changes such as vocalic deletion or insertion, assimilation, and other morphophonological alternations.

## (5) Suffixation

### (5.1) The plural suffix $-t(V)$

- |                        |                       |                         |
|------------------------|-----------------------|-------------------------|
| a. s <sup>ʕ</sup> aħan | əs <sup>ʕ</sup> ħenti | plates                  |
| b. mēh                 | mhot                  | waters (a lot of water) |

### (5.2) The plural suffix $-un$

- |           |        |          |
|-----------|--------|----------|
| a. lɪftɪn | lɪftun | aunts    |
| b. gəfnin | gɪfun  | tulchans |

### (5.3) The plural suffix $-i$

- |            |        |                        |
|------------|--------|------------------------|
| a. k'sʕ-ət | k'esʕi | cliffs/ mountain edges |
| b. ɛɾt-ɔt  | ɛɾi    | boys                   |

Jebbāli is also characterized by a group of plurals that take double and triple plural markers; two to three plural markers are stacked one after the other to indicate plurality in these forms.

## (6) Doubly and triply marked plurals

- |             |                    |                            |
|-------------|--------------------|----------------------------|
| a. miħħəl   | miħħabluntə        | chameleons                 |
| b. k'ar     | k'abrin            | graves                     |
| c. diħdef-t | diħdafontə/ diħduf | traditional males' outfits |

Despite the intriguing intricacies involved in the noun plural formation of this language, Jebbāli noun plurals have not been given their due analytical or theoretical linguistic exploration. The only works which briefly touch on plurals in Jebbāli are Ratcliffe (1992, 1996, 1998a &b) and Simeone-Senelle (1997). These are descriptive with the aim of documenting the common noun plural shapes in the language using the CV shapes, whereby C stands for consonants and V for vowels. Moreover, they are not solely devoted to the study of plurality in Jebbāli. Little and sporadic mention of Jebbāli

noun plurals is made in order to either supplement the grammatical sketch of Jebbāli (Simeone-Senelle 1997) or to compare Jebbāli plurals with modes of pluralization in Semitic and Afro-Asiatic languages (Ratcliffe 1992, 1996 and 1998a &b). However, these works do offer a good background and lay the fundamentals to understanding the most common patterns of noun plurals in the language with numerous supportive examples drawn either from fieldwork in Oman or a Jebbāli lexicon (Johnstone 1981).

This study is a linguistic attempt to document the diverse shapes of internal and external plurals in Jebbāli. More specifically, it explores the diverse plural shapes observed in the formation of this morphological phenomenon in the current speech of Jebbāli speakers. It is the aim of this dissertation to also provide a formal unified analysis of the most common and systematic plurals in Jebbāli within the framework of Optimality Theory (Prince and Smolensky 1993/ 2004; McCarthy and Prince 1993a &b).

There is always aspiration to offer a systematic and specialized study on “Noun Plurality in Jebbāli” similar to “The Morphology of Nominal Plural in the Cushitic Languages” by Andrzej Zaborski (1986) and “Nominal and Verbal Plurality in Chadic” by Paul Newman (1990). A reliable reference on the recurrent patterns of plural formation in this language is lacking. Moreover, previous work on Jebbāli plurals is only limited to describing and categorizing the existing plural shapes based on their CV patterns. There is not any linguistic work that mentions the phonological and morphological mechanisms involved in the process of plural formation in Jebbāli or in other Modern South Arabian languages. I find no work that attempts (even if unsuccessfully) a theoretical framework to offer a cogent analysis of noun plurality in this language.



Noun plurals in Jebbāli are very diverse; they exploit many systematic non-concatenative morphological processes and exhibit morphophonological alternations. A singular shape may map onto numerous plural patterns. For example, bi-consonantal singulars may systematically take a suffixal VC template, exhibit a vocalic change or take two plural markers. They may also take a plural suffix or map onto a distinct plural template. Thus, despite a level of systemicity, the relation between the resultant plural shape and the singular, from which this plural is derived, is not always predictable.

Using the International Phonetic Alphabet (IPA) to transcribe Jebbāli plurals is a breakthrough contribution of this dissertation. The majority of work done on Jebbāli continues to follow the nonstandard notations first employed by the late Thomas Johnstone in 1981 for Jebbāli and other Modern South Arabian languages. This constitutes an obstacle to knowing what exactly the phonemic sounds of the language are. Moreover, with the informal notations, it was hard to know the phonological processes pertinent to the language and to clearly state how they contribute to the understanding of Jebbāli noun plurals.

Past works on Jebbāli conducted by the native speakers of the language always insist on the untrue affiliation and relatedness of Jebbāli to Arabic. These studies base this spurious belief on the substantial amount of borrowings Jebbāli has from the dominant and surrounding Arabic and Arabic dialects. In this dissertation, Jebbāli's noun plurals refute convincingly such beliefs and reveal different plural mechanisms employed by Jebbāli than those found in Arabic. For instance, Jebbāli does not employ the dominant broken plural shape with an extra length in the second syllable and with the canonical iamb (CV.CV:), which is widely attested in Arabic. Moreover, Jebbāli

exploits a plural pattern reported to figure in the morphology of Ethiopian languages. This is also asserted in Ratcliffe (1998:196) who states “Jebbāli shows a pattern of plural formation for underived masculine nouns which is much closer to Ethiopian Semitic than to Arabic.” The language is named Modern South Arabian based on its geographical location in the Arabian Peninsula and not because it relates closely to Arabic.

### **Overview of Dissertation**

This dissertation is organized as follows. Chapter One describes the most common and exceptional noun plurals in Jebbāli. It also reveals the role of gender in singular-plural mappings and uncovers facts about how gender functions in the combination of nouns and adjectives. I also discuss the scope and limitations of this dissertation in Chapter One. The remainder of this dissertation is structured as follows. Chapter Two presents the necessary background information on Jebbāli. It provides an overview of Jebbāli through the exploration of its genetic affiliation, dialectal variations and phonemic inventory. It also delineates details on the syllabic structure and stress pattern of Jebbāli. Furthermore, it situates the data of this dissertation and reports previous scholarship on Jebbāli and other Modern South Arabian languages. It sketches information on Jebbāli’s phonetic tendencies and nominal and verbal morphologies. Since the focus of this dissertation is on the noun plurality of Jebbāli, past research done on Jebbāli noun plurality is thoroughly reviewed in a separate section to cast light on findings and reveal how this dissertation builds on and supplements previous works on this pivotal area of linguistics.

Chapter Three reviews the most pervasive mechanisms of plural formation employed in a wide array of Afro-Asiatic languages. It surveys the most common

mechanisms of plural formation in Arabic, Hebrew, two Ethiopian languages (Tigrinya and Amharic), a host of Chadic languages (most significantly Hausa), Cushitic languages, Modern South Arabian languages (Harsusi and Jebbāli) and finally Egyptian and Coptic. The last section of the chapter summarizes some of the shared tendencies between Jebbāli and these languages in regards to noun plural formation.

The Fourth Chapter lists some of the significant approaches to non-concatenative morphology. It shows the tenets and assumptions made in previous Templatic and Autosegmental approaches and later the Prosodic Morphology approach. It basically outlines the efforts of Templatic and Prosodic approaches in tackling a host of non-concatenative processes observed in languages that have non-concatenative morphology. Moreover, it presents the basic theoretical assumptions the current study hinges on for its analysis and arguments. It gives a succinct background of the main principles of Optimality Theory, the constraint-based theory of phonology, and introduces the major constraints employed for the analysis of the various mechanisms of plural formation in Jebbāli. Finally, it shows the superiority of Optimality Theory in accounting for a large spectrum of phonological and morphological phenomena. The last section briefly discusses Generalized Template Theory which the dissertation adheres to in order to analyze some of the templatic tendencies observed in the formation of noun plurals in Jebbāli.

Chapter Five includes a formal analysis of the systematic shapes and regular mechanisms of plural formation in the language using the framework of Optimality Theory (Prince and Smolensky 1993/ 2004; McCarthy and Prince 1993a &b). The analysis addresses the *Vb* infixed plurals, the plurals attaching a suffixal *VC* template

with fixed segmentism and a copy of the final consonant of the base (partial reduplication), the templatic plurals derived from geminated singulars and plurals marked by ablaut.

Chapter Six discusses the exceptional plural shapes and addresses the phonological and morphological peculiarity associated with their formation. It also lists the obstacles that hinder accounting for them cogently. Finally, I elaborate on how Optimality Theory addresses such exceptionality and the various approaches it takes to address lexical marking. These approaches are applied to the analysis of the exceptional noun plurals in Jebbāli. The final section seeks to outline an approach that unifies these exceptional patterns into a single Optimality Theory analysis.

Chapter Seven closes the dissertation by presenting the major contributions of this dissertation and summarizing the results of the analyses for the various systematic plural shapes of Jebbāli. The final section of this chapter discusses a number of remaining issues that can be considered for future research.

### **Description of the Plural Patterns**

Noun plurals in Jebbāli are formed by various non-concatenative operations which occur concomitantly with enormous phonological changes, resulting in immense diversity in the plural shapes. For example, plurality can be systematically marked by *Vb* infixation, attachment of a suffixal *VC* template with a fixed vowel and a copy of the final stem consonant, mapping singular forms with gemination onto a specific plural template and ablaut. Parallel with these morphological processes, plural forms exhibit phonological alternations like vowel deletion, vowel insertion, metathesis, assimilation and re-syllabification.

This diversity in plural formation can sometimes be systematic; the resultant plural shapes straightforwardly relate to the particular shapes of their singular forms. For instance, only bi-consonantal and mono-consonantal singular shapes reduplicate their final stem consonant to indicate plurality; tri-consonantal singular shapes are observed to pluralize by processes other than copying a consonant from the base. Moreover, the majority of singular forms that take the infix *Vb* are quadri-consonantal with the canonical shape CVCCVC. Bi-consonantal singulars whose second radical is geminated expand their segments and map onto a specific plural template different from the template resulting from mapping quadri-consonantal singular forms.

However, many plural forms can hardly be related to their singulars. To illustrate, since bi-consonantal singulars, for example, may take various shapes of plural (attaching a *VC* template, suffixation, vocalic opposition and bearing double plural markers), it is extremely unpredictable to assign a definite plural shape to a particular singular form. Furthermore, a few singular forms take simultaneously two to three plural markers to mark plurality. Therefore, establishing a general mechanism of plural formation for Jebbāli poses a challenge because there are many divergent plural patterns that cannot be solely attributed to the shapes of their singular forms. However, overall, the diverse Jebbāli's plural shapes are phonologically conditioned. They exhibit common morphological and phonological characteristics or tendencies which are indicative of the prosody of the language as a whole.

Jebbāli's noun plurals are also characterized by a fair amount of borrowings which have taken place from various dialects of Arabic spoken in Oman and Yemen as well as between Jebbāli and other Modern South Arabian languages. Borrowing has certainly

affected a huge number of plural forms and mechanisms. For instance, similar to Arabic, most of the bi-consonantal singulars borrowed from Arabic tend to be pluralized by templatic expansion (copying the second or third consonant in the base), although not, as previously stated, by the canonical broken plurals.

This section will thoroughly describe the diverse plural shapes of Jebbāli. Discussion of the plural shapes first outlines the typical, systematic and most common plural patterns and then moves to describe the peculiarity of the exceptional shapes and shapes that take double and triple plural markers. Before embarking on the description of these patterns, it is worth mentioning that noun gender in Jebbāli is determined by (1) the inherent gender of the singular noun, and (2) the feminine suffix markers *-ah* and *-(V)t*. Thus, the suffixes *-(V)t* and *-ah* attached to some singular forms in the data described below indicate the feminine gender and do not contribute to the consonantal roots of these forms.

### **Suffixation**

Like other Semitic languages, Jebbāli has plural suffixes that attach to singular forms to mark plurality. However, the resultant plural shape is not purely ‘sound’ since the plural suffix imposes some sort of phonological change into the final shape of the plural.

There are three plural suffixes in Jebbāli: *-t(V)* whereby  $V \rightarrow /i/$  or  $/ə/$ , *-Vn* whereby  $V$  is mostly  $/u/$ , and finally *-i*. The last suffix was a marker of duality which no longer seems to be an active and systematic process in the language. Only very few archaic forms continue to take this suffix and bear the dual meaning (e.g. [kuʒ-ət] ‘kidney, sing.’ takes the plural [kiʒi] ‘kidneys, dual.’).

These plural suffixes attach to various singular shapes ranging from bi-consonantal to quadri-consonantal singulars. However, the default plural suffix in the language is  $-t(V)$  which serves as the plural marker for loan words and nonce forms. It is also a feminine plural marker, and resembles in shape the Arabic feminine plural suffix  $-a:t$ . Many Jebbāli speakers use this suffix when given a singular form of any shape from Arabic, English or another language. After these suffixes attach to singular forms, a number of phonological alternations affecting the quality of the vowels, syllabic structure or consonantal quality of the singular forms occur. For example, vowel deletion and insertion occur frequently. A wide range of vocalic change is also attested in many forms. Moreover, place assimilation of the final nasal consonants in the singular forms to /t/ can easily be detected in the plurals with the suffix  $-t(V)$ . These wide-ranging phonological alternations that accompany suffixation indicate that suffixation does not alone serve as a sole marker of plurality. Side by side, suffixation and internal changes carry the meaning of ‘plural’. Below, I show some representative examples of singulars which take  $-t(V)$  to mark plurality. More forms are found in Appendix [A].

#### (1) Suffixal plurals in Jebbāli

##### (1.1) The suffix- $t(V)$

a. $\int^f ef$	$\int^f i\text{f}i\text{t}\text{ə}$	elbows
b. $bat^{\text{a}}\text{a}\text{h}$	$bat^{\text{a}}\text{h}\text{i}\text{t}\text{i}$	beaches
c. $\text{ʔ}\text{ɔ}b$	$\text{ʔ}ab\text{i}$	doors
d. $\text{t}\text{h}er$	$\text{t}\text{h}are\text{t}\text{ə}$	mountains
e. $\text{ʔ}ar\text{t}$	$\text{ə}r\text{t}\text{i}$	grounds/ floors
f. $l\text{ə}h$	$l\text{h}ot\text{i}$	cows
g. $\text{t}\text{ə}f\text{ə}l\text{-}\text{ɛ}t$	$\text{t}\text{ə}f\text{ə}l\text{ɔ}t\text{ə}$	people from dhofari
h. $\text{t}\text{ʃ}ifr\text{-}et$	$\text{t}\text{ʃ}of\text{or}\text{t}\text{ə}$	plaits, tresses of hair

The plural forms above exhibit some vocalic changes when the plural suffix  $-t(V)$  attaches to them. To illustrate, forms (d) and (f) have an extra vowel after the last consonant when the plural suffix attaches. Moreover, a change in the vocalic quality is

observed in the plural forms when they are attached to this suffix. For example, the plural form (h) has a back rounded vowel unlike its singular form which contains a high front unrounded vowel. Form (a) appears to lose or degeminate an /f/ when the plural suffix gets attached.

Another plural suffix common in Jebbāli is *-un* or *-in*. Although this suffix is not as common or productive in Jebbāli as the default one, quite a few singular forms are pluralized by attaching this suffix. Moreover, this suffix is also similar to the sound plural suffixes *-u:n*, *a:n* and *-i:n* attached to masculine plural nouns in Arabic. However, Jebbāli does not have length in the plural suffix. Ratcliffe (1998:165), who explores plurality in a number of Afro-Asiatic languages, states “the vowel systems [of Modern South Arabian languages] have undergone changes resulting in neutralization of the contrast between long and short, high and low vowels in many environments.” Moreover, it is worth pointing that the suffix *-a:n* is “widespread in Classical Arabic and other Arabic dialects; it corresponds to the external suffix of the masculine plural of adjectives and participles in Ge ‘ez” (Belova 2009:310). The fact that some Arabic dialects have the same plural patterns attested in some Ethio-Semitic languages reveals that they are historically in contact. To illustrate, Ratcliffe (1996: 299), when discussing a shared pattern of pluralization between Arabic and Ethio-Semitic languages, provides at least three pieces of evidence to prove that this shared plural pattern results from contact rather than from the potential of a common ancestor. For example, he observes that suffixal reduplication targets bi-radical and mono-radical consonantal singulars in both of these language families. Second, the quality of the vowel in the reduplicated suffix is similar to the vowel that occurs between the C<sub>2</sub> and C<sub>3</sub>



in three-consonant internal plural. Third, we may expect to find a default consonant rather than the reduplicated consonant in these plural types. Finally, Ratcliffe observes that if this pattern occurs in tri-consonantal singulars, then one of the root consonants must be glide (hollow form).

The singulars, which attach to *-Vn* suffix, are also diverse in their shapes. They can have two, three or four consonants in their base. Noticeable vocalic change is observed as one moves from the vowels contained in the singulars to those the plural nouns have. An important observation to make is that there is often some sort of a vocalic contrast that accompanies suffixation to realize plurality. In other words, if the singular form has a back rounded vowel /u/ or any of its variants, the plural noun takes a front unrounded vowel /i/ or any of its variants too, as in (d) and (e) below.

(1.2) The suffix *-Vn*

a. lɪftɪn	lɪft <u>un</u>	aunts
b. gəfnɪn	gɪf <u>un</u>	tulchans
c. k'əla	k'əl <u>un</u>	children
d. ðunub	ðɛnb <u>in</u>	tails
e. dɪχtər	dɪχtɪr <u>un</u>	doctors

The last plural suffix to be described here was formerly a dual marker *–i*. Duality is no longer a systematic process in Jebbāli and many forms which have the suffix *–i* currently denote plurality. Again, this suffix gets attached to only bi-consonantal (forms (b), (c) and (e) below) and tri-consonantal singular shapes (forms (a)-(c) below). The semantics of the forms attached to this suffix are diverse and relate to living and non living entities. Therefore, semantics alone cannot serve as a clue to signal a correlation between this plural marker and the forms they attach to it. Singular forms which have the feminine suffix *-Vt* such as forms (a) to (d) lose the feminine suffix prior to attaching

the plural marker *–i*. The following examples of plurals take the former dual marker to mark plurality:

(1.3) the suffix *-i*

a. s <sup>ʕ</sup> əfr-it	s <sup>ʕ</sup> oforj	cooking pans
b. ɛrt-ɔt	ɛrtj	boys
c. haʒ-at	haʒi	black flies
d. k's <sup>ʕ</sup> -ɛt	k'es <sup>ʕ</sup> j	cliffs/ mountain edges
e. ɪlik	ilkɛ	angels

## Vb Infixation

The most systematic and widely attested plural shape in Jebbāli involves infixation of *Vb*. The largest data corpus collected takes the *Vb* infix and belongs to the masculine class. This pattern of plurality tends to occur in nouns that relate to tools, gear and equipment in general. Loan words pertinent to tools such as [mas<sup>ʕ</sup>t<sup>ʕ</sup>r-ah/ mas<sup>ʕ</sup>abt<sup>ʕ</sup>ər] 'rulers, sing./pl.' are observed to take this pattern too. Therefore, *Vb* infixation is productive within this semantic sphere.

This plural shape exhibits infixation of *Vb* exactly after the third segment of the singular form. The infix constitutes the second syllable from the left edge of the plural form. The majority of quadri-consonantal singular forms take this pluralization mechanism (forms (a-d) below). However, it is important to note that not every quadri-consonantal form will take the *Vb* infixation since a large number of quadri-consonantal singular forms also take the default plural suffix *–tV* to indicate plurality.

The shape of the singular form is CVCCVC which becomes CVC**Vb**CVC after they pluralize. The vowel in the infix can be /a/ or /ɛ/ based on the place features of the preceding consonant. When the consonant is a pharyngeal, pharyngealized or glottalized, the V of the infix is mostly /a/. However, if the preceding C is a coronal, velar as in (b) or bilabial, the vowel of the infix is /ɛ/.

## (2) Plurals with Vb infixation

### (2.1) Regular Vb infixed plurals

a. mɪrɪʔun	mɪrɛbɪʔən	the top parts of legs
b. mɪɣnam	mɪɣɛbnəm	mattresses made of leather
c. s <sup>ɕ</sup> ɪndɪkʔ	s <sup>ɕ</sup> ɪnɛbdekʔ	boxes
d. mært <sup>ɕ</sup> um	mɪrɛbt <sup>ɕ</sup> am	pots used to keep ghee

A number of vowel-initial singulars take Vb infixation to mark plurality (examples (a-d) below). All the examples collected begin originally with a nasal /m/ which is deleted word-initially in Jebbāli (Johnstone 1981; Nakano 1986; Hofstede 1998). After /m/ deletes in the singular form, the following vowel nasalizes. The tri-consonantal singular shape (underlyingly quadri-consonantal) becomes [ĩ:CCVC] and it is, in fact, the derived version of /mVCCVC/. There are two plural shapes for those singular forms: one plural shape with an initial schwa and the other retrieves the deleted /m/. So, the resultant shapes are əC**Vb**CVC and mVC**Vb**CVC.

### (2.2) Singulars with an initial deleted /m/

a. ɪftəħ/ mɪftəħ	əfɛbtəħ/ mɪfɛbtəħ	keys
b. ɪktəb/ mɪktəb	əkabtəb/ mɪkabtəb	offices
c. ɪt <sup>ɕ</sup> ɕam	ə t <sup>ɕ</sup> abɕam/ mɪ t <sup>ɕ</sup> abɕam	restaurants
d. ɪɣlɪs/ mɪɣlɪs	əɣɛblɪs/ mɪɣɛblɪs	rooms for guests

The last groups of singulars that take the Vb infix are quite esoterically shaped. Some of the singulars have consonant cluster CC word initially (forms (a) and (b)). They bear the shape CCVC. Others are bi-consonantal with the shape CVC. The resultant shapes of the plural forms are also diverse. Plural forms (c) and (d) below lose the vowel in the infix and maintain only the *b*; they take the shape (V)C**b**VC.

### (2.3) Other Vb infixed plurals

a. lɣɛm	milabɣəm	muzzles
b. tɪʔadɔ	tɪʔbedɔ	Zizyphus spina Christi
c. t <sup>ɕ</sup> ɛl	ɛt <sup>ɕ</sup> bɔl	drums
d. xɛr	xɔr	news

## Attachment of a Suffixal VC Template

As a shared anomaly common to many Afro-Asiatic languages, nouns with one or two stem consonants tend to acquire a third consonant in the plural form by reduplicating a consonant from the base. For instance, Belova (2009:310) reports a number of Arabic dialects and Ethiopian languages that mark plurality by reduplicating the third or final radical, including the Arabic dialects of Upper Egypt (e.g. [bnitta] for [bint] ‘girl’, Sudan (e.g. [usudda] for [asad] ‘lion’, Nigeria (e.g. [duggunne] for [digin] ‘beard/ chin’), the region of Lake Chad (no example therein is supplied), Amharic (e.g. [wɔndəməm-at] for [wɔndəm] ‘brother’), East Gurage (e.g. [alagāgo] for [alaga] ‘stranger’) and Soddo (e.g. [gurazazä] for [gurz] ‘old man’).

Ratcliffe (1996) argues that this tendency can be explained in terms of templatic expansion whereby an extra consonant is realized in the plural form in order to meet some templatic constraint required by the language. He further argues that the extra consonant can be one of three “things” (using Ratcliffe’s word): default, a consonant normally used as an affix such as /t/ which indicates the feminine gender in Semitic or a copy of the stem consonant.

In Jebbāli, reduplicating the final consonant in the base is observed to be a systematic plural formation process. Bi-consonantal singular forms of mostly CVC shape exhibit partial suffixal reduplication (V)CC<sub>x</sub>ɔC<sub>x</sub>. Most of the collected plural forms taking this pattern are, by and large, borrowed from Omani Arabic.

The single vowel in the singular form varies greatly while most of the plural forms consistently have /ɔ/ between the last stem consonant and the reduplicated final

consonant in the plural form. Only three forms in the collected data have /ɛ/ in the suffixal reduplicant (forms (g-i) below).

(3) Partial suffixal reduplication

a. ħut	ħtɔt	fish	m
b. nuf	nfɔf	selves	m
c. rɛf	ɛrfɔf	shelves, racks, bulks	m
d. mus	ɛmsɔs	razors	m
e. kɛf	ɛkfɔf	palms of the hand; claws	m
f. ħag	ɔħgɔg	pilgrims	m
g. ħel-ɛt	ħelɛl	dry leaves	f
h. xel-ɛt	xelɛl	lavatories	f
i. hab-ot/ hib-ot	hbeb/ heb	songs	f

The ‘initial’ vowel in the plural shape (forms (c-f) above) does not occur in all the plurals with the suffixal template. In some forms, the initial inserted vowel harmonizes with /ɔ/ in the reduplicant suffix (form (f) above). Singular forms taking this pluralization pattern belong to different classes; whether the forms are masculine or feminine, it does not matter. In the data collected, there is a single uni-consonantal form which pluralizes by taking the suffixal template with partial reduplication and pre-specified vowel. This form bears the shape CV whose single C reduplicates resulting in VC<sub>x</sub>ɔC<sub>x</sub>. The example is [Ɂa, ɛɁɔɁ] ‘brothers’.

### Ablaut/ Vocalic Opposition

One of the most prevalent plural shapes in Jebbāli involves ablaut or vowel opposition. This tendency toward reversal of vowel quality can also be observed in Arabic and Ge ‘ez (Ratcliffe 1998:167). Ratcliffe (1998:200) states that “most four-consonant masculine [nouns] with /e/ or /i/ in the last syllable have the vowel alternation type”. I classify the plurals taking ablaut into two major shapes. The first shape affects singular forms which have three or four root consonants (forms (a-d) below) and the second shape concerns the resultant bi-consonantal plural shape CVC (e-g). In the first

shape, the last syllable of the plural form has a vowel different from that in the last syllable of the singular form. In the majority of forms, back vowels appear in the plural form as opposed to front vowels which the singular forms pervasively have.

The second shape is derived from diverse singular shapes which can mostly be bi-consonantal or tri-consonantal in shape. However, the plural is always CVC with an obvious change in the vocalic quality. Observe the following examples:

(4) Ablaut or vowel opposition

a. ʔɔtim	ʔɪtɔm	orphans (m.)
b. s <sup>ɕ</sup> afɾir	s <sup>ɕ</sup> əfrɔr	flowers
c. xadər	xədɔr	isolated homes
d. xatɕɪk'	xatɕok'	dresses
e. nidɔ	nudɔ	water skins
f. k'udɔ	k'adɔ	ropes
g. ɤeg	ɤagɔ	men

## Templatic Plurals

### Plurals derived from geminated singulars

The fourth systematic plural shape concerns the plurals derived from geminated singular forms which take on a definite templatic shape. In the plural forms, the gemination is broken up by a vowel /ɛ/ or /e/. Singulars of the shape CVC<sub>x</sub>C<sub>x</sub> derive this plural shape. The vowel in the singular varies among /a/, /ɛ/ and /ə/. The final shape of the plural form is CVC<sub>x</sub>VC<sub>x</sub>.

(5) Plurals derived from geminated singulars

a. məll-ɛt	milɛl	pots
b. k'all-ɛt	k'eɛl	hilts (of swords)
c. dəkk-ɛt	dəkek	benches outside a house

### Plurals with truncation and templatic expansion

Jebbāli has two opposite morphological operations which mark plurality in a wide range of words: truncation and templatic expansion. These two processes affect diverse singular shapes (can be bi-, tri- or quadri-consonantal). Templatic expansion involves

an extra syllable or consonant in the plural form as opposed to the singular form which has fewer syllables or consonants.

(6) Templatically expanded plurals

a. xof-ɪt	xalif	windows
b. kɛr	e:kwar	chiefs
c. ɪkber	məkbər	sweethearts
d. faʕɔr	faʕjɔr	young bulls

On the other hand, the truncated plural form exhibits fewer consonants or fewer syllabic structures than those contained in the singular form. Since this language involves a lot of deletion, it is possible to think of the extra syllable or consonant in the plural forms as reappearance or retrieval of the deleted segment or portion in the singular forms. Observe the following examples:

(7) Truncated plurals

a. e:s <sup>ʕ</sup> baʕ	e:s <sup>ʕ</sup> oʕ	fingers
b. k'uʕdɛn	k'ɔʕɔd	camel-calves
c. muχbut <sup>ʕ</sup>	moχot <sup>ʕ</sup>	cartridges
d. e:rbɛħ-t	e:roħ	fans
e. mk'albet <sup>ʕ</sup>	k'albet <sup>ʕ</sup>	turnings on a path

The last most miscellaneous pattern of plural formation in Jebbāli involves an internal change. However, the change is very eclectic in nature to the extent that it is very hard to establish a generalization that governs a particular internal change. However, the change can be described as templatic in nature. Plurals belonging to this category are mapped onto three basic templates: CVCVC, CVCC and CCVC. Interestingly enough, the singular forms, from which these plurals are derived, are unanimously tri-consonantal. The class to which these forms belong is also diverse and there is no definite class grouping these forms together. Observe these sets of plural patterns:

(8) Templatic Plurals

(8.1) Plurals taking the shape CVCVC

a. bʕal-ɛt	bəʕɛl	female possessors
b. salʕ	sɛʕəʕ	cheeks
c. əshib	sahab	waves
d. gɪlɪl-t	gɪlɪl	rifle bolts

(8.2) Plurals taking the shape CCVC

a. dɪmʕ-ut	dmaʕ	tears
b. sɛkən	skun	communities

(8.3) Plurals taking the shape CVCC

a. ʁabz-ɛt	ʁəbz	bread
b. kəlθ-ot	kəlθ	stories

Jebbāli has some plural forms which cannot be classified into any of the above explored patterns. In the collected data, there is only a few number of plurals which belong to this type, which reveals the rarity of this type. Some of these plurals have metathesis; others have consonantal shift. However, the shift of consonant is not clear or easily identifiable. In other words, much morphophonology characterizes these forms. Observe the following examples:

(9) Miscellaneous Shapes

a. səbrin/ səbr-at	səbro	ghosts
b. reʃ	ereʃ	heads
c. ʔɪnʔatʕ	ʔɪnʔab	beads
d. ɔɾɁ	erɔɾɁ	months
e. ʔaxar	a:ʔaxar	old men

Jebbāli has a distinct group of noun plurals which take two to three plural markers. These plurals may have two plural suffixes consecutively following each other (examples (a-c) below) or can take the *Vb* infix along with the default plural suffix *-tV* (forms (d) and (e)). The plural form (f) is the only collected form that bears three distinct plural markers.

The set of plural forms marked by two to three plural markers is limited. Jebbāli speakers fail to supply more doubly marked plurals than the ones listed in Appendix [A].



Moreover, there is nothing special about the singular shapes which can justify why they take double or triple markers: singulars which take double plurals range in their shapes from bi-consonantal (forms (e) and (f) below) to quadri-consonantal (form (a)). I observe that the plurals taking double plural markers are native to Jebbāli and are not borrowed from Arabic. I also observe that plurals taking more than one plural suffix do not designate special semantics or add emphasis to these forms. More specifically, they are not “plurals of the plurals”. Observe the following examples:

(10) Plurals bearing two to three plural markers

a. dɪdɛf-t	dɪdɛfɔntə/ dɪdɛf	traditional males' outfits
b. səħar-ah	səħaruntɪ	traditional wooden boxes
c. ʒet	lɔbtə	monitor lizards
d. lɛt	lɛɔbtə	nipples
e. zol-it	zoluntə	carpets
f. kɔf-et	kɔfɔntə	caps

Like many Afro-Asiatic languages, Jebbāli has a number of lexicalized plural forms whose singulars and plurals are vastly unrelated. These plurals, though unsystematic, seem to be semantically interrelated. Most of the collected words relate to humans and living entities. Below, I list a sample of suppletive or lexicalized forms. Interested readers are referred to appendix [A] for more forms.

(11) Suppletive plural forms

a. tɛθ	ʔɪnɛθ	women
b. ɪmbera/ m bera	ɛrtɪ/ ɛrtot	boys
c. bri	ʔɪni	sons
d. brɪti	ʔontɪ	daughters

It can be drawn from the data above that Jebbāli utilizes quite a large number of non-concatenative morphological mechanisms to indicate plurality. These mechanisms are accompanied by many phonological changes such as vocalic change, vocalic deletion, insertion and consonantal assimilation. The singular forms, from which these

diverse plural shapes are derived, are also very diverse and cannot be solely a clue about how a singular will be pluralized. It is important to note that some singulars may take multiple plurals, and some plurals may be doubly pluralized (i.e. take double plural markers).

### **Gender in Singular-Plural Mappings**

In exploring the diverse plural shapes in Jebbāli, I investigated whether the gender of a particular noun determines what plural pattern it takes. In other words, is gender a direct determinant for the resultant plural pattern? I also studied the gender of a number of plural forms when they combine with descriptive words (adjectives) to check if there is a difference between the gender of nouns and that of the adjectives describing them. Do nouns change their gender when they are pluralized?

In Arabic and Omani Arabic specifically, there are two modes of pluralization: sound and broken. Sound plurals take the plural suffixes—*-u:n/ -i:n* for masculine forms and *-a:t* for feminine forms. Most of the feminine singular forms maintain their gender when they are pluralized. This is manifested by the fact that they always attach *-a:t* in their plural formation. Examples from Omani Arabic include [ʃa:l-ah] → [ʃa:l-a:t] ‘halls, fem.’, [mall-ah] → [mall-a:t] ‘bowls, fem’, [riħl-ah] → [riħl-a:t] ‘trips, fem.’ and [dabba:s-ah] → [dabba:s-a:t] ‘staples, fem.’ However, since broken plural is the most common mode of plural formation in Arabic, many of the feminine singular forms which take broken plurals are prone to alter their gender due to the fact that broken plurals are gender-null (e.g. [mqamf-ah] ‘feminine’ → [mqa:mif] ‘spoons, feminine’ and [muql-ah] ‘feminine’ → [maqa:li] ‘frying pans, masculine’). I also observe that gender may change

when singulars are pluralized. For example, a masculine noun such as [ko:b] ‘cup, sing.’ becomes feminine [ko:b-a:t<sup>2</sup>].

In Jebbāli, I observe that many masculine singulars alter their gender when they become plurals. Since the majority of singular forms pluralize by the default plural marker *-tV* which is considered by many Jebbāli speakers to be a feminine plural marker too, masculine nouns which take this suffix in their plural formation are, in turn, feminine. This is manifested by the fact that quite a large number of masculine nouns which take the plural suffix *-tV* become feminine when checked against my Jebbāli consultants<sup>3</sup>. In (12) and (13), I list a number of masculine nouns which become feminine in their plural formation and vice versa:

(12) Feminine to masculine:

a. lħ-ət	lħoi/ lħa	beards
b. lɛbk’-ət	lek’	bottles, water-jars
c. eʕlk’-ut/ maʕlk’-ot	o:ʕolk’/ moʕolk’	spoons

(13) Masculine to feminine:

a. ʔorom/ a:rm	ʔeromtə	roads
b. herum	hərmɪti	plants
c. e:d	aditə	hands
d. ʕen	ʕantə	eyes

Two observations about the above forms are in order here. The majority of plural forms taking the *-t(V)* suffixation mode of pluralization are feminine regardless of the gender of the singulars from which these plurals are derived. Masculine plural nouns take diverse plural patterns. However, a large and substantial number of masculine plurals take the *Vb* infixation and *-un* suffixation (only two exceptional forms are recorded in my data). To conclude, gender is not an influencing feature for the plural

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<sup>2</sup> *a:t* is a feminine plural suffix.

<sup>3</sup> I would venture to claim that the default plural suffix *-Vt* is parallel to *-a:t*, the feminine plural suffix in Arabic and they may be diachronically related or proto-type.

formation pattern. There is diversity in both the gender and the pattern of pluralization. A singular noun may change its gender in its plural form. However, Jebbāli, like many Afro-Asiatic and Semitic languages, have a number of plural markers that are gender specific.

I will now tackle gender in the combinations of noun plurals and adjectives. In Arabic, adjectives follow nouns and have to agree in gender and number with them. In the case of broken plurals, if the noun plural takes a masculine adjective attached with *-u:n* or *-i:n*, then its inherent gender is a masculine. However, if it takes the suffix *-aat*, then it is a feminine. It is worth mentioning that some adjectives also take the broken plural formation. However, the gender of the feminine plurals accord with that of the adjectives they go with (e.g. [ʔa:wl-**ah** kabi:r-**ah**] ‘big table, fem.’, [ko:b ta:ris] ‘full cup, masc.’, [masa:mi:r qʂa:r] ‘short nails, masc.’).

Based on surveying the gender of plural nouns when they combine with various adjectives in Jebbāli, I observe that Jebbāli adjectives agree with the nouns they modify in number and gender. Hofstede (1998: 25) states “there is agreement between the noun and the adjective (which always follows the noun) in gender and number”. However, there are a number of neutral adjective forms whose shape stays unaltered whether the noun they describe is masculine or feminine (e.g. [re)ti] ‘tall’, [lɛniti] ‘white’, [ħeriti] ‘black’, [ʔarħat] ‘beautiful’, [ðahnut] ‘clever’ and many others that relate to cleanliness, fatness and strength. These adjectives, thus, have a common gender.

On the other hand, I observe that when adjectives are marked, they often attach the plural suffix *-tV* and describe feminine plural nouns. Observe the following examples:

(14) Plural Adjectives

Masc.	Fem.	Gloss
a. <i>ʃaḥmun</i>	<i>ʃaḥmuntə</i>	dark
b. <i>tgar</i>	<i>tgartə</i>	business-oriented
c. <i>badut</i>	<i>bdetə</i>	untruthful
d. <i>mink'al</i>	<i>mink'alitə</i>	brave

In conclusion, based on the data collected and interviews with native Jebbāli, there are two groups of adjectives in the language. The first group takes the same shape for both masculine plural and feminine plural nouns. The other group of adjectives attaches the noun plural suffix *-tV* to indicate feminine gender, while the masculine adjective is usually unmarked. Adjectives are not observed to pluralize by other plural mechanisms like the *Vb* infix, attachment of a *VC* template or ablaut *mudolo* to the nouns they describe.

## CHAPTER 2 AN OVERVIEW OF JEBBĀLI

Jebbāli, one of the Modern South Arabian languages<sup>4</sup>, is widely spoken in the mountains and coastal plains of Dhofar (Ḍufār, in Arabic), a governate in the southern region of the Sultanate of Oman. Geographically, it stretches from Ḥāsik in the farthest east to Ḍalkūt in the farthest west and is primarily spoken in the cities, towns and villages of Ṣalālah, Mirbāt, Ṭāqah, Raysūt and Ḥalāniyyāt Islands. Jebbāli is also spoken in sporadic areas situated at the boarder shared between Dhofar and Yemen (Lonnet 1985:50; Hofstede 1998:13).

Dhofar receives annually the monsoon rains which transform the entire region into absolute greeneries serving as a tourist attraction and an affordable destination for vacationers from the Gulf and Europe. The majority of Jebbāli speakers are shepherds who keep cows and camels; pasturing the cattle depends mainly on the rain the mountains of Dhofar receive from the end of June to mid September during the monsoon season (ḫarīf, in Arabic). They are also engaged in cultivating frankincense-bearing (Dragon's Blood) trees whose pedigree gum or incense is known for its fine quality and is exported to the neighboring regions (Johnstone 1981:xi; Al Tabuki 1982:52; Hofstede 1998; Morris 2007).

Various names designate this language; for instance, Jebbāli is equally known as Shehri (pronounced as [ʃəħri] with an initial voiceless lateral fricative) in reference to the original 'Shehri' people who first inhabited the mountains of Dhofar. The 'Shehri' people have long believed that Shehri belongs to them alone and that other tribes have

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4 Other Modern South Arabian languages include Mehri, Ḥarsusi, Baṭḥari, Hobyot and Socotri. Mehri is spoken in the southern parts of Oman and Yemen. Ḥarsusi speakers originally come from Jidat Al-Ḥarāsīs in Oman while Baṭḥari is spoken on the coast of the Ḥalāniyyāt Islands. Hobyot is widely found at and around the border shared between Oman and Yemen. In Yemen, Socotri speakers reside.

subsequently acquired it from them. Therefore, they always call the language after their tribe, 'Shehri'. However, other tribes in Dhofar prefer to name it 'Jebbāli', denying that it exclusively belongs to the Shehri group and arguing that Shehri is originally derived from the word [ʔaħr] or [ʔaħir] which means "mountains or rural areas". Al Mashani (1999) and Al Shehri (2007) state that [ʔaħr] refers specifically to the coast between Oman and Yemen. In the past, the language was dubbed as 'Qarawi' and 'Eħkili' which insinuate reference to old social differences and which sound pejorative to native speakers of Jebbāli (Johnstone 1981; Hofstede 1998; Morris 2007). Al Mashani (2003) argues that the best name for this language is 'Lisān Ĥimyyar<sup>5</sup> al- Mu'āsir' (the contemporary tongue of Himyyar) which indicates that Jebbāli is a shared linguistic wealth and is deeply linked to the glorious civilization built by the ancient people of South Arabia.

Johnstone (1975: 94) estimates the total number of speakers of Jebbāli to be about 5.000 speakers. Hofstede (1998: 13) states that the number might be 50.000. Native Dhofaris, who are estimated to be 249,000 people<sup>6</sup> by the most recent national census conducted in 2010, believe that approximately 70% of the population in Dhofar speak or at least understand Jebbāli.

In spite of the considerable exposure of Jebbāli speakers to Arabic through modern schools and influential Arabic dialects of local tourists and visitors on one hand and foreign languages on the other hand, Jebbālis take utter pride in their language and

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<sup>5</sup> Ĥimyyar is "a tribe whose origin lies in the region of Ḍufār. This tribal group gradually extended its power across the whole of Yemen and eventually exercised authority over the southwestern half of the Arabian Peninsula during the first centuries of Islām" (Encyclopedia of Arabic Language and Linguistics 2009: 256)

<sup>6</sup> 34.5% of this figure is expatriates.

teach it as a first language to their children. This pride coupled with the isolation it enjoys (Al Mashani 1999; Al Shehri 2007) enable Jebbāli to persist as a distinct entity until today. In fact, it is extremely rare to meet a person from the south of the Sultanate of Oman who does not speak Jebbāli either as a first or second language. However, since Jebbāli is not written and there is an ongoing wave of modernization exercised by the Omani government to enhance “Arabicized economic development” (adopting Lonnet’s 2009 terminology), Arabic remains to be the language used in writing, worship and formal education for all Jebbāli speakers.

This chapter introduces Jebbāli through the exploration of its genetic affiliation and dialectal variations. It also situates the data used in this dissertation and provides an overview of the previous scholarship done on Jebbāli and other Modern South Arabian languages. Rarely is there a reference which exclusively talks about Jebbāli without mentioning the other Modern South Arabian languages. This can be attributed to the fact that South Arabian people are often fluent in two or more Modern South Arabian languages (Lonnet 2009: 298) and can readily supply field workers and former scholars with forms from the other languages too. Furthermore, the research on these languages is still in its infancy, and it is a breakthrough to attempt a comparative linguistic study of all the related Modern South Arabian languages in a single study.

This chapter also provides a grammatical sketch of Jebbāli which is basically a description of its phonemic consonantal and vocalic inventories, syllable structure and stress. It lists the most common phonological processes pertinent to Jebbāli. The last two sections discuss Jebbāli’s nominal and verbal morphology and provide an overview of the major scholarship on plurality in Jebbāli.



## Genetic Affiliation

Jebbāli is a Semitic language and one of the Modern South Arabian languages. Semitic languages belong to the Afro-Asiatic family. More relevantly, the South Semitic is divided into two branches; Modern South Arabian languages occupy an eastern branch (Rodgers 1991; Hetzron 1997; Faber 1997; Ratcliffe 1992 among a host of Semitists). Faber gives the following classification for South Semitic:

(1) South Semitic

    Eastern

        Socotri

        Mehri, Ḥarsusi, **Jebbāli** (emphasis mine)

    Western

        Old/ Epigraphic South Arabian

        Ethiopian Semitic

(Faber 1997:5-13)

As seen in the classification above, Modern South Arabian languages belong to the Southeast Semitic branch. These languages refer to Jebbāli, Mehri, Ḥarsusi, Baḥārī, Hobyot and Socotri which are spoken in Oman and Yemen.

Due to Jebbāli's extreme resemblance to and shared linguistic features with Ethiopian languages, it is not uncommon for distinguished Semitists and anthropologists to group the Modern South Arabian languages together with the Semitic languages of Ethiopia in the South Semitic branch. For instance, in Goldenberg (1977), he maintains that the reason for grouping Arabic, Ethiopian and South Arabian languages into one group is due to the fact that they all share broken plurals. Moreover, because it has been established that Arabic (including Sabea<sup>7</sup>, Mehri and Socotri) and Ethiopian languages stand in a closely comparative relationship (Goldenberg 1977:473), broken

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<sup>7</sup> Sabea is one of the ancient Old South Arabian languages (also known as Epigraphic or Sayhadic) found in the period between the beginning of the first millennium B.C.E. and the middle of the sixth century C.E (Belova 2009:301).

plural formation marks an important stage in the development of these languages. These languages also share vowel lengthening in their verbal morphology<sup>8</sup>. In his concluding remarks, Goldenberg maintains that South Arabian and Ethiopian languages constitute the same branch of grouping, excluding Arabic which is only distantly related to Modern South Arabian languages. This conclusion stands in a striking contrast with the arguments strongly held and continuously emphasized by the native speakers of the language who constantly claim that Jebbāli and Arabic are highly interrelated.

### **Dialectal Variations**

Johnstone identifies three dialectal varieties of Jebbāli on the basis of their geography in Dhofar: Eastern, Central and Western (Johnstone 1981:xii; Hofstede 1998:14). He believes that Central Jebbāli is the most important dialect among all. It represents the original or mother Jebbāli, as other dialects have many affinities with Central Jebbāli, and only minor differences between it and other dialects exist.

### **Situating Jebbāli Plurals**

Since Central Jebbāli is considered to be the most representative variety of Jebbāli, the singular and plural tokens collected in this study pertain to Central Jebbāli, primarily spoken in Salalah (Ṣalālah, in Arabic), the main city in the Southern region of Oman. More specifically, the data represent the current Jebbāli spoken by four native speakers whose ages range from 24 to 50. The majority of Jebbāli speakers are bilingual, with fluency in both Jebbāli and Arabic. Two of the four informants in this study understand both Arabic and Jebbāli while the other two informants also speak English as a third language.

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<sup>8</sup> Jebbāli is not contrastive in length.

Singular and plural forms were recorded during two principal fieldwork trips to Oman during the summers of 2009 and 2010. The researcher arranged two to three meetings per week with Jebbāli consultants to elicit new forms and verify old ones through corrective feedback and interviews. Singulars and plurals are transcribed using the International Phonetic Alphabet notation (IPA). To the best of my knowledge, this dissertation is the first in attempting to purely use the IPA for Jebbāli since previous works partially use the IPA in combination with other non-standard symbols. Lonnet (2009) provides the equivalent IPA symbols to some of the informal notation found in the old scholarship of Jebbāli and other Modern South Arabian languages.

### **Previous Studies on Jebbāli and other Modern South Arabian Languages**

There are two main types of sources of information available concerning Jebbāli. One is based on systematic accounts and studies done by interested European linguists, anthropologists and sociologists. The most significant research is carried out by the late professor Thomas Johnstone, whose work on Jebbāli and other Modern South Arabian languages has long served as the main reference to these languages. In spite of this, the research done is descriptive or anecdotal in nature, intending to describe the peculiarities of this language and expose its deviations from the surrounding dominant Arabic or Arabic dialects. Moreover, the data collected in these studies, though interesting, are transcribed using confusing symbols and unclear notations. Recent work on Jebbāli (c.f. Hofstede 1998) has continued to use this transcription despite the availability of the latest IPA theory of transcription at the time when their research is conducted. The second type of source of information is the recent and growing interest seen in research done by the native speakers of this

language. The latter is also descriptive in nature and focuses on proving interrelatedness between Arabic and Jebbāli.

This section reviews the majority of descriptive works done on Jebbāli and other Modern South Arabian languages. These works delineate the major linguistic and non linguistic features that arouse the interests of scholars coming from as diverse spheres of study as anthropology, sociology and linguistics, and whose motives in investigating Jebbāli and other Modern South Arabian languages differ vastly. Some of these scholars are affiliated with organizations aiming at the revitalization of Modern South Arabian languages while others are engaged in long term research projects that aim at bringing forth the linguistic wealth of these languages. The discussion will first highlight the more miscellaneous and general works on Jebbāli. These works serve as a background to the language and briefly discuss diverse and holistic linguistic aspects of Jebbāli in the same study. Then, I move to discuss the more specialized linguistic works which are considered to be reference works to the phonetics and phonology, nominal morphology, verbal morphology and syntax of Jebbāli.

The intriguing linguistic features of Jebbāli have long remained hidden and insufficiently explored despite the wealth of research produced until this point in time. The majority of work done is descriptive in nature and cursory in essence. Hardly can a researcher come across any analytic or theoretically systematic study on the language. Moreover, there was blind reliance on scripts collected by the early Vienna Expedition (1898) which is dubbed as “inaccurate” and certainly can lead to “unreliable conclusions” (Matthews 1969).

## Introductory Scholarship on Jebbāli

Johnstone (1981), Simeone-Senelle (1997), Al Mashani (1999) and Clover (1988) report that Fulgence Fresnel, a French consul in Jeddah in 1836, makes the first reference to Jebbāli which he calls Eḥkili. According to Al Mashani (1999: 42), Fresnel has written many letters which provide valuable information about this language in 1839.

Simeone-Senelle (1997) mentions that in 1898 an Austrian expedition known as the *Südarabische* Expedition came from Vienna and began studying the people and languages in the southern part of the Arabian Peninsula and Socotra Island. Three pioneer scholars: Dav. Heinr Müller, Alfred Jahn and Wilhelm Hein have significantly emerged from this expedition and came back to Vienna with collected sample texts of Socotri, Mehri and Jebbāli languages. It is important to note that the scholars and explorers in this expedition identify Jebbāli as *Shkhawri* [ʃχauri] (Johnstone 1981; Simeone-Senelle 1997). Thomas (1937) reports the egregious geographical mistake Müller made when situating the Jebbāli habitat “on the Persian Gulf”, which is in fact quite far away from Dhofar. In 1909, Bittner studied these texts and wrote three articles describing these languages. It is reported in Al Mashani (1999) that Bittner published numerous articles attempting to devise grammars for Socotri, Mehri and Jebbāli. These texts continue to constitute the only source of information available for Jebbāli until 1937 (Al Mashani 1999:42).

The first mention of Ḥarsusi and Baḥḥari is made by Bertram Thomas (1937), a British scholar who speaks Arabic. His study introduces the ‘four strange tongues’ of the South Arabia revealing social, cultural and linguistic peculiarities of each tongue in addition to intensive comparative lists of numerous words including personal names and

names of animals. He explores aspects of the morphology and syntax of these languages such as pronominals, articles, nouns, sentences and more in each language. More relevant, he lists a collection of singular forms with their plurals but offers no discussion about how plural is formed. He classifies Jebbāli as a separate language distinct from Mehri, Ḥarsusi and Baḥari, which collectively form one group. According to Thomas, a person whose ear is accustomed to the dialects of Modern Arabic is struck by two pervasive features of Modern South Arabian Languages: “lateralized consonants or lisped sibilants and nasalized vowels” (Thomas 1937:236), especially those heard in Jebbāli words.

Although Lonnet’s 1985 article is solely devoted to presenting the geography and linguistic features of Mehri and Hobyot, she lists many phonological and morphological characteristics of Jebbāli towards the end of her article. Such information serves greatly in understanding the phonological tendencies of this language.

Simeone-Senelle (1997) offers background information about Modern South Arabian languages. She provides a comprehensive sketch which delineates the phonology and morphology of these languages. For instance, after discussing some sociological and geographical aspects of these languages, she embarks on giving a detailed description of the phonemic inventory, phonological processes, nominal and verbal morphology and syntax of these languages. She also explores specific linguistic aspects of these languages like numeral and deictic. Her study is broad and the information pertinent to Jebbāli is interspersed with information about other Modern South Arabian languages. However, it serves as a good linguistic background for these languages.

Al- Hafeedh's study (1998) on the languages and literary works of Mahrah<sup>9</sup> asserts that Mehri is the original language of all other Modern South Arabian languages. He also argues that it is the mother of the Semitic languages known today because it is the oldest among them. His study allocates chapters for three major Modern South Arabian languages (Jebbāli, Socotri and Mehri) presenting samples of their poetry, texts and songs. He first describes Jebbāli which he refers to as the *Himyyari* of Dhofar. Then, he intensively talks about Mehri which he names *Himyyari* of Mahrah. In both these chapters, he presents samples of Jebbāli and Mehri words and compares them to Arabic verbs to prove relatedness of these languages to Arabic. Finally, he discusses Socotri, delineating crucial facts about this language including its location, its ancient name, inhabitants and an overview of its poetry. From my perspective, the samples of Jebbāli words supplied are not enough to establish that Jebbāli and Arabic are interrelated. First, the sample supplied includes many borrowings from Arabic. Secondly, one cannot establish 'relatedness between two languages' based on only a handful of ten words or so.

Faber's article "Genetic Sub-grouping of the Semitic Languages" published in 1997 classifies Jebbāli and other Modern South Arabian languages as Southeastern Semitic based on the shape of the definite article *C(a)* where C is one of *h-*, *ħ-*, *ʔ-*. She argues that the classification of Semitic can be made based on their observed morphological and phonological innovations. These innovations could either result from contact with other Semitic languages, especially those of the same grouping, or evidence for similar genetic affiliation. After adopting the fully detailed classification of

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<sup>9</sup> Mahrah is both the tribal group and place of Mehri.

Semitic by Hetzron (1972 et seq.), she presents a number of prominent cues that support such a classification. Most relevantly, Faber (pp.13) mentions that forty nine Sabeen nouns form their plural with the prefix ʔ- reflecting the template ʔVCCVC. Seven of these have cognates in Jebbāli (one takes sound plural while the rest exhibit the internal mode of pluralization).

Al Shehri (2007) descriptively discusses the phonology, morphology and syntax of Jebbāli in five chapters of his Master's thesis. Each of these aspects is briefly examined and a comparison is then made between the linguistic features of Jebbāli and Classical Arabic. He presents Jebbāli texts including poetry, proverbs, folktales and conversational speech transcribed into quasi IPA and translated into Arabic. He also supplements his study with an atlas illustrating comparisons of lexical words found in the three varieties of Jebbāli: Central, Eastern and Western, as previously mentioned in Johnstone (1981). Moreover, he reviews the work done on Jebbāli from three aspects: Jebbāli in the old Arabic writings, systematic studies done by native and non native speakers of Jebbāli in the Arab world, and finally work done by scholars from the West. More relevant for the sake of this dissertation, the author talks about how Jebbāli marks plurals. For instance, he mentions the suffixes *-at* and *-u:n* for the regularly formed plurals. He also presents examples of broken plurals of Jebbāli, summarizing the canonical CV shapes with which plurals surface. Similar to previous work, his study is descriptive in general and does not include a theoretical linguistic framework to account for the phonology, morphology and syntax of this language other than mere description resembling what has been written about the language thus far. The two major contributions that can be acknowledged for Al Shehri are the atlas that pinpoints



variations in lexical words, phonology and morphology among the three varieties of Jebbāli and the comprehensive review of previous scholarship on Jebbāli.

In a joint meeting of the Anglo-Omani and British-Yemeni Societies, Morris (2007) presented an exuberant talk that highlights the current situation, earliest work and new research of Modern South Arabian languages. In a zealous tone of speech, Morris sheds light on the historical aspects of these languages and traces their origin and relatedness to Old South Semitic and Ethiopian. Her published talk is comprehensive and serves as an excellent sociolinguistic background to these languages, as it also presents the social life and traditions of the speakers of these languages. She finally talks about her own project which aims at collecting the poetry of Socotri in order to preserve this pivotal literary wealth and anticipates the future of these languages.

In the most recent Encyclopedia of Arabic Language and Linguistics (2009), Lonnet delineates some historical and linguistic facts about Modern South Arabian languages. She explores the historical events, shaping the development of these languages, their linguistic contact with each other and their “kinship proximity with Arabic” (pp.298). She also presents interesting discussion about the origin of some lexical borrowings, comparing and contrasting the shared roots of some representative forms of these languages with Arabic. Furthermore, she discusses some of the non-standard notation of the fricatives and offers their IPA equivalents. She argues that there is a recent tendency for the ejective fricatives to be realized as pharyngealized or uvularized due to contact with Arabic. She also discusses some of the peculiarities in the verbal and nominal morphologies, enumeration system and particles of these

languages. Historically, Lonnet argues that Jebbāli, which she describes as continental, develops away from the influences of Old South Arabic, Arabic and Eastern Modern South Arabian languages. Thus, Jebbāli is “marked by Arabic to a limited extent only” (pp.297). This conclusion refutes the claims made by native speakers of Jebbāli who demonstrate the relatedness of Jebbāli to Arabic (Al Mashani 1999 & 2003; Al Shehri 2007).

Belova (2009) explores the affinities and differences between South Semitic languages (Old South Arabic, Modern South Arabian and Ethiopian languages) and Arabic (including Classical Arabic, Modern Standard Arabic and the new dialects of Arabic). She argues that South Semitic languages are heterogeneous and the isoglosses between them and Arabic “may be common only with some particular group of dialects (of Arabic and South Semitic)” (pp.301), which poses a challenge to positioning Arabic within the same sub-grouping of South Semitic. She outlines a number of distinguishing phonetic, phonological, morphological and lexical features of Arabic and South Semitic. More relevant is her discussion of the phonological processes prevalent in Modern South Arabian languages and the nominal system, including the exploration of the plurality in these languages. Belova’s discussion of plurality is reviewed in the section on plurality in this chapter.

Al Mashani (2003) provides a comprehensive introduction to the Jebbāli language and people. He proposes the long name ‘Lisān Ĥimyyar al- Mu’āsir’ for this language based on his belief that it is a shared linguistic wealth and heritage. He reviews the major works of Jebbāli carried out by Arabs and Europeans and provides commentaries

and reflections about these works. Finally, he translated the lexicon he wrote in 1999 into Arabic with some additions and modifications.

### **Scholarship on the Phonetics and Phonology of Jebbāli**

Below I review the works that deal with the phonetic and phonological aspects of Jebbāli. These works are more linguistically focused than the above reviewed works, as their objectives are to explore specific phonetic and phonological features of the language.

Johnstone (1975) argues that Modern South Arabian languages have glottalized or ejective consonants which were thought to be only a privilege in Ethiopian and some Cushitic languages. His field work in Oman and Socotra documented a number of words which were phonetically tested. It is proven that these languages possess such a group of glottalized or ejective sounds. Towards the end of the article, Johnstone involves the opinions and reactions of some prominent scholars, who were made to listen to the recordings, about this discovery. Much valuable discussion and interrogation are raised about the origin of glottalization in Modern South Arabian languages. Interestingly enough, this type of discovery reveals interrelatedness between Modern South Arabian languages and Ethiopian languages. It will be worthy to explore the exact linguistic features shared between these two groups of Semitic in future research.

Frovola (2005) establishes ‘etymological correspondences’ for the glottalized or ejective sibilant /ʃ̣/. In Central Jebbāli, the corresponding sound is notated as /ʃ̣/ (pharyngealized sibilant). She argues that this sound has been found in Mehri, Ḥarsusi and Central Jebbāli and presents relevant data for this sound from these languages. Her data come from two sources: a Jebbāli Lexicon (Johnstone 1981) together with his

two other lexicons on Mehri and Harsusi and secondly from Brittner (1951). She maintains that there are 24 Jebbāli roots which have / $\text{f}^{\text{h}}$ /, fourteen of which synchronically correlates with /k'/. Looking closely at her data, I observe how / $\text{f}^{\text{h}}$ / in certain plurals and duals corresponds with /k'/ in the singulars. In quite a large number of forms, the opposite happens. She also includes a detailed discussion of the origin of these roots. She finally deduces that in Jebbāli, / $\text{f}^{\text{h}}$ / results from palatalization of /k'/. I observe that the comparison is not always valid as some of the so called “correspondent” forms or cognates do not seem to be so. Discrepancies of meaning and distinct radicals in the roots between the correspondent forms can easily be identified.

### **Scholarship on the Nominal Morphology of Jebbāli**

Works that document the morphological behavior of the language are numerous. Much research observes vast differences between the morphology of nouns and verbs and prefers to discuss them separately. Below, I first review the works of nominal morphology and then move to discuss scholarship on verbal morphology.

In his attempt to rectify his own mistakes in previous research on Jebbāli (Matthews 1957<sup>10</sup> and 1960), Matthews (1969) explores the true phonological nature of the deleted /m/ resulting in a nasalized vowel in Jebbāli which Maximilian Brittner considers “anything other than unexplained enigmas” (Matthews 1969:23). Matthews argues that the deleted /m/ before a vowel word initially and medially is a determiner in Jebbāli. It serves to make a word definite and is comparable to the definite article *a/-* in Arabic. To illustrate, when [misk] ‘musk’, [milħot] ‘salt’ and [mol] ‘property’ are made

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<sup>10</sup> A paper given at the 24th International Congress of Orientalists, Munich.

definite, they surface as [ẽsk], [ẽleħot] and [ũl] respectively<sup>11</sup> (Matthews 1969:25). Thus, it provides evidence for the existence of ‘determination’ in this language. In his final remarks, Matthews severely criticizes the hasty deductions and intolerable inaccuracies made by Brittner and his colleagues of the Austrian expedition in regards to their sheer ignorance about the true nature of the deleted /m/ in Jebbāli.

Lesalu’s 1945 research paper entitled “The Body Parts in Modern South Arabian Languages” serves as a comparative study of the Semitic ‘body parts’ vocabulary. It reveals how Modern South Arabian languages express body parts using words different from those widely used in other Semitic languages. According to Lesalu, these words qualify South Arabian languages to be an independent group. Lesalu’s data come from various sources including scripts collected by the Vienna Expedition. His study classifies vocabulary into: words common to all Semitic, words found in South Arabic and South Semitic, words existing in South Arabic and North Semitic, words common in South Arabic, Akkadian and Ethiopic, and finally vocabulary shared by South Arabic dialects only. His way of listing the words extracts the bilateral, trilateral and quadrilateral consonantal roots and lists all relevant words used in each and every language under these types of roots.

Johnstone began working on Jebbāli in 1969 with two principal informants who speak Eastern and Central Jebbāli. To begin with, he worked with a speaker of Eastern Jebbāli who is a native speaker of Mehri. Johnstone, on the basis of the words and texts collected from that informant, managed to write a word list. However, after learning that Central Jebbāli is “generally accepted as the best Jebbāli” (Johnstone 1981: xiii), he

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<sup>11</sup> In Matthew’s transcription, the tilde is on top of an /n/ where m deletes (e.g. [ñisk], [ñilħot] and [ñol]). However, I follow the IPA method of transcription which shows nasalization on vowels when /m/ deletes.

started to re-write his list so that it conforms to Central Jebbāli. In (1981), he completed a Jebbāli lexicon and published it. This lexicon includes background information about this language, its verbal system with its peculiarities, conjugated prepositions and the definite article. Johnstone's lexicon is very comprehensive and systematically documents Jebbāli words. It serves as an invaluable reference for Jebbāli despite the unusual notation used to transcribe the language.

Johnstone (1970) observes that previous work carried out by the *Südarabische Expedition* on Modern South Arabian languages does not make any assertion whether these languages mark 'definition' on nouns. There is only a categorical statement made by Matthews (1969) who lists three forms for the definite article *a-*, *ha-* and *ḥa-* but gives no evidence for this proposition. Johnstone meticulously investigates whether Modern South Arabian languages have a definite article by studying numerous examples representing four Modern South Arabian languages which he collected during his fieldwork in Oman. His data reveal that Mehri and Socotri mark definite article by attaching *a-*, *ha-* and *ḥa-* word-initially. Jebbāli, on the other hand, have *i-*, *je-* and *ε-* which he calls a *prosthetic*<sup>12</sup> vowel. Johnstone observes that the genitive and partitive forms mentioned in his notes for the first time are not marked by these prefixes. He also notes that this prefix can also be detachable or becomes a radical leading to the conclusion that this prefix has the tendency to lose its meaning and for a form to be used in its prefixed form only. He also observes that there are etymologically monosyllabic forms in which the attached prefix has become one of the radicals, especially in Ḥarsusi and Mehri.

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<sup>12</sup> According to the Encyclopedia of Arabic Language and Linguistics (2009: 728), prosthesis involves the addition of a short vowel to prevent the occurrence of impermissible consonant clusters word-initially.

Johnstone (1980a) argues that gemination which occurs in nouns marked for the definite article and with certain forms of the causative verbs is fairly a recent development in central and eastern dialects of Jebbāli. He observes that in both these sets, only certain sounds are geminated. He further claims that gemination as a morphological feature distinguishing meanings of words has long been lost from these dialects. He also believes that gemination characterizing subject forms are "...a function of stress and pattern" (Johnstone 1980a: 61). His evidence comes from loan nouns borrowed from Arabic which tend to surface without gemination in Jebbāli. However, he argues that borrowed verbs which have gemination in some forms and not others provide more convincing support for the loss of gemination in Jebbāli. To begin with, he discusses forms with the definite article and reveals that the most recurrent form of the definite article in Modern South Arabian languages is e- with variation in the quality of this vowel when a form begins with guttural sounds. However, in some cases, gemination occurs as a marker of definiteness in forms with gutturals. To illustrate his propositions, he lists many nouns that occur with the prefix e- in their definite form. He observes that if /b/ or /m/ are the first consonants in a word, then they get elided so that the e-prefix is no longer visible as a marker of definiteness. He also observes that the definite article is elided in forms that begin with voiceless consonants. Forms that begin with glides behave the same way as words that begin with a glottal stop. In verbs, Johnstone also notes that when an initial radical is deleted by a rule, the medial consonant gets geminated. In his conclusion, he offers no explanation as to why gemination continues to develop in these two groups. Such a study highlights many

interesting phonological and morphological tendencies in Jebbāli and provides a basic understanding of the interaction between morphology and phonology.

Nakano's book (1986) is based on a report written during two field projects granted to the author and done in Oman and Yemen with other researchers from Tokyo University of Foreign Studies. The book is more or less a semi-dictionary of Mehri, Socotri and Jebbāli in which the equivalents of some English words and expressions are listed for the three languages. Unlike Johnstone's lexicons of these languages, this quasi dictionary does not depend on the consonantal roots for the listings of these languages' vocabularies. Rather, the way it is organized is based on English categories such as body parts, dressing and toilet, food, habitation, tools,...etc for which their equivalent forms in Modern South Arabian languages are given. Before Nakano gave the lists, he provided the readers with the phonemic inventories for these languages followed by some remarks and notes about the notation not shown in IPA. Not all the languages have equivalents for the English words and there are many phonetic affinities in the shapes of the words expressing certain meanings in all of the Modern South Arabian languages.

Johnstone (1973) explores diminutives in Mehri, Socotri and Jebbāli. Although he observes that diminutives have infrequent occurrence in Modern South Arabian languages, he asserts that they may surface in speech only relevant to a few social contexts such as praise, blame, commiseration and when women talk to children. Thus, they may serve a 'caritative' function in the latter usage. He lists two main patterns for diminutives in each Modern South Arabian language and supplements them with various examples. More relevant for Jebbāli are the patterns CeC&C and CeCeCen. He



lists ample forms for these two patterns and shows their various connotations. Furthermore, he investigates plurals of diminutives and diminutives of body parts. Finally, he shows that the patterns of diminutives in his study deviate from the shape CuCaC which was thought to be the pattern of diminutives in Modern South Arabian languages. The second type of diminutive relates to CVCVC<sub>n</sub>. The vowel quantity of the diminutive marker *-an* for Jebbāli and Socotri is long but its quality is hard to establish.

In 1983, Johnstone wrote an article on the enumeration systems employed in 34 South Arabian languages. This work serves to acquaint readers with the enumeration system in these languages.

In his succinct article whose length is only three pages, Testen (1998) concludes that the stem of the cardinal numeral ‘nine’ in Semitic can be reconstructed as [tiʃ<sup>w</sup>ʕ-] whereby /ʃ<sup>w</sup>/ is phonetically realized as a palatal sibilant with lip rounding but ‘never with a w- glide (Nakano 1986:v) .This conclusion is based on surveying its prevalent shape in numerous common Semitic languages including Arabic, Biblical Hebrew, Akkadian<sup>13</sup>, Ugaritic<sup>14</sup>, Syriac<sup>15</sup> and Ge ‘ez<sup>16</sup>. However, the stem of this numeral in Modern South Arabian languages is remarkably different in two respects: the absence of the initial *ti-* and the presence of /s/ instead of the customary /ʃ<sup>w</sup>/ sound. This results in sVʕ as the

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<sup>13</sup> Akkadian is “the language of the Assyrians and Babylonians of ancient Mesopotamia” (Huehnergard 2000:xxi).

<sup>14</sup> The Ugaritic language is “known in the form of writings used in the lost city of Ugarit (modern Ras Shamra)”

<sup>15</sup> Syriac is a dialect of Aramaic which spread, together with the other Aramaic dialects, from the upper Euphrates (Aram Naharayim) into Syria and Mesopotamia (Restö 2009: 178-182).

<sup>16</sup> Ge ‘ez is the oldest written language which belongs to the Ethio-Semitic group. It dates back to the mid-fourth century C.E and continues to exist until approximately the tenth century C.E (Belova 2009:301).

constructed stem for the number 'nine' in Modern South Arabian languages. Testen offers insights to explain why the cardinal numeral 'nine' has undergone these specific changes. For example, he argues that the appearance of the sibilant reflects a regular phonological change which occurs prehistorically. As for the absence of *ti*- 'nine' initially, it resembles the widespread phenomenon of the loss of *t* characterizing certain sets of verbs in Jebbāli and Socotri. Although he does not have sufficient evidence, Testen claims that this erosion of *t* reflects an ongoing tendency in the language to abandon *t*-word-initially comparable to Ethiopian languages which merge /i/ and /u/ into /ə/. Testen's ideas require more evidence and intensive survey of numerous data from the language to validate his conclusions.

Al- Mashani (1999) thoroughly examines the lexical relation between Classical Arabic and Jebbāli. He does a comparative analytical study and devises a lexicon composed of four glossaries. He lists the Jebbāli words that correspond in root and meaning with Classical Arabic, those that correspond in root and have similar meaning with Classical Arabic, those whose meaning is similar to Classical Arabic but different in root and finally those that are exactly similar in both root and meaning. He also discusses phonetic shift and metathesis in Classical Arabic and Jebbāli. His methodology of listing the words in his lexicon is similar to Johnstone's lexicon of Jebbāli (1981).

### **Scholarship on the Verbal Morphology of Jebbāli**

In the verbal paradigms of Semitic languages, the *t*-prefix marks the 2nd and certain 3rd person forms. Johnstone (1968 and 1980b) observes that there is a *t*-prefix loss in two Modern South Arabian languages: Socotri (1968) and Jebbāli (1980b). While Jebbāli and Socotri exhibit a *t*-prefix loss in certain verbal themes including the

indicative, subjunctive and conditional forms of causative verbs, intensive-conative verbs, quadri-literal verbs and passive verbs, Socotri also elides this prefix in the reflexive and hollow verbs. Johnstone (1980b) presents lengthy paradigms of these themes proving that there is a systematic loss of the *t*-prefix. He explains that this loss represents a well-marked feature of Jebbāli and Socotri, especially in 3rd feminine singular, 2nd masculine and feminine singular and plural. He further shows that Jebbāli subjunctive and conditional passive forms extends this loss to the non-occurrence of the *i-/j-* prefix and the *n*-prefix of the first person plural. He finally draws the conclusion that Jebbāli and Socotri are closely related and this phenomenon indicates “the possibilities of the Semitic verb extension and change” (Johnstone 1980b: 470).

Testen (1992) offers a phonological analysis of the phenomenon of the loss of the *t*-prefix in Socotri and Jebbāli mentioned in Johnstone (1968 and 1980b). He thoroughly investigates the types of verbs that exhibit truncation of the *t*-prefix and divides them into two classes: verbs preserving *t*- and verbs lacking *t*-. According to Testen, although these two classes seem to “consist of apparently arbitrarily delineated set of stem-types” (Testen 1992: 447), this random classification becomes justifiable when comparing them with their stem-types cognates of Literary Arabic. He observes that Jebbāli and Socotri truncate the person marker *t* from verbs whose cognates in Literary Arabic have the pre-radical vowel /u/. He then explains the loss of the *t*-prefix from phonological and historical perspectives pointing out that the *t*-less forms result from a change in the initial sequence *tu-* to a simple vowel in the course of the morphological development of the verb. The loss does not happen when the pre-radical vowel is /a/. Testen also explains why *j-* and *n-* disappear from the passive paradigm of Jebbāli. He

shows that while Jebbāli consistently loses the *t*-prefix before /u/ in open syllables, it also loses *j*-, *n*-, and perhaps the glottal stop in closed syllables. According to Testen, this analysis allows us to list Jebbāli and Socotri alongside Arabic and Akkadian, providing evidence that early Semitic distinguishes between the pre-radical vowels /u/ and /a/ in the prefixed tenses of the verbs.

Hayword et al's study (1988) on the vowels contained in the verbal paradigm in Jebbāli was inspired by Johnstone's introduction in his Jebbāli lexicon (1981). That introduction describes two conjugational classes (C(A): CəCə□C and C(B): CéCəC) of the simple verbs in Jebbāli. These classes mainly differ in the shape the third person masculine singular takes in the perfective, imperfective and subjunctive forms. While most verbs can be classified under these two classes, Johnstone notes that verbs whose consonantal roots are characterized by weak radicals, gutturals or /b/ and /m/ have idiosyncracies and may thus diverge from the two classes. Hayword et al focus on the effect of gutturals contained in the roots of some verbs on the vowels, accent placement and CV shapes of these verbs. They observe that the conjugation taken by these verbs is hybrid and display features of both classes. After establishing the underlying canonical forms of the simple verbs in Jebbāli, Hayward et al intensively discuss how the vowels contained in verbs with gutturals differ. They also discuss the effect of accent placement on the nature of the surface form of the verb. Towards the end of their study, they manage to linearly derive a small subset of verbs with gutturals. I consider this study to be quite systematic. It also lists a number of phonological processes in the language which have direct bearing on the verbal paradigm of the language.

## **Scholarship on the Syntax of Jebbāli**

The syntax of Jebbāli has been examined in a PhD dissertation by Hofstede (1998) who presents a descriptive study of the syntax of Jebbāli. She explores the core parts of a nominal, prepositional and adverbial phrase and explains how relative clauses are expressed in Jebbāli. Then, she discusses simple clauses such as the non-verbal clause and the simple verbal clause with two crucial aspects relevant to the simple clause: interrogative and comparative syntactic constructions. She also offers a description of complex clauses expressing sentential arguments, embedded question complements, indirect quote and adverbial clause. Besides syntax, she investigates aspects of morphology in Jebbāli such as tense, aspect, modality, negation, degree of comparison and interrogative. Although her study is mainly descriptive in nature with numerous illustrative examples of syntactic and morphological structures, she sporadically ventures into offering a phonological descriptive analysis of the contexts when a particular structure occurs. For example, she describes why a particular structure takes on a plural meaning by listing its syntactic and morphological contexts. Moreover, when a certain morphological function is expressed by distinct allophonic structures, she explains the phonological contexts of each. Hofstede's work serves as a useful and comprehensive descriptive study of the syntax of Jebbāli since it explores many, if not, most of the syntactic structures of Jebbāli supported with illustrative examples from natural speech.

## **Grammatical Sketch of Jebbāli**

Below, I present a grammatical sketch of Jebbāli. I introduce the consonantal and vocalic inventories of the language in separate sections followed by a brief discussion of the phonological processes pertinent to consonants and vowels. I also offer a brief

description of the supra-segmental inventory, which sketches an overview of the syllabic structures admissible in Jebbāli and the stress pattern of the language. It is important to note that these two linguistic aspects have been poorly understood and little attention was given to them in the literature of Jebbāli.

## **Sound Inventory**

### **Consonants**

Central Jebbāli has quite a large consonantal inventory which includes 35 phonemic consonants, making Jebbāli's phonetic inventory quite expansive. In addition to these 35 phonemes, Central Jebbāli has the voiced lateral fricative [ɬ] which is an allophone to //l/. It surfaces when //l/ is followed by a high front vowel as in [gʲiɬi] (masculine), [gʲel-aɬ] (feminine) 'sick, ill' and [miχɬif, maχabləf] 'deserted place, sing. and pl.' It also surfaces when //l/ is preceded by a high front unrounded vowel as in [χiɬ/xel] 'maternal uncle, sing. and pl.'. /g/ is palatalized and realized as [gʲ] in the context of a front vowel as in [gʲiɬi] (masculine), [gʲel-aɬ] (feminine) 'sick, ill'. Central Jebbāli has the allophone [ɟʷ] for the phoneme /g/ when /g/ precedes rounded vowels such as /o/ and /u/ as in [ŋgal/ ŋiɟʷol] 'eyebrow, sing. and pl.' and [fɪnɟʷon/ fangti] 'coffee cup, sing. and pl.' and [tuɟʷur/tegɔrte] 'rich, sing. and pl., feminine'.

Other varieties of Jebbāli have a larger consonantal inventory which includes /ɟ/ and /dʒ/ (Eastern Jebbāli) as phonemes (c.f Hofstede 1998:19 for a comprehensive list of the consonants in all varieties of Jebbāli).

Johnstone (1975:98) argues that ejectives in Jebbāli must be grouped together with the voiced consonants from a morphological perspective. For instance, he observes that nouns with initial voiced sounds or ejectives when attached to the prefix *e-*, the definite article of Jebbāli, alter this vowel into *a-/ɛ-*, e.g. /e- ɰabrɛ/ → [aɰabrɛ]

'jinni that takes possession of a body' (Johnstone 1980a: 65) and /e-s'afir/ → [ɛs'afir] 'flower'. Hofstede (1998:27-30) also observes that the definite article precedes a noun if its first root consonant begins with a voiced sound or an ejective; otherwise, the noun occurs without the definite article if it begins with a voiceless sound<sup>17</sup>. Thus, they behave as a natural class together. Other evidence comes from the verbal morphology of this language. Johnstone maintains that a morpheme *e* in the derivation of certain verbs deletes before voiceless consonants and remains before voiced and ejectives/glottalized sounds. To illustrate, the base form of the verbs [egodəl] 'plait, braid', [ʔoðən] 'call to prayer' and [(o)ħoð<sup>ɛ</sup>ur] 'caution, warn' exhibits variations on the presence or absence of *e*-verb initially (Johnstone 1981: xx). The pharyngeal /ʕ/ is strongly articulated in Jebbāli (or enunciated, using Johnstone's terminology) and is always aspirated if it occurs word-initially and precedes a front vowel, e.g. [ʕ<sup>h</sup>en] 'eye'.

In the chart below, I only include the phonemic consonants of Central Jebbāli with their point and manner of articulation indicated. The transcription notation used throughout this dissertation is mainly IPA. Due to the fact that most emphatics are realized as ejectives and have glottalization (and sometimes post glottalization) in their realization, I transcribe them with an 'ejective' diacritic instead of the dot beneath the sound which represents velarization or pharyngealization in Arabic emphatic sounds.

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<sup>17</sup> This observation, however, is not without exceptions (c.f. Hofstede 1998:27 and 30). For example, when the first root consonant is a semi-vowel, it becomes unclear whether the definite article precedes or follows the noun.

Table 2-1 Phonemic chart of consonants

	bilabial	labio- dental	lamino- dental	alveolar	lamino- postalveolar	velar	pharyngeal	glottal
<i>Stops</i>								
voiceless				t		k		ʔ
voiced	b			d		g		
ejective						k'		
pharyngeal				tʰ				
<i>Fricatives</i>								
voiceless		f	θ	s	ʃ	x	ħ	h
voiceless ejective			θ'					
rounded sibilant			ʃʷ					
pharyngeal sibilant			ʃʷʕ					
voiced			ð	z	ʒ	ɣ	ʕ	
voiced pharyngeal			ðʕ	zʕ				



Table 2-1 Continued

	bilabial	labio- dental	lamino- dental	alveolar	lamino- postalveolar	velar	pharyngeal	glottal
voiceless pharyngeal				s <sup>h</sup>				
voiceless lat. fricative				ʃ				
voiceless lat. fricative ejective				ʃ'				
<i>Affricates</i>								
voiceless ejective lateral				tʃ'				
Nasals								
voiced	m			n				
Liquids								
voiced trill				r				
lateral voiced approximant				l				
central voiced approximant					j	w		

## Vowels

Similar to its expansive consonantal inventory, Jebbāli also exhibits a vocalic inventory which is “rich in qualitative [but not in quantitative] contrasts” (Ratcliffe 1998:196) because the language has undergone a change, shortening long vowels. According to Ratcliffe (1998:196), proto-Semitic long /aa/ and short stressed /a/ are usually reflected as /ɛ/ and /ɔ/ but also commonly /o/ and /u/. The chart below outlines the vowels in Jebbāli.

Table 2-2 Phonemic chart of vowels

	front	mid	back
high	i		u
	e		o
mid	ɛ	ə	ɔ
low		a	

Jebbāli has two major phonological processes that relate to its vocalic inventory: raising and backing. A vowel followed by /m/ is usually raised; /ɔ/ becomes [u] and /e/ becomes [i] (Johnstone 1981; Hofstede 1998). To illustrate, in the verbal paradigm, the imperfective takes the shape *in*-CV<sub>2</sub>C whereby V<sub>2</sub> is consistently /u/ in the vicinity of a nasal /m/. Compare, for example, [indum] ‘to stay’ and [ijfχum]<sup>18</sup> ‘to cry’ versus [intʕf] ‘to visit late at night; to come stealthily’ (Johnstone 1981:xxiii). The vowels /e/ and /ɛ/ have the allophone [a] which can be a front or back vowel.

Vowel length is not contrastive and long vowels are relatively rare, except where elision is involved. To illustrate, long vowels result from the deletion of /w/ or intervocalic /b/, or as a merger of the definite article with the first vowel of a noun whose first radical

<sup>18</sup> *n* in the imperfective prefix *in*- is assimilated to a following fricative.

is a glottal stop, e.g. /bedɛn/ = [e:dɛn] ‘body’ (Simeone-Senelle 1997:382; Johnstone 1981: xxx). Long vowels may also result from the deletion of /m/ word-initially as in /manzɪl/ → [i:nzɪl] or [ĩnzɪl] ‘house, sing.’.

Nasalized vowels are relatively common and they occur when /m/ is deleted or when /n/ spreads its nasal feature to neighboring vowels, e.g. [rem] ‘tall person’ → [re)ti] ‘tall person, sing. and pl.’. Nakano (1986) shows that any vowel in Jebbāli can be nasalized.

The vowels /i/ and /e/ are diphthongized and realized as [i<sup>h</sup>] and [e<sup>h</sup>] respectively. The vowel /o/ is realized as [o<sup>w</sup>], which can be also realized as [ɔ] by some speakers of Jebbāli, and /u/ is realized as [u<sup>w</sup>].

Simeone-Senelle (1997:382) states that Jebbāli never has diphthongs in its phonemic vowel inventory. However, Hofstede (pp.21) finds the diphthong [aɪ] in her fieldwork. Fieldwork done for this dissertation also found the diphthong /oɪ/ serving as a rare plural marker for some forms, e.g. [mɪnk’oɪ] ‘monitor lizards’ from the singular [mɪnk’-at], [mɛlb-ɛt] → [moloɪ] ‘corner, sing. and pl.’ and [k’ət<sup>h</sup>b-ɛt] → [k’t<sup>h</sup>oɪ] ‘carved wooden doll, sing. and pl.’.

### **Phonological Processes Pertinent to Consonants**

Jebbāli has a number of notable phonological processes which characterize both its consonantal and vocalic inventories. These crucial phonological tendencies are pointed out in major works of Jebbāli such as Johnstone (1975:95-104), Johnstone (1981:xiv), Lonnet (1985), Simeone-Senelle (1997), Hofstede (1998), Belova (2009) and Lonnet (2009). I will outline the major phonological tendencies that pertain to

consonants and then move to give some remarks on the vocalic inventory of the language in a subsequent section.

### **Devoicing and aspiration**

These phonological processes concern stops. Voiceless stops are aspirated word-initially and voiced stops are devoiced word-finally. To illustrate, /kot/ is realized as [k<sup>h</sup>ot] ‘tower’ and /kub/ is realized as [k<sup>h</sup>uɓ] ‘cup’ phonetically. The pharyngeal phoneme /ʕ/ is always aspirated if it occurs word-initially, and precedes a front vowel, e.g. [ʕ<sup>h</sup>en] ‘eye’

### **Elision**

In Jebbāli, /b/ and /m/ generally elide in initial and intervocalic position and their loss affects the length and quality of a following vowel. To illustrate, the vowel following a deleted /b/ lengthens, whereas the one following an elided /m/ nasalizes or lengthens, e.g. /mɛl/= [ɛːl] ‘money’ and /bedɛn/= [eːdɛn] ‘body’. However, intervocalic /m/ may not always delete, e.g. [e-mih] ‘the water’ versus /e-məndik’/= [ĩndik’] ‘the rifle’ (Johnstone 1981; Hofstede 1998).

### **Palatalization**

Palatalization occurs when a consonant (usually a stop) is followed by a front (high) vowel, typically /i/. For example, in Jebbāli, /g/ is palatalized [g<sup>j</sup>] as in [g<sup>j</sup>el-at] (feminine) ‘sick, ill’. According to Johnstone (1981) and Hofstede (1998), the degree of palatalization may vary depending on the phonetic context, dialectal variety and speaker. Moreover, certain other sounds are palatalized too in the vicinity of a high back vowel like /u/. For instance, /ʃ<sup>w</sup>/ is a phoneme in Central Jebbāli and an allophone of /k/ when /k/ is followed by a back rounded vowel as observed in [kabid] ‘liver, in Arabic’ which is pronounced as [ʃ<sup>w</sup>ubd-et] in Jebbāli, /ʃ<sup>h</sup>/ is a phoneme and an allophone of /k’/ as in [k’atməḥ] ‘to be disappointed, in Mehri’ is articulated in Jebbāli as [ʃ<sup>h</sup>ṯh] ‘to be

mean, disappointing person' and /ʃ/ is a phoneme and an allophone of /k/ as in /kirʃ/ 'belly, stomach' → [ʃirʃ], whereby /k/ becomes [ʃ] (Frovola 2005:431; Belova 2009:303).

### **Insertion**

In Jebbāli, there is a preference for forms to end in a consonant. Jebbāli speakers insert word-finally a glottal stop or /h/ in borrowed words from Arabic which end in a vowel (Johnstone 1981:xiv). For example, /kursɪ/ 'chair' becomes [kursɪʔ]. I also observe that Jebbāli speakers tend to insert either an /h/ or /ʔ/ before a final liquid or nasal in a form. The insertion of /h/ and /ʔ/ are rather arbitrary and there is no phonological context that restricts the insertion of /h/ over /ʔ/ or the opposite (/ʔ/ over /h/). As a matter of fact, some speakers accept the insertion of either /h/ or /ʔ/ in the same form, so these may be interchangeably added in a form. Where the final consonant of a word is a liquid or nasal, the combination of the following sounds have emerged in Jebbāli: -hn#, -ʔn#, -hr#, -ʔr#, -hl#, -ʔl#, -hm# and -ʔm# (Johnstone 1981:xiv).

### **Fortition and lenition**

Jebbāli has two contradictory processes (fortition and lenition) which simultaneously affect the glide /w/ and the stop /b/ in borrowed words from Arabic which underlyingly have these two sounds. The glide /w/ is normally realized as a glottal stop /ʔ/ or /b/ in initial and post vocalic positions /wħd/ ~ [ʔaħdi] 'alone'; /wħt/ ~ [baħt] 'monster'; /wld/ ~ [ʔelɛd] 'children'; /wgd/~ [jəbgɔd, ibgɔd] 'he may go' (Johnstone 1981: xiv). At the same time, intervocalic /b/ is substituted by /w/, /j/ or vowel lengthening, e.g. /e-bot/= [o:t] or [a:t] 'the house'.

## Substitution

In Jebbāli, as well as other Modern South Arabian languages, there is a free alternation between /f/ and /θ/ (Belova 2009:303). To illustrate, [θawr] ‘bull’ in Ḥarsusi is articulated as [for] in Jebbāli and Mehri.

## Metathesis

Jebbāli has many lexical forms borrowed from Arabic which have undergone metathesis. Examples include [lat<sup>ʕ</sup>aχa] ‘smudged’, [ʃaḥam] ‘fat of meat’ and [χamaʃa] ‘scratched’ in Arabic, which are pronounced in Jebbāli as [t<sup>ʕ</sup>alχ], [maʃḥ] and [tχam] respectively (more examples can be found in Al Mashani 1999).

## Supra-Segmental Inventory

### Syllabic structure

Unfortunately, the only work that briefly discusses syllable structures in Jebbāli is Simeone-Senelle (1997:382) who devotes a short paragraph stating that the common syllabic shapes are CV(C) and CV:. She states that consonant clusters such as CCV(C) or CCV: are not uncommon in word initial position. Moreover, in word final position, syllables with final clusters such as CVCC# occur. Jebbāli usually resolves the consonant clusters word-initially by inserting a *prosthetic* vowel in front of the first consonant, e.g. [(ə)ftəker] ‘to remember’ (Johnstone 1981:xxiii). The insertion of a *prosthetic* vowel licenses the occurrence of onsetless syllables as in [ɔχt<sup>ʕ</sup>ɔt<sup>ʕ</sup>] ‘letters, pl.’. Apart from the *prosthetic* vowels, Jebbāli words especially singular forms generally begin with a consonant and end in a consonant too. Where a form otherwise ends in a vowel, a glottal stop or an /h/ is added in a pause. Therefore, Jebbāli has VC, CV, CVC, CCV, CVCC, CCVC and V:C syllable structures. The syllable shapes VC, and V:C are

restricted to word initial position, as in [ək.bet] ‘cups, pl.’ and [ĩ:g.lɪs]<sup>19</sup> ‘room for guests, sing.’. The shapes CVC and CV are very common and occur in word initial, medial and final positions. This is illustrated in [de.fɛb.tər] and [mer.gɛl] ‘cauldron, sing.’, [fu.rum] ‘to fill up’, [k’ə.la] ‘child, sing.’, [əm.te.rot.] ‘car, sing.’ and [tə.ba.ku.tə] ‘tobacco, pl.’. As for the syllable structures CCV, CCVC and CVCC, they are mainly observed in word initial and final positions, as in [.ər.tti.] ‘ground, pl.’, [fə.ʕɔ.mtə] ‘man, pl’ and [.mhot.] ‘water, pl.’, [mas<sup>ʕ</sup>.t<sup>ʕ</sup>rah.] ‘ruler, sing.’, [.qoʔb.] ‘youthful but low’ and [qo.ʕodt.] ‘place or bed of a paralyzed person or one who cannot move.’. In Jebbāli, long vowels are phonologically derived; they surface after the deletion of a nasal /m/ or /b/.

## Stress

Several studies on Jebbāli unanimously<sup>20</sup> agree that Jebbāli words can have more than one prominent syllable (Simeone-Senelle 1997; Johnstone 1981), e.g. [dínít] ‘pregnant’ and [min<sup>ʕ</sup>ér-ót] ‘middle finger’. Johnstone (1970) states “a characteristic feature of [Jebbāli] is that all syllables, the vowel of which is not *anaptyctic*, tend to be equally prominent, the vowel of an open syllable being half-long to long.” (pp.296).

Stressed vowels are slightly longer than unstressed vowels in open syllables and in final .CVC# syllables. I observe that a noun maximally has two stressed syllables and stress always falls on the last two syllables, provided that the vowels in these syllables are full vowels and are not *prothetic*. In a form of three syllables, the last two syllables

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19 The underlyingly form is /mɪɡlɪs/ whose initial /m/ deletes and the following vowel nasalizes and lengthens.

20 Hayward et al (1988) have a different view about stress. In their study of the vowels contained in verbs in Jebbāli, they claim that they did not note any instances of verbs containing more than one accented syllable (pp. 247). They devise an accent rule for the perfective verb in Jebbāli which stipulates that except in the case of 3 feminine singular, 3 masculine dual, and 3 feminine dual forms (in which accent always falls on the inflectional suffix), the accent falls on the second stem vowel unless this is followed by a guttural, in which case it falls on the first stem vowel.

are stressed. For example, the form [mizél]<sup>wót</sup> ‘coconut-shell used as a receptacle for ghee’ has the last two syllables stressed. Therefore, stress in Jebbāli is assigned by a rule that goes as follows: starting from the end of a form, stress falls on the last syllable and the syllable immediately preceding it, provided that the vowels in these syllables are full and not inserted. Basic verbs in Jebbāli include two syllables with a single prominent stress due to the fact that only a single syllable has a full vowel. The templatic shapes of the verbs are: perfective CəCə□C and imperfective CéCəC (Hayward et al 1988:241).

### **Overview of the Nominal Morphology**

Nouns in Jebbāli have two genders (masculine and feminine) and three numbers (singular, dual and plural). The feminine markers are *-əh*, *-ɪt* and *-ɛt*. Simeone-Senelle puts it generally as (V)*t* whereby (V) can either drop or its quality may vary considerably, depending on the phonological context surrounding it. She maintains that some feminine nouns which are borrowed from Arabic take an */-h/* ending. Dual is externally indicated by the suffix *-i* and is usually followed by the numeral ‘two’, e.g. [ʁeg-*i* t<sup>ʰ</sup>ro] ‘two men’. In Jebbāli, duality is no longer systematically marked and dual can be used to signal plurality (Johnstone 1975:113). Plural forms, on the other hand, have diverse shapes and can be externally and internally marked.

Simeone-Senelle (1997) presents a discussion of the various CV shapes the singulars, duals and plurals take in the nominal morphology of Modern South Arabian languages. For the sake of this dissertation, I will limit the discussion to the shapes of Jebbāli nouns. The singulars of the biliteral roots have the shapes CVC and CVC+ a feminine marker, and the trilateral roots take the shapes CVC(V)C, CCVC, CV:CVC,



C(V)CVC and C(V)CV:C. For the quadrilaterals, the canonical shape is CVCCV:C, which is quite common.

Like other Semitic languages, Jebbāli imposes internal changes on the root to signal various meanings. However, gemination is not contrastive in Jebbāli. Thus, geminated root consonants are phonologically conditioned and do not indicate a semantic meaning. Observe the following meanings for the root {skn} 'dwelling, house' as different vocalic melodies are sandwiched between the consonants:

(2) sukn 'dweller'

maskan 'house'

maskin 'dwelling'

(Al Shehri 2007:174)

### **Plurality in Jebbāli**

Jebbāli, like other South Semitic languages, have two modes of pluralization: external (also known as sound) and internal plurals. Internal plurals involve internal stem changes such as mapping onto a template, reduplication, ablaut and infixation. It has also been noted that a singular form may have many plural shapes in Jebbāli (Johnstone 1981; Simeone-Senelle 1997).

Plurality in Jebbāli and other Modern South Arabian languages has been compared to some plural patterns of Ethiopian languages and not with Arabic broken plurals (Johnstone 1975:113). Ratcliffe (1998a) argues that plurality is a very revealing morphological process. Therefore, it must be taken into account when classifying Semitic languages. The diverse patterns of plural formation should be scrutinized as they can be indicative of where a particular language belongs in the classification of Semitic. Ratcliffe (pp.95-97) makes the following observations about plurality in Jebbāli in his discussion of the broken plural and Semitic sub-classification.

1. Jebbāli has a plural pattern for the masculine base nouns which is much closer to Ethiopian Semitic shape than to Arabic.
2. the most prevalent shapes of plural in Jebbāli are VCCVC (62 of 207 forms in Johnstone's Jebbāli Lexicon) or CVCVC (also 62 examples), with the inserted vowels /ɔ/, /u/ and /ɛ/, very rarely do /e/, /i/ surface in these shapes. However, /a/ shows in guttural environment only. Therefore, the most common shapes are ɔCCɔC, ɛCCɔC, ɛCCɛC, ɛCCuC, CVCɔC, CVCɛC and CVCuC.
3. there are 25 plurals with word initial consonant clusters. They neither have an initial vowel nor an epenthetic vowel to break up the consonant clusters.
4. the third most common shape of plurality (28 out of 207) is ɛCCeC(V)t. This shape reflects a common plural pattern in Ge 'ez.
5. the sound feminine plural is also commonly found but usually derives from weak root or bi-radical singulars. This shape exhibits a vocalic stem change.
6. the feminine singular suffix has the shapes -et, -ɛt, -at and -ɔt. There is a correlation between the quality of the vocalic suffix and the plural form. Singulars taking the shape CvCCet are observed to strongly favor the plural shape CeCɔCte, with inserted /ɔ/ and feminine plural suffix -te. On the other hand, an internal plural shape CVCVC (in which the vowels are usually /ɛ/, /e/, /a/ and occasionally /ɔ/, /o/ or /u/ and often a copy of the vowel in -Vt) is preferred for the singulars CVCCet (52 of 59 forms), CVCCɔt (26 of 27) and CVCCat (11 of 11).
7. quadriliteral singulars take three distinct shapes. The first shape they take is the common southern Semitic shape CaCaaCiC but the second syllable is not long and has the vowels /o/, /ɔ/, /u/ or rarely /ɛ/ in Jebbāli. Secondly, they take a shape derivable by the alternation of the vowel in the final syllable CVCCe/aC → CVCCoC and CvCCɛ/iC → CvCCuC and finally the shape CVCVbCVC with an infix -Vb- (-ɛb- or -ab-) between the second and third radical.
8. the reflex of the quadriliteral shape CoCoCuC is common for the feminine but rare for the masculine singulars.
9. the prominent plural shapes in other southern Semitic languages CaGaaCiC and CaCaaGiC whereby G → glide do not occur in Jebbāli. This is reflective of the fact that Jebbāli has no CVCVVC or CVVCVC patterns. This also has to do with the fact that both consonantal and vocalic length contrasts have been lost in the language.
10. the reflex of the participial form CaaCiC takes the pattern CɔCəC. The vowel of the first syllable may be /o/ or /u/ and the vowel of the second syllable may be /u/.
11. the most common plural for adjectives is CVCɛCt or CvCaCt.

The current synchronic study of ‘Noun Plurality in Jebbāli’ is theory based and focuses on the morphophonological processes involved in the formation of noun plurals in Jebbāli. It, therefore, differs from Ratcliffe’s diachronic study of plural formation in Semitic (1998), which mainly aims at documenting the most common tendencies observed in the CV shapes of plurals and finding a proto-type plural form in Semitic. However, some of his observations regarding noun plurals are confirmed by this study. For example, I also observe that the most common plural marker for adjectives is the default plural suffix  $-t(V)$  (observation #11) and agree with Ratcliffe about the fact that this suffix is a feminine plural marker and commonly found (observations #5 and #4); whether it attaches to weak or sound roots is not explored in this study. Moreover, this study conforms with Ratcliffe’s observation that quadri-literal nouns most often are pluralized by either ablaut or  $Vb$  infixation (observation #7). These two processes are very prevalent in Jebbāli, and I observe that ablaut targets other shapes of singular forms too (bi-literal and tri-literal). Contrary to Ratcliffe, I did not see the shape  $CaC(/o/, /ɔ/, /u/)CiC$ , which he claims to be also common for the quadri-literal forms, as prevalent as infixation and ablaut. In observation #9 above, Ratcliffe states that “Jebbāli has no CVCVVC or CVVCVC patterns”, and this study also confirms the non-existence of such plural shapes in the language. Ratcliffe also observes that the most prevalent shapes of plural in Jebbāli are VCCVC or CVCVC, with the inserted vowels  $/ɔ/$ ,  $/u/$  and  $/ɛ/$ , very rarely do  $/e/$ ,  $/i/$  surface in these shapes (see observation #2). I list these shapes under ‘templatic plurals’ and conclude that they are not as common as other plural patterns. In my data, the initial V in the template VCCVC is *prosthetic* and does not appear in many plural forms. While this study also shows that the feminine suffix bears the shapes  $-et$ ,  $-$

εt, -at and -ɔt, it does not investigate if there is any correlation between the quality of the vocalic suffix and the plural form.

Simeone-Senelle (1997:388) identifies some crucial features of plurality in Jebbāli and other Modern South Arabian languages. The most common pattern of plural for the triliteral verbs is CCV:C (a plural for many feminine singulars) and for the quadriliteral are CCV:CC and CCVCC. A common pattern of plurality in Jebbāli is CCVC**Vb**CC and there is also vocalic opposition observed in the last syllable of both the singular and plural forms. Simeone-Senelle (1997:388) also identifies that some plural patterns correspond to Arabic *plural of the plural* (emphasis hers). External plural, on the other hand, takes the suffix -Vtə (n) (Simeone-Senelle 1997:388 and Lonnet 1985:54). Some plurals with the suffix -i come from the dual (Johnstone 1975:113).

Similar to Simeone-Senelle's conclusion, this study also concludes that Vb infixation and ablaut are, by and large, the most common mechanism for plural formation in Jebbāli. However, this study does not list CCV:C as a common plural pattern for the tri-literal verbs, and agrees about Ratcliffe's observations that Jebbāli plural forms do not involve length in their overall shapes. Simeone-Senelle claims that -Vtə(n) is a marker for the external plural. However, this study does not have the (n) included in the default plural marker -t(V), and shows that the /n/ belongs to a different plural suffix -Vn, and is never optional (as shown by the brackets around it in Simeone-Senelle's study).

### **Literature Review on Plurality in Jebbāli**

Despite the interesting complexities involved in the plural formation of this language, Jebbāli plurals are not explored analytically or theoretically. The only works which briefly touch on plurals in Jebbāli are Ratcliffe (1992, 1996, 1998a &b) and

Simeone-Senelle (1997). Belova (2009) offers an interesting discussion about plurality in South Semitic in general and briefly mentions some recurrent shapes of plurals in Jebbāli.

These studies are descriptive and they only document the common plural shapes in the language. Moreover, they are not solely devoted to the study of plurality in Jebbāli. Insufficient and sporadic mention of Jebbāli plurals is made in order to either supplement a grammatical sketch of Jebbāli (Simeone-Senelle 1997) or to compare Jebbāli plurals with modes of pluralization in Semitic (Ratcliffe 1992, 1996, 1998a; Belova 2009). Furthermore, there is no work done on Jebbāli plurals which attempts any of the new theoretical and analytical phonological and morphological frameworks which prove to offer systematic accounts for the morphophonological particulars of this language. When describing plurality in Jebbāli, they only reference CV shapes without mentioning any relevant phonological process. However, these works do give an idea about the most common patterns of plurals in the language with numerous supportive examples drawn either from fieldwork in Oman or a Jebbāli lexicon (Johnstone 1981). Therefore, they serve as a background for a study of plurality in the language.

This section reviews the major work that discusses and describes plurality and plural patterns in Jebbāli and outlines the knowledge gaps in the literature with respect to this pivotal research area. Most specifically, it reviews Ratcliffe (1992), Ratcliffe (1996), Simeone-Senelle (1997) and finally Ratcliffe (1998a &b).

In his lengthy diachronic study to reconstruct a proto-language for the broken plural formation in Afro-Asiatic languages and Semitic, Ratcliffe (1992) surveys quite a large number of languages revealing diverse patterns of plural formation and arguing

convincingly that long -aa generally characterizes the broken plurals. In the course of surveying plural patterns in Modern South Arabian languages, he provides insightful discussion on Jebbāli plurals comparing them with modes of pluralization in other Southwest Semitic languages (Jebbāli was thought to belong to Southwest Semitic then) and Arabic in particular. Most relevant for the sake of this dissertation, he argues that South Semitic and Jebbāli never express plural by reduplication which only occurs as a result of templatic expansion for bi-radical and weak roots. He also states, with illustrative examples, that Jebbāli's long vowels have evolved into short stressed vowels and their quality has been phonologically neutralized. His discussion on remnant sounds /n/ and /l/ of some plural forms provides basic understanding to the otherwise unusual behavior of some derived plurals, whose singulars have no such sounds underlyingly.

Ratcliffe (1996) briefly discusses Jebbāli plurals whose second and third radical is exactly the same sound, and argues that these plurals are merely templatic expansion. He maintains that Afro-Asiatic languages do not express plurality by reduplication. However, reduplication surfaces to conform to some templatic restrictions imposed by the relevant language. He provides evidence based on the behavior of similar reduplicated plurals in other Semitic languages.

Ratcliffe (1998a) presents valuable discussion about patterns of plural formation in Jebbāli. He lists the diverse CV shapes of the plurals along with the most common singulars from which these plurals are derived. He further illustrates the shapes with examples and deep discussion on their behaviors and their general phonological tendencies. Interestingly, he observes that Jebbāli's patterns of plurality are closer to

Ethiopian than to Arabic. The major observations made in Ratcliffe (1998) about plurality in Jebbāli were listed in the section of plurality in Jebbāli above.

Ratcliffe was mystified by the large number of different vowel qualities in what he calls group I plurals (i.e. plurals of CVCC masculine). There are CVCεC, CVCɔC, CVCuC, CVCeC, etc. He also questions the plurals with -Vb- infix (personal communication). He states "these forms all seem to go back to CVCaaC and ʔaCCaaC, but could also reflect forms with inserted /u(u)/ or short /a/" (1998b:198). Moreover, in languages where both internal and external plurals co-exist, Ratcliffe (1998b: 219-242) maintains "the internal plural is either the obligatory or at least the only productive plural for underived, unmarked nouns of three or fewer consonants (stem shapes CVC, CVCC, CVCVC), while the external plural is generally obligatory for productively derived nouns such as participles and verbal nouns". Ratcliffe, contrary to the claims that will be made in the analysis of Jebbāli plurals, assumes that the shape of the stem (input) determines the shape of the plurals (output) instead of the output singulars serving as the base for the output plurals. However, it is important to remember that Ratcliffe has a different purpose of studying plurality (comparative and historical with the aim of reconstructing a proto-plural in Semitic) while this study is phonology oriented.

Simeone-Senelle (1997:388) identifies some crucial features of plurality in Jebbāli and other Modern South Arabian languages. She outlines the most common patterns of plural in this language and other Modern South Arabian languages. Her list of the plural shapes in the language is not as comprehensive and precise as Ratcliffe's; however, it serves a good background for common plurals of Jebbāli.

Belova (2009) discusses some plural shapes taken by Jebbāli and other Modern South Arabian languages. For instance, she observes that the CuCu:C pattern is so rare in Modern South Arabian languages (e.g. k'un/ k'erun 'horns' in Jebbāli). Moreover, some plural patterns found in Ḥarsusi correspond etymologically to the Arabic pattern CaCu:C or CiCa:C. She also argues that the plural shape [θawr]/ [heθweret] 'bulls', which occurs in Ḥarsusi, is relatively rare in other Modern South Arabian languages.

### **Concluding Remarks**

Johnstone (1975), Simeone-Senelle (1997) and Ratcliffe (1998) whose works are reviewed above have made crucial observations about plurality and identified the most prevalent plural patterns in Jebbāli. Their studies provide insights into the understanding of this morphological phenomenon and highlight certain facts including the closeness of some plural patterns to Ethiopian languages. Ratcliffe's work in particular provides insightful discussion of the study of plurals in Modern South Arabian languages (Jebbāli and Ḥarsusi) and other Semitic languages. His arguments in support of the need to classify Semitic on the basis of the behavior of their plural formation are quite illuminating and revealing. Moreover, the tendencies of these plurals to resemble plural patterns of Ethiopian languages may support their inclusion under the same branch. I particularly acknowledge the organization of the plural patterns in Ratcliffe (1998a & b), and his thorough discussion based on the thoughtful comparison he made among plural patterns in Semitic languages.

However, these studies are not without shortcomings. The fact that they are not holistically devoted to the study of plurality in Jebbāli does not qualify them to be comprehensive references to this issue. Simeone-Senelle (1997) talks briefly about plurals in Modern South Arabian languages since her work focuses mainly on sketching



the grammar of these languages and acquainting the readers with the peculiarities of their phonological and morphological aspects. Ratcliffe limits his discussion to certain plurals, and does not tackle all existing plural shapes in Jebbāli.

### **Summary of Chapter Two**

This chapter serves as an overview of the language under study in this dissertation. It discusses the geographical location of the language, its speakers and genetic affiliation. It also situates the data that will be analyzed in a subsequent chapter, and reports major scholarship done on Jebbāli and other Modern South Arabian languages. It also sketches the phonemic inventory of the language using the IPA which previous works on Jebbāli did not fully embrace. It was indeed very hard to follow these works since some non-standard notation figured prominently with confusing descriptions about the place and manner of articulations of the phonemes in Jebbāli. This dissertation will hopefully be a reference to the IPA phonemes of the language and smooth the path for future research on Jebbāli. In this chapter, I also provided a description of the prominent syllable structures, stress, nominal and verbal morphologies of the language. Finally, I reviewed previous scholarship on plurality in Jebbāli, outlining the background information on this area of research.

The next chapter discusses plurality in a number of Afro-Asiatic languages and highlights the most prevalent plural formation processes in these languages. It also explores some salient phonological alternations that accompany the formation of noun plural in these languages.

### CHAPTER 3 PLURALITY IN AFRO-ASIATIC LANGUAGES

One of the most intriguing and much investigated morphological phenomena in Afro-Asiatic languages is plural formation. This phenomenon, which has exposed unusual mechanisms for forming plurality, has long captivated the interest of linguists who explore the diverse plural patterns in these languages with considerable enthusiasm (c.f. Worrel 1920 for Hamitic<sup>21</sup>; Vergote 1969 for Coptic and Egyptian; Zaborski 1986 for Cushitic; Arabneh 1978 for Hebrew; McCarthy and Prince 1990 for Arabic; Racliffe 1992, 1998a & b for Berber and a host of Semitic and Afro-Asiatic languages; Newman 1990 for Chadic, Buckley 1990 for Ethiopian; and subsequent works on plurality in Afro-Asiatic languages).

Afro-Asiatic languages exploit a number of distinct mechanisms to mark noun plurality. For instance, in addition to the usual suffixation mechanism widely attested in Indo-European languages<sup>22</sup>, noun plural in Afro-Asiatic languages is also expressed by an internal plural which constitutes the most common type of plural formation for a number of Afro-Asiatic languages including Arabic (Levy 1971; McCarthy and Prince 1990a; Abd-Rabbo 1990; Abu-Mansour 1995 among others). Suffixation, however, is not purely sound, linear or straightforward in many of the Afro-Asiatic languages (e.g. Hausa, Hebrew, Jebbāli, Berber and Amharic). Much allomorphy in the stem happens when a plural suffix attaches to the singulars in order to meet certain phonological or morphological requirements imposed by the language.

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21 Hamitic is no longer a valid language family; however, the term remains in use in academic works done by European scholars.

22 Indo-European languages also mark plurality by non-concatenative morphological processes. For example, English has ablaut, e.g. *mæn* → *mɛn*.

Ratcliffe (1998: 86) shows the relative distribution of internal and external plural formation in Afro-Asiatic languages. He maintains that Hebrew and Aramaic form their plurals mostly by suffixation; the majority of derived nouns and nouns with more than three consonants take external plural most of the time. On the other hand, Arabic, Old South Arabian languages, Modern South Arabian languages and Tigre utilize internal plural to mark plurality in their nominal morphology. Where the internal plural is productive, the external plural for these languages is obligatory in derived nouns only.

The two most prevalent mechanisms for plural formation in Afro-Asiatic languages are suffixation (sound plural) and internal (broken) plural. In Berber, there is also a mixed plural in which a combination of internal and external plural markers occurs to mark plurality (Ratcliffe 1992: 475). Under internal plural, there are many sub-patterns such as affixation with internal change, reduplication, mapping singulars onto diverse plural templates, infixation, and vowel opposition. Ratcliffe (1992), in his diachronic study to re-construct a proto- Semitic language on the basis of plural formation, has classified these diverse plural mechanisms into five major types of pluralization: Suffix Type, Tonal Type, Reduplication, Internal or /aa/ Type and Lexical Type. The tonal type is observed in tonal languages which also use tone as a contrastive feature to mark plurality. Because this type is not true for Jebbāli, it is not discussed here.

This chapter discusses the major morphological mechanisms employed in the plural formation by different Afro-Asiatic languages. It also describes the phonological consequences of these mechanisms. More specifically, it surveys the most common mechanisms of plural formation in Arabic, Hebrew, two Ethiopian languages (Tigrinya and Amharic), Berber, **Hamitic** languages, a host of Chadic languages (most

significantly Hausa), Cushitic languages, Modern South Arabian (Harsusi and Jebbāli)<sup>23</sup> and finally Egyptian and Coptic. Although the list of languages surveyed is, by no means, complete, the discussion herein highlights the major attested mechanisms. I observe that there appears to be no appreciable distinction among the languages or dialects classified under a family language in the general patterns of plural formation. Therefore, my exploration of a certain family language is limited to representative daughter languages since the same plural patterns may be the same in the other daughter languages. I also observe that the majority of languages surveyed here employ the same mechanisms but the details (i.e. shape of the suffix or the phonological consequence that the suffix entails) vary greatly. I also note that quite a few languages use similar suffixes to mark plurality; both Ge'ez and Jebbāli mark plurality by the suffix  $-t(V)$ . Berber and Arabic use  $n$  in their plural morphemes: Arabic has  $-u:n$  and Berber utilizes  $-n$  for masculine and  $-in$  for feminine.

In order to offer a succinct discussion, I only outline the most prevalent and commonly used mechanisms of plural formation that relate to the patterns of plurality observed in Jebbāli, discussed in Chapter One. I classify these patterns into two major mechanisms: Suffixation and Internal Plural. Under Internal Plural, I list a number of relevant mechanisms such as ablaut, mapping onto templates, infixation and reduplicating a consonant from the base. Before I embark on the description of these mechanisms, I will present the most widely accepted genetic classification of the surveyed Afro-Asiatic and Semitic languages, summarized in Robert Hetzron in 1997. Then, I will outline a number of observations relevant to plural formation in Afro-Asiatic

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23 The reason for limiting the discussion to these two Modern South Arabian languages is the non availability of literature on plurality in the other languages.

languages. I conclude the discussion by briefly outlining the shared characteristic features between Jebbāli plurals and plurals in Afro-Asiatic languages.

### **Classification of the Surveyed Languages**

The Afro-Asiatic language family includes six main branches: Berber, Chadic, Cushitic, Egyptian/ Coptic, Omotic and Semitic. There are five major nodes within the Semitic branch: Arabic, Northwest Semitic, Ethiopic, South Arabian, and East Semitic (Faber 1997).

This chapter highlights the plurality mechanisms in Berber, Chadic, Cushitic, Egyptian/ Coptic and the first four nodes of Semitic in the order presented in the classification of Semitic below. It will also discuss the plural form in three language groups in the Afro-Asiatic language family: Chadic, Cushitic and Egyptian/ Coptic. Under Chadic, I will discuss Kanakuru, Jegu, Kera, Ga'anda, Bachama and Hausa. The discussion of Cushitic includes the Bishari dialect and Afar-Saho. Finally, I review plurality in Egyptian and Coptic.

As mentioned above, many of these languages display similar tendencies in the general patterns of plural formation. Moreover, the majority of daughter languages classified under a certain language family shows no appreciable distinctions in plural suffixes or internal change. Therefore, I only choose representative examples which showcase the shared plural patterns between these languages and the language under study.

The languages discussed in this chapter are genetically interrelated, and many affinities in the plural formation processes exist among them. The representation below reveals the classification of Semitic, and lists the daughter languages whose plural formation tendencies will be subsequently explored.

## (1) Classification of Semitic

### Arabic

#### Northwest Semitic

Canaanite languages

Hebrew

Aramaic languages

#### South Semitic

Western South Semitic

Ethiopic

Cushitic

Bishari Dialect

Afar-Saho

North Ethiopic

Ge 'ez

Tigrinya

Tigre

South Ethiopic

Amharic

Gurage

Eastern South Semitic

Harsusi

Jebbāli

### **Observations on Plural Formation in Afro-Asiatic Languages**

Some Afro-Asiatic languages make fine semantic distinctions between the different types of plural patterns they exhibit. Moreover, different plural patterns may serve distinct grammatical functions. For example, Arabic has three types of plurals based on their semantic relation (plurals of paucity, plurals of multitude or multiplicity and collective plurals). Plurals of paucity relates to the numbers from three to ten whereas plurals of multiplicity indicate 'more than ten'. Collective plurals relate to a 'group' of things. This fine distinction has been lost in many modern dialects of Arabic (e.g. Omani Arabic), which no longer references how many numbers a plural denotes. By and large, internal plurals are used to express multitude in a wide range of Arabic dialects. Cushitic languages have singulative, collective and paucal plurals (Zaborski 1986). The term 'singulative' indicates a singular nominal that is inflected for singular

number, often because the bare form is a collective (singulatives and collectives are common in Arabic too) (Kramer 2009: 183). The usual scenario cross-linguistically is that singulars are morphologically unmarked. However, the Cushitic family and Arabic mark singulars too. Chadic languages encompass noun plurals and pluractional verbs which mark numbers in verbs (Newman 1990). One of the peculiarities of plurality in Chadic is the identity of markers of nominal plurals with the markers indicating the 'frequentative' or 'intensive' form of the verbs and the plurality of the objects of the verb at the same time (Frajzyngier 1977: 37). Yimam (1996) also claims that there are four numbers in Amharic: singulative, singular, paucal and plural. Paucal refers to "few" number of items.

Plurals in Afro-Asiatic languages can be sensitive to gender. To illustrate, the majority of regular Arabic plurals display sensitivity to gender; singulars which belong to the feminine class take the plural suffix *-a:t*. This can also be attested in a number of Afro-Asiatic languages including Jebbāli whose default plural suffix *-t(V)* is also a feminine plural marker. Furthermore, in Cushitic languages, the feminine singulars are attached to a plural suffix different from the plural suffix attached to the masculine singulars. In Chadic, however, Newman (1990: 6) observes that "gender is never distinguished in the plural". Thus, plurals bear a common gender and can equally relate to masculine and feminine. In Berber, "nouns always have a prefix, which varies with gender (masculine or feminine), number (singular or plural) and state (absolute or construct)" (Ratcliffe 1992:459).

One of the striking characteristics of plurality in **Hamitic** languages is that the plural of a masculine noun must be feminine while that of a feminine must be masculine

(aka polarization or polarity). The feminine ending, which is the marked class for these languages, indicates the plural of a masculine noun. Worrel (1920) argues that this is the case for Somali collective plurals too. Thus, in Hamitic, the plural of many masculine nouns such as [ʕali:m] ‘scholar; scientist, sing.’ becomes feminine [ʕulama-aʔ] ‘scholars; scientists, pl’ which, according to Worrel, bears a feminine ending -aʔ. The feminine singular nouns like [baɪd-ah] ‘egg, sing’ deletes their feminine suffix and become masculine [baɪd] ‘eggs, pl.’

### Suffixation

The most widely employed mechanism for plural formation in Afro-Asiatic languages is suffixation. Almost all the languages surveyed here are observed to use suffixes to mark plurality. However, the shapes of suffixes used vary considerably from language to language. Below, I survey how various Afro-Asiatic languages use suffixation to signal plurality.

In the Arabic sound plural, masculine singulars take *-u:n* in the nominative and *-i:n* in the accusative case, e.g. [muʕalɪm] ‘teacher, sing.’, [muʕalɪm -u:n] or [muʕalɪm -i:n] ‘teachers, pl.’. Feminine nouns, on the other hand, take the plural morpheme *-a:t* when marking plurality (e.g. [tɑ:wɪl-ah] ‘table, sing.’, [tɑ:wɪl -a:t] ‘tables, pl’). Suffixation in Arabic is straightforward and the length in the final syllable of the singular form is not affected by the attachment of yet another heavy syllable of the plural suffix, e.g. [tɑjja:r] ‘pilot, sing.’ [tɑjja:r-u:n] ‘pilots, pl. nominative.’ and [tɑjja:r-i:n] ‘pilots, pl. accusative.’<sup>24</sup>

Ractliffe (1998:85) maintains that Hebrew’s most pervasive mode of pluralization is external plural. Ravid and Schiff (2009: 50-52), who thoroughly discuss plurality in

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<sup>24</sup> The syllable shape CVVC is only allowed word finally. In this example, since the plural suffix begins with a long vowel, the new syllabification makes the next to last syllable .CVV. instead.



conjunction with a host of phonological alternations in Hebrew, also claim that forming plurals in Hebrew is mainly a stem suffixation of *-im* for the masculine nouns; e.g. [bakbuk] ‘bottle, sing.’ [bakbuk-im] ‘bottles, pl.’ and *-ot* for the feminine nouns, e.g. [sira] ‘boat, sing.’ [sir-ot] ‘boats, pl.’ Masculine singular nouns in Hebrew are typically phonologically unmarked as in the above cited form [bakbuk] ‘bottle’ or end in *-e*, e.g., [mixe] ‘lid’, [more] ‘teacher’ and [kone] ‘customer’ while feminine singular nouns are marked by the stressed *-á*, e.g., [pará] ‘cow’, [morá] ‘teacher, feminine’, [koná] ‘customer, feminine’ or by the widely attested feminine suffix *-t*, or its variant *-ut*, e.g., [saparit] ‘hairstylist’ and [xanut] ‘shop’.

In Hebrew, suffixation may keep the stem intact or it can impose morphological and phonological changes into the stem to which the suffix attaches. There are five major stem changes outlined in the literature of plurality in Hebrew (Arabneh 1978; Ravid and Schiff 2009). The first phonological consequence is *vowel reduction or deletion*. As stress shifts, the used-to-be stressed vowel either shortens or deletes all together, e.g. [pákid] ‘clerk, sing.’ [pkidim] ‘clerks, pl.’. However, if the stressed vowel is preceded by a sonorant, then another vowel is inserted. To illustrate, in the form [málon] ‘hotel, sing.’, the stressed vowel /a/ is preceded by a sonorant /m/. After /a/ deletes and becomes /mlon/, /e/ is inserted. The final plural shape becomes [melonot] ‘hotels, pl.’ in which the plural suffix *-ot* is attached. The second phonological stem change involves *vowel opposition/ change*. For instance, a monosyllabic noun undergoes vowel change, e.g. [xec] ‘arrow, sing.’ [xicim] ‘arrows, pl.’. The third change involves an *insertion or deletion of -t*. While some feminine singular nouns ending in *-t* lose it, other feminine nouns ending in a vowel *-a* retrieve it. The fourth phonological change involves a *stop/*

*spirant alternation* which is conditioned by many morphological and lexical contexts. According to Idsardi (1997), the basic generalization that governs stop/ spirant alternation in Teberian Hebrew is that “fricatives appear postvocally and stops appear elsewhere (postconsonantly and at the beginning of words following a pause)” (pp.368). So, this phonological process is restricted to coda position, e.g. [zikaron] ‘memory, sing.’ alters its stop into spirant [zixronot] ‘memories, pl.’ By the same token, a spirant changes into a stop, e.g. [af] ‘nose’ becomes [apim] ‘noses’. Finally, a host of miscellaneous *phonological changes* may occur to mark plurality in conjunction with suffixation, e.g. [iʔa] ‘woman, sing.’ alters to [naʔim] ‘women, pl.’

One of the phonological consequences for attaching the plural suffix in Hebrew is stress alternation in nouns. The stress moves to the final syllable in plurals. For example, when the plural suffix *-im* is attached to [xatúl] ‘cat, sing.’, the stress shifts to the last syllable [xatulím] ‘cats, pl.’. In the feminine singular stems, if the feminine suffix *-t* precedes a stressed vowel as in [saparí-t] ‘hairstresser, sing.’, the plural suffix *-ot* attaches to the singular form after the feminine suffix *-t* deletes; [saparijot] ‘hairstressers, pl’ results. Secondly, if *-t* precedes a non-stressed vowel, the final *-Vt* drops and the stressed plural syllable is formed in the same manner, e.g. [malkód-et] ‘trap, sing.’ [malkdót] ‘traps, pl.’. Masculine nouns ending in *-on* take the feminine plural marker *-ot*, e.g. [vilon] ‘curtain, sing.’ is pluralized as [vilonot] ‘curtains, pl.’

Zaborski (1986) is a comprehensive reference to the morphology of nominal plurality in Cushitic languages. He has offered substantive exploration to all the occurring patterns of plurality in Beja (North Cushitic), East Cushitic, Arbore-Elmolo Dasenech, Highland East Cushitic, Agaw and South Cushitic along with a comparative

discussion of the peculiarities in each and every language. He observes that Cushitic languages have both external, internal, and reduplication modes of pluralization. One of the most widely attested plural suffixes is *-a*, e.g. [san] ‘brother, sing.’ [sana] ‘brothers, pl.’ This suffix attaches to various singular shapes including bi-radical, tri-radical singulars, and singulars ending in the suffix *-ej*, e.g. [kolej] ‘stick, sing.’ [kolajja] ‘sticks, pl.’ where reduplication of the final glide may occur in some forms but not across the board. In bi-syllabic words, the vowels /i/, /e/ and sometimes /a/ elides when the plural suffix attaches, e.g. [dirim] ‘herd, sing. becomes [dirma] ‘herds, pl’. In the Bishari dialect of Cushitic, singulars ending in the vowel *-i* also attaches the plural suffix *-a* and the plural form surfaces with hiatus, e.g. [garabi] ‘footpath, sing.’ becomes [garabia] ‘footpaths, pl.’ Borrowed nouns from Arabic and Tigre into Cushitic also take this suffix (Zaborski 1986: 9), e.g. [bekir] ‘virgin, sing’ becomes [bikra] ‘virgins, pl.’

In Berber, plurality is marked by suffixing *-n* for the masculine plural noun and *-in* for the feminine plural noun.

In Afar-Saho of Cushitic, there is an opposition between singulative and collective; the latter is marked by the suffixes *-to*, *-ta* and *-tu*. In Southern Afar, there is also the suffix *-n* with its variants, i.e. *-ntu*, *-nta* with masculine and *-nto* and *-nta* with feminine nouns. The /t/ of these suffixes sometimes assimilates to the root-final consonant (unfortunately, no examples were provided to illustrate this phonological change).

Many Ethiopian languages including Tigrinya and Amharic use suffixation to mark plurality in nouns. For example, in their plural form, many Tigrinya nouns take a plural suffix *-tat* such as [ʔabbo] ‘father’ whose plural form is [ʔabbo-tat] (Buckley 1990: 75). In Amharic, the singulars are unmarked while plurals take the suffix *-off* (Kramer 2009:

182), e.g. [bet-u] ‘house, sing.’ [bet-otfɪ-u] ‘houses, pl.’. There are also two other plural suffixes in Amharic *-an* and *-at*, e.g. [mämhɪr] ‘teacher, sing’ [mämhɪr-an] ‘teachers, pl.’ and [kʔal] ‘word, sing’ [kʔal-at] ‘words, pl.’.

According to Simeone-Senelle (1997), Harsusi has the plural suffix *-Vt*, e.g. [jəra:b] ‘sack, sing.’ [jəɾəbət] ‘sacks, pl.’. Moreover, some plural nouns appear with the feminine plural suffix *-ten*. Ractliffe (1998a: 95) states that the quality of the vowel in the suffix of the singular determines the shape of the plural. For instance, singulars of the shapes CVCCeet, CVCCajt or CVCCiit take the plural shapes CVCaCten and CVCeCten, e.g. [jebdeet] ‘liver, sing’ becomes [jebadten] ‘livers, pl.’ (Ractliffe 1998: 94).

In Jebbāli, suffixation is the default mode of pluralization. Native speakers, when asked to pluralize nonce and loan words, use suffixation (specifically the suffix *-tV*) most often. Simeone-Senelle (1997:388) and Lonnet (1985:54) claim that external plural, in Jebbāli, takes the suffix *-Vtə(n)*. Some plurals with the suffix *-i* come from the dual (Johnstone 1975:113). I observe that dual is no longer systematic in the language. Very few archaic nouns remain to be considered dual and are used occasionally by native speakers to indicate duality. Nouns bearing the dual marker *-i* indicates plurality in the current speech of Jebbāli speakers.

Kanakuru, a Chadic language, realizes nominal plural in three distinct ways: suffixation of *-ngin* or its variants *-nɜin/-nɜen*, suffixation of *-ijan/-ujan* and gemination of the second consonant plus attaching any of the above suffixes. Other Chadic languages such as Jegu and Kera suffix *-an* to mark plurality. Ga’anda and Bachama form plurality by alternating the vowel in the singular into *a*, a plural marker believed to be the proto form of plurality in Semitic (Ratcliffe 1992).

The third less widespread mechanism for nominal plurality in Chadic is the attachment of the suffix *-Vn*<sup>25</sup>. Many Chadic languages also mark plurality by the morpheme *a*. One of the most studied Chadic languages for its plural formation is Hausa whose various shapes of plurals are highly linked to root expansion (Newman 1990). This expansion is signaled by a range of phonological alternations including gemination of the final consonant in the root and internal stem change. According to Newman (1990), Hausa has twenty eight classes that can be classified into eight classes on the basis of shared phonological and tonal similarities. On the other hand, Schuh (1992) identifies two major classes of plurals in Hausa: final vowel change plurals and suffixed plurals. He further distinguishes four plural vowel endings (*-ii*, *-uu*, *-oo* and *-ai*) and four suffixes which can be classified into two dimensions (uCa vs. aCi) or the suffixal consonant (*-k* or *-n*) which he illustrated in the following table:

Table 3-1 Suffixation

	-k- in suffix	-n- in suffix
-uCa	tsa:nuka	da:kuna
-aCi	go:naki	wa:sani

(Schuh 1992: 3)

The masculine plural noun in Egyptian is obtained by suffixing *-w*, e.g. [nṯr] ‘god, sing.’ [nṯr-w] ‘god, pl.’ This suffix may undergo a number of phonological changes such as metathesis with other consonants, assimilation and elision. It may also be realized as *-u* which surfaces short in closed syllables and long in open syllables. The Coptic plurals, on the other hand, relate to four classes: *o*- class, *i*- class, *e*- class and *u*-class (Vergote 1969:80). However, Ratcliffe (1992) listed only two classes for Coptic: *e*- class

<sup>25</sup> Jebbāli also uses the suffix *-un* to mark plurality.

and *u*-class. The plural ending for the feminine nouns is *-wt*. It is apparent that most Afro-Asiatic languages mark feminine gender with the suffixal morpheme *-t*.

### **Internal Plural**

The second most widely used mechanism for forming plurality in Afro-Asiatic languages is internal plural formation. Under Internal Plural, a number of non-concatenative morphological mechanisms are attested. For example, there exist broken plural, vowel opposition, reduplication, mapping onto templates, and affixation with internal change.

### **Broken Plural**

Broken plural involves an internal stem change such as forming a typical iamb by lengthening the second syllable contained in the left foot of the plural form. Diverse shapes of broken plurals such as (CVCV:)<sup>26</sup>CV:C, (CVCV:)CVC, (CVCV:)C, and CVCVC are attested in Arabic, e.g. *qirdun* ‘monkey, sing.’ *quruudun* ‘monkeys, pl’ (Ratcliffe, 1998). Levy (1971) attempts to relate the diverse shapes of the broken plurals to the distinct shape of the singulars. However, a given singular pattern may have two different plural forms which imposes a challenge to making a definite statement about a direct relation between singular and plural shapes.

Despite the fact that Arabic exhibits enormous variation in the shapes of broken plurals, Abu-Mansour (1995: 326) proposes that the criterion for mapping singulars onto a specific plural template can be linked to “phonological, morphological and semantic properties of the nominals”. He outlines three morphological mechanisms with

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<sup>26</sup> Foot is enclosed between brackets.

concomitant phonological consequences, which capture the huge diversity of broken plural templates in Arabic.

(2) Rules of forming broken plurals:

1. Deletion of the feminine suffix which is not part of the consonantal root of the singular form.  $\{-X\} \rightarrow \emptyset$  / [plural].

2. /-aa/ infixation whose locus is either after the second or third consonant of the stem.  
 $\emptyset \rightarrow aa$  / # CVC-C...  
[plural]

3. Vowel raising  
 $V \rightarrow [+hi]$  / # CVC – C...#  
[plural]

The third phonological consequence for Arabic broken plurals is argued to be a dissimilation process (McCarthy and Prince 1990a). It is observed that when the singular form has the vowel /a/ in the last syllable, the broken plural has /i/ instead in the same syllable. Moreover, the length of the final syllable is maintained when singulars with a long final syllable are mapped onto the plurals. The overall generalization that governs the formation of canonical broken plurals in Arabic is that the left edge of the singular form CVC or CVV is mapped onto a typical iambic foot CVCVV (McCarthy and Prince 1990a; McCarthy 2000). It has been observed that the dominant iamb constructed involves an LH foot, a sequence of a light syllable followed by a heavy one.

In Hebrew, only two singular shapes CVCC and CVCC-*at* take internal plural, and even for these two singular shapes there are external plural forms too (Ratcliffe 1998). Egyptian and Coptic also display some internal change when forming plurals, e.g. naṭrwu → naṭjru ‘gods’.

In Cushitic languages, Zaborski considers the broken plural to be ‘archaic’ (p.17). The plural in these languages are characterized by tendencies (mostly templatic in

nature) different from those of the broken plural. For example, the plural takes several patterns such as vowel shortening and vowel opposition. For example, in Beja, a long vowel in the singular is shortened, e.g. [ka:m] ‘camel, sing.’ becomes [kam] ‘camels, pl.’ In the Bishari dialect, ablaut is observed, e.g. [sega:f] ‘door curtain, sing.’ pluralizes as [segef] ‘door curtains, pl.’, which is in fact a form of vocalic opposition. Many changes in the vowel quality are reported for Cushitic languages including (u:/u), (u:/i), (e/a and o) or (o:/a).

In Tigrinya, the largest number of nouns takes the broken plural which is indicated by two general mechanisms for Tigrinya nouns: infixation or association to a plural template. According to Buckley (1990), the most common exhibited pattern or template is composed of a quadriliteral root, which is linked to a disyllabic template in the singular form (CVCCVC) and maps onto a tri-syllabic template in the plural C $\Lambda$ CaCiC (Buckley 1990: 75). Moreover, the number of the consonants in the singular form forces a number of phonological processes to occur in order to satisfy the designated template. For example, spreading of the medial or final consonant of a trilateral singular occurs to fill the extra consonantal position in the quadriliteral plural template. For example, when a singular form with a trilateral root associates to the template of four C slots, the medial consonant spreads to satisfy the template, e.g. [t $\Lambda$ m $\Lambda$ n] ‘snake, sing.’ becomes [t $\Lambda$ mamin] ‘snakes, pl.’ (Buckley 1990: 76). However, if a singular form has four root consonants, then spreading proceeds straightforwardly, whereby each C fills in the C slot, e.g. [k $\Lambda$ nf $\Lambda$ r] ‘lip, sing.’ when mapped onto the above template becomes [k $\Lambda$ nafir].

In Amharic, the formation of some plurals includes prefixation, ablaut and change in the prosodic template (i.e. broken plural). However, the nouns that take broken



plurals are few in Amharic (Kramer 2009), e.g. [känfär] ‘lip, sing.’ [kanäfir] ‘lips, pl.’ (pp.185).

### **Affixation with Internal Change**

Plural formation can display features of both sound and broken plurals. The fact that an affix must occur in conjunction with a stem change makes it hard to list these plurals under External or Internal types. To illustrate, the majority of plurals in Amharic are observed to be “inflected with a prefix and/or a suffix along with vocalic and prosodic alterations” (Kramer 2009: 185), e.g. [nigus] ‘king, sing.’ [nägäs-t] ‘kings, pl.’ and [masfin] ‘prince, sing. [mäsaḥin-t] ‘princes, pl.’.

In Tuareg, a Berber language which includes the dialects of Central Sahara, Southern Algeria, Niger and Mali, a plural suffix is accompanied by vowel lengthening (e.g. [adrar] → [idraarən] ‘mountains’) (Ratcliffe 1992:462).

In Hausa, suffixation or external pluralization encompasses different allomorphs or internal changes into the singular stem. Surprisingly, these allomorphic suffixes are not straightforwardly attached to the end of the singular forms. Rather, each suffix imposes an internal change to the root to which it is attached. For instance, where a singular is mapped onto the plural, the consonant in the suffix may be a copy of the final consonant in the root or epenthetic. In some cases, the suffix forces the contiguous consonants of the root to split in order to satisfy templatic requirements. Hausa has three representative suffixal plurals –*unaa* (baɓkɔ́ → bákkúnáa ‘bows’), –*aaCee* (birnii → bíráanèe ‘cities’), –*aa* (tárkóo → tárkkáa ‘traps’) whose C may vary depending on the shape of the singular forms (Rosenthal 1999:344). Looking at these plural

patterns makes one feel they are internal plural. However, scholars of Hausa regard them as external plurals.

It has been observed that the plural in Hausa favors attachment to an iambic base. Particularly, in the suffix –aaCee, a mix of external and internal plural can be detected due to the pressure of the surface form to realize an iambic foot (Rosenthal 1999). When a plural exhibits variations in its final shape, this can be due to violations of a definite set of requirements that governs the final shape of plurality (prosodic requirements, for example).

Besides the phonological consequences observed when suffixation occurs in Hausa, Schuh also identifies a process of ‘polarization of root weight’. He observes that if the initial vowel in the root is heavy, the vowel in the reduplicated plurals surfaces short, e.g. [zo:be/ zobaba]. Moreover, in singulars with CVN syllables where N is homorganic to the following consonant, N is not to be thought as a separate consonant. Thus, such a plural will take a different mode of pluralization contrary to what is expected.

## **Reduplication**

One of the most common mechanisms for forming Internal Plural in Afro-Asiatic languages is reduplication which is found to apply to a specific set of singulars. Ratcliffe (1996) states that “in contemporarily spoken Semitic languages, reduplication as a feature of plural formation is most common in some Neo-Aramaic dialects and in some Modern South Arabian languages”. He also observes that “the form of reduplication in both sets of languages is consistently suffixal reduplication of a single consonant with a predictably fixed vowel appearing between reduplicated consonants” (Ratcliffe 1996: 298).

Cushitic also has reduplication which is indicated by a repetition of the last consonant of the singular either after the final vowel or with a change in the final vowel, e.g. [ikó] ‘tooth, sing.’ [íkok] ‘teeth, pl.’ and [gaba] ‘hand, sing.’ [gabob] ‘hands, pl.’ It is important to note that, in some Cushitic languages such as Beja, reduplication is limited to plural adjectives. Moreover, Ractcliffe (1992 and 1998) argues that reduplication should not be considered as a valid mechanism for forming plurality in Semitic, and states that it only occurs as a matter of ‘prosodic expansion’ of the stem singulars.

In Amharic, a number of nouns may take partial reduplication when they are pluralized, e.g. [gobäz] ‘young man, sing.’ [gobäzazit] ‘young men, pl.’. Newman (1990) also observes full or complete reduplication in some Chadic languages.

In Jebbāli, bi-radical singulars form their plurals by reduplicating the last consonant.  $CVC_x$  singulars take the plural shape  $CC_xVC_x$  whereby the V in the plural shape is mostly /ɔ/ with the exceptions of a few forms that fill the vocalic slot by /ɛ/. Examples include [dik] ‘rooster, sing.’ [dkɔk] ‘roosters, pl.’ In some cases, the plural inserts /ɔ/ word-initially. There is a correlation between the quality of the vocalic suffix and the singular form in some plural patterns (Ratcliffe 1998). The vowel in the singular’s shape varies greatly, and determines whether the suffix in the plural morpheme is /ɔ/ or /ɛ/.

In Kabyle, most bi-radical singulars and some vowel-final singulars add an extra consonant in their plural formation. More specifically, the second root consonant gets reduplicated (e.g. [afus] → [ifassən] ‘hands’) (Ratcliffe 1992: 464).

### **Mapping Singulars onto Templates**

Mapping singulars onto a specific plural template is a form of internal plural. It is attested in a number of Afro-Asiatic languages. For instance, in Amharic, quadri-

consonantal roots pluralize by mapping the singulars onto the template CăCaCiCt where the final /t/ deletes before liquids.

The majority of plurals in Harsusi take the template CVCVVC. Some plurals insert an initial vowel to this template. Ractliffe (1998) counts about 14 examples that behave in this way. The second common plural shape in this language is CeCewweC, which might be a cognate to the Arabic broken plural shape CuCuuC. The feminine suffix in Harsusi appears as *-et*, *-eet* (with its phonological variants *-iit* and *-ajt*), *-oot*, *-aat* and *-eh* in words borrowed from Arabic, and the original /aa/ vowel usually corresponds to /oo/ or /ee/ in Harsusi. One common feminine plural pattern is CeCeeC, CeCooC and rarely with a short vowel CeCaC. In Harsusi, the plural shape CeCooCeC(et) is taken by masculine quadrilaterals, while the plural shapes CeCeeCeC or CeCooCeC relate to feminine quadrilaterals. Finally, singulars which have the CVCVVC shape map onto the patterns CeCiiC, CeCooC or CeCjooC.

Other numerous patterns are also observed in Jebbāli. Ractliffe (1998) identifies the most prevalent shapes of plural in Jebbāli to be VCCVC or CVCVC, with the inserted vowels /ɔ/, /u/ and /ɛ/; very rarely do /e/ or /i/ surface in these shapes. /a/ appears in a guttural environment only. Therefore, the most common shapes are ɔCCɔC, ɛCCɔC, ɛCCɛC, ɛCCuC, CVCɔC, CVCɛC and CVCuC. The third most common shape of plurality is ɛCCeC(V)t. This shape reflects a common plural pattern in Ge'ez too. Quadrilateral singulars in Jebbāli take three distinct shapes: the common southern Semitic shape CaCaaCiC but the second syllable is not long and has the vowels /o/, /ɔ/, /u/ or rarely /ɛ/ in Jebbāli, which has a shape derivable by alternation of the vowel in the

final syllable: CVCCe/aC → CVCCoC and CVCCε/iC → CVCCuC. The last pattern involves -Vb- infixation.

Simeone-Senelle (1997:388) states that the most common pattern of plural for the tri-consonantal verbs is CCV:C (a plural for many feminine singulars) and for the quadriliteral are CCV:CC and CCVCC. Simeone-Senelle (1997:388) also identifies that some plural patterns correspond to Arabic *plural of the plural* (emphasis hers).

### **Templatic plurals derived from geminated singulars**

Geminated singular forms map onto distinct templates when they become plural. In Arabic, McCarthy (1979) treated stems with a geminate as bi-radicals with an obligatory consonantal spreading. An example of a geminated singular that maps onto a specific plural template in Arabic is [ʒill] 'shade, sing.' → [ʒila:l] 'shades, pl.'.

In Tigrinya, singulars whose medial consonantal slot is geminated takes a particular template. When forming plurals, the gemination is broken up by a vowel, e.g. [gɫbbɫ] 'large snake, sing.' is pluralized as [gɫbabɪl] 'large snakes, pl.' Buckley (1990) explores another templatic plural pattern derived from a geminated singular in Tigrinya, which involves the spreading of the last consonant instead of the usual medial spreading, e.g. [mɫɾbɫb] 'fishing net, sing.' has the plural [mɫɾabɪb] 'fishing nets, pl.'

In Jebbāli, bi-radical singulars whose second consonant is geminated, and which take the shape CVC<sub>x</sub>C<sub>x</sub> take the plural shape CVC<sub>x</sub>ε/eC<sub>x</sub>, e.g. [møll-ɛt] 'pot, sing.' becomes [milɛl] 'pot, pl.' in the plural form.

Ḥarsusi has forms which show gemination of the second consonant in the plural form, e.g. [ʁa:ber] 'pregnant she camel, sing.' [ʁewabber] 'pregnant she camels, pl.'. However, this pattern is not very common across other Modern South Arabian languages (Belova 2009).

In Chadic languages, the templatic behavior of geminated singulars is considered to be “a reduced form of reduplication.” (Newman 1990: 46). In addition to the particular template taken by a plural derived from a geminated singular, there is also a weakening of intervocalic consonants (Newman 1990: 47). In Kanakuru, for example, the geminate may simplify to a single consonant.

### **Infixation**

In Jebbāli, one of the most prevalent plural shapes involves *Vb* infixation (Johnstone 1981; Simeone-Senelle 1997; Ratcliffe 1998a &b). Ratcliffe (1998) considers the shape CVC *Vb*CVC to have an infix *-Vb-* (*-ɛb-* or *-ab-*) between the second and third radical.

Most of the plurals with the *Vb* infixation are derived from quadri-radical singulars. However, a few bi-radical singulars are also observed to infix *Vb* or only *b* when they become plurals. The locus of *Vb* infixation is consistent, and is observed to occupy the second syllable of the plural form.

Newman (1990: 81) recorded some pluractional patterns in Sura of Chadic to have a final /-p/ affixation. He argues that this pattern is due to either contact with neighboring non-Chadic languages or the /p/ being a reflex of \*t by a morphologically restricted dissimilation rule ( e.g.[mùut] →[murap] ‘die’).

### **Vocalic Opposition**

Internal vocalic mutation (be it ablaut or apophony) has been attested in many Afro-Asiatic languages. One interesting peculiarity of Cushitic is the contrast in suffixes of the singulars and plurals. For example, the singular form [alum-to] ‘animal footprint, sing.’ bears one of the suffixes that may mark plural. This suffix changes and a different plural suffix like *-a* marks plural. Thus, the plural for [alum-to] is [alu:m-a] ‘animal

footprints, pl.’ Moreover, in the Bishari dialect of Cushitic, ablaut is widely observed, e.g. [sega:f] ‘door curtain, sing.’ pluralizes to [segef] ‘door curtains, pl.’. Many changes in the vowel quality are reported for Cushitic including u:/u, u:/i, e/a and o or o:/ a (Zaborski 1986).

Quite a large number of tri-radical and quadri-radical singulars in Jebbāli take on vocalic opposition when mapped onto their plurals. Singulars with front unrounded vowels form their plurals with back rounded vowels. This mechanism for plural formation in Jebbāli has been mentioned in Simeone-Senelle (1997).

Pluractionals in Chadic languages exhibit ablaut as one of the common mechanisms for forming plurality. For example, in Bachama, plurality is marked by vowel lowering (Newman 1990:72). Another pattern, in Saya, involves vowel lengthening but without a change in quality.

Vergote (1969) observes some vocalic changes whereby /a/ becomes /i/ in Egyptian and Coptic languages.

In Kabyle (Northern Algeria), a Berber language, masculine singulars with a high vowel (i or u) or zero vowel before the last consonant show the vowel *a* before the last consonant in the plural form (e.g. [amshish] → [imshash] ‘cats’). Nouns which end in –u also follow the same pattern (e.g. [azru] → [izra] ‘stones’). Ratcliffe (1992:461) interprets this type of plural as internal *a* plural. Singulars with *a* in the final syllable exhibit a double vocalic alternation (e.g. [amkan] → [imukan] ‘places’). However, the external plural is preferred for nouns with *a* (e.g. [argaz] → [irgazən] ‘men’).

### **Shared Patterns of Plurality in Jebbāli and Afro-Asiatic Languages**

In Jebbāli, there is noticeable diversity in the patterns of plural. This diversity can sometimes be attributed to the shape of the singular form (whether the singular is bi-

radical, tri-radical, quadri-radical, or weak). Moreover, Ractliffe (1998) argues that the diversity can also be attributed to the vowel in the suffix of the singular.

Besides the plurals that reveal regularity, and can systematically be accounted for, Jebbāli has quite a large number of suppletive or lexicalized plurals, e.g. [tɛθ] ‘woman, sing.’ [ʔijnɛθ] ‘women, pl.’. Most of the lexicalized plurals collected relate to humans such as boys, girls and babies. These do not follow a certain pattern, and the forms of both the singulars and plurals are highly unrelated. Ractliffe (1992) included a long list of languages that mark plurality by suppletion including Berber, Chadic and Cushtic languages.

In spite of the fact that Jebbāli exhibits diverse patterns of plural in its nominal morphology, it shares many interesting characteristics with other Afro-Asiatic languages. I outline the most salient features of pluralization Jebbāli shares with many Afro-Asiatic languages:

1. although suffixation is the default mode of pluralization in Jebbāli, it expresses plurality more often by imposing an internal change in the stem than by suffixation. This is manifested through the large and highly diverse number of non-concatenative operations Jebbāli exploits to mark plurality. Ractliffe (1998) identifies three singular shapes out of five which prefer internal to external plural. He has surveyed similar tendencies in Arabic, Aramaic, Old South Arabian languages, and Tigre. The distribution of internal plural concentrates more for the tri-consonantal singulars taking the shapes CVCC, CVCC-at and the quadric-consonantal singular CVCCVC.
2. a singular form in Jebbāli may correspond to more than one plural pattern (Simeone-Senelle 1997). Hausa, a Chadic language, is also reported to have multiple plurals for a singular form, each with potentially distinct allomorphy and varying tonal melodies (Newman, 1990 and the works cited therein). Moreover, in Harsusi, a singular form may have multiple plurals. Arabic, too, exhibits this feature of multiplicity of plurals.
3. in the formation of plurality, languages tend to favor a certain pattern over other patterns. For instance, Jebbāli is observed to admit various shapes of singulars into the plural pattern of *Vb* infixation. Hausa is reported to have a ‘leveling’ tendency whereby the suffixal plural –ooCii is the most productive plural pattern.



4. it is not uncommon that some of the mechanisms for plurality are productive and are observed to be employed more often by the majority of Afro-Asiatic languages. Other mechanisms are archaic and are no longer preferred as plural mechanisms. In Jebbāli, the most productive mechanisms include suffixation, vowel opposition and mapping onto specific templates. These patterns are widely attested in Modern South Arabian languages, Chadic and Cushtic languages.

5. by and large, there is a preference to map singulars with a geminated root consonant onto specific templates. Templates are defined as skeletal shapes that are unspecified for segments but have intercalated consonants and vowels. Infixation of certain consonants is also attested across the board.

6. Johnstone (1975: 113) and Simeone-Senelle (1997:389) observe that some plurals in Jebbāli are attached to *-i* which is a dual marker. However, they are considered to be plurals in the language. Newman (1990) observes that three or four branches of Chadic exhibit plurals formed by a final *-i* which bears a high tone most of the time.

7. although Ratcliffe (1992) eschews that reduplication exhibited widely in the formation of plurality in a number of Semitic languages such as Chadic, Cushitic and Jabbāli should be taken as a result of templatic expansion since it occurs mostly in bi-consonantal and weak roots, this phenomenon is very prevalent in a number of Chadic languages, Dahalo of the Chushtic family (Zaborski 1986) and observed in Jebbāli too.

8. Ratcliffe (1998) argues that 'internal *a*' or broken plural is the prevalent mechanism for forming plurals in Afro-Asiatic and should be reconstructed as the main plural marker for proto-Semitic. Jebbāli plurals exhibit massive internal changes to the extent that suffixation too is accompanied by internal changes. Jebbāli does not have broken plural as a mechanism of forming plurality in its morphology. In fact, the 'internal *a*' plural formation characteristic is not exhibited in Jebbāli at all.

9. Abd-Rabbo (1990) explores the phonology of vowels in the broken plurals, and shows that the variations exhibited in the first and last syllables of various patterns of broken plurals happen as a result of avoiding homophony. Where the productive /*aa*/ plural is blocked, he shows the possibility of the emergence of similar words but with different meanings in the language. The plural of [muʔmin] 'believer' is the sound plural [muʔmin-*u:n*] since if the internal /*a*/ plural takes place, the plural will be [maʔa:mɪn] 'safety places'. Jebbāli singular forms which have multiple plurals are observed to map onto specific templates rather than taking the *Vb* infix or reduplicating a base consonant. This may happen as a result of homophony avoidance though a thorough scrutiny must be done to justify this claim.

10. Zaborski (1976) maintains that Afro-Asiatic languages have portmanteau plural morphemes. An obvious example would be the Arabic external plural morpheme which takes *-u:n* for the nominative case and *-i:n* for accusative. Socotri, a Modern South Arabian language, marks plural by *-i:n* and *-ihɔn*.

11. Jebbāli marks plurality by ablaut as one of the most prevalent mechanisms for forming plurality in the language. I argue that ablaut is, by and large, a morphophonological process in which plural forms must observe a change from their morphologically related pair, the singulars. The change can be driven by anti-faithfulness constraints which stipulate that related forms must be different as they belong to different classes. Homophony avoidance can be a reason.

### **Summary of Chapter Three**

In conclusion, plural formation in Afro-Asiatic languages is an intriguing morphological phenomenon. It encompasses numerous mechanisms unattested in Germanic languages such as broken plural, which involves some sort of stem change, reduplication, infixation, vocalic opposition and mapping onto plural templates. Each and every non-concatenative process outlined above comes with certain phonological changes.

In the final section of this chapter, I listed some crucial observations that outline where Jebbāli meets with other Afro-Asiatic languages. Jebbāli shares many of the widely attested mechanisms for forming plurality with these languages. However, it also has a unique plural formation pattern which is the infixation of *Vb*. This chapter outlined the most common non-concatenative morphological mechanisms used to indicate plurality in a number of well-studied Afro-Asiatic languages. It also described the phonological processes that occur concomitantly with these mechanisms.

## CHAPTER 4

### APPROACHES TO NON-CONCATENATIVE MORPHOLOGY

In non-concatenative morphology, morphological oppositions are most often expressed not through affixes but rather by invoking an 'internal' change into the word. Thus, a word cannot be divided into smallest contiguous constituents, each designating a particular meaning. Rather, the derived meaning is encoded via other non-concatenative morphological operations such as infixation, truncation, ablaut, reduplication, mobile morphology and root and pattern (templatic) morphology. In Arabic, in particular, the meaning is encoded in the template or canonical shape the word takes.

To address the complications involved in the formation of words in non-concatenative morphology, many morphological approaches have been proposed. These include Autosegmental and Templatic Approaches, Prosodic Morphology and Optimality Theory. The analysis proposed by the earliest models such as Templatic Morphology entails many shortcomings, and warrants the exploration of other later models such as Prosodic Morphology and Optimality Theory to tackle such problems.

Below, I will explore the major approaches to analyzing non-concatenative morphology. I will specifically address two pre-Optimality Theory approaches and then outline the theoretical assumptions of the Optimality Theory approach. The discussion will sketch the advantages and shortcomings of each approach with respect to other frameworks and discuss their relative success in accounting for non-concatenative morphological processes. The last section will delineate the assumptions made by Generalized Template Theory which translated the superfluous templatic effects into universal constraints.

## Pre-Optimality Theory Approaches

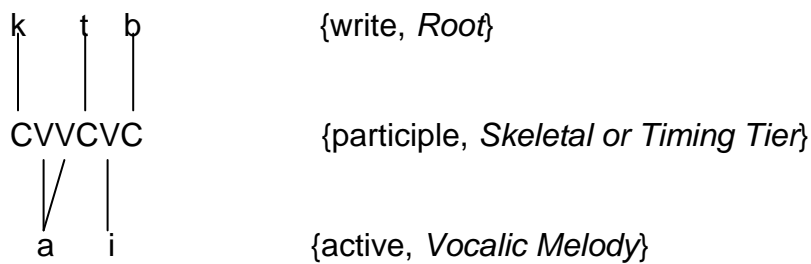
### Autosegmental and Templatic Approaches

The stem in non-concatenative languages has three constituents that cannot be isolated from each other: the consonantal root defined as “the fundamental lexical unit” (McCarthy and Prince 1990b:2), the templatic shape onto which the root consonants are mapped and finally the vowels which indicate voice and aspect.

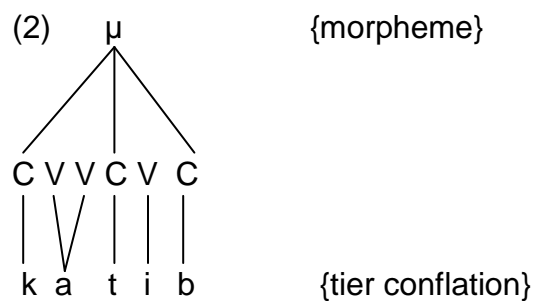
John McCarthy (1979 and 1981) uses the principles of Autosegmental Phonology which was first proposed by Leben (1973) and Goldsmith (1973 and 1976) for tone and vowel harmony phonological systems in order to account for the three non-isolable parts of non-concatenative morphology. In Autosegmental or Templatic Morphology, the fundamental notion is that morphemes are not represented linearly as a “sequence of phonemic segments separated by a morpheme boundary” (Ractliffe 1992:32). Rather, McCarthy stipulates that “the string of segments is uninterpretable, but the morphological analysis is given by another simultaneous level of representation.” (McCarthy 1979: 221). In other words, McCarthy proposes, following proposals of Autosegmental Phonology, that words are represented by three tiers: a skeletal tier (also known as the timing tier) which is segmentally unspecified (or uninterpretable, using McCarthy’s terminology) and includes abstract information about the linear order of bare **C**onsonants and **V**owels notated as **CV**. The other two tiers have the consonants of the root and vocalic sequences which also occur as independent autosegments and each belongs to separate tiers. Then, the consonants and vowels (melodic elements) associate with the timing tier in accordance with the Universal Association Convention of phonology. The latter stipulates that melodic elements associate with the skeletal tier one to one, left to right. These tiers represent the notion

‘morpheme’ notated as  $\mu$  which is “a set of feature matrices dominated by a single node” (McCarthy 1981: 384). To illustrate, the autosegmental representation for [kaatib] ‘writer’ in Arabic is:

(1)



[kaatib] is represented by three tiers: the CVVCVC or skeletal tier, the consonantal and vocalic melodies tiers. Though these tiers occur in different planes, they are linked by association lines one to one and left to right, except long vowels. For a string of segments to be pronounceable, McCarthy (1986) proposes the convention Tier Conflation which linearizes the morphological tiers into a single tier. Thus, the combination of ‘write’, ‘active’ and ‘participle’ yields the pronounceable form [kaatib] “writer”:



Tier Conflation also operates when a phonological string is composed of a stem and affixes. Thus, it linearizes the stem melodies first and then folds in the remaining affixes. Association lines are also subject to two conditions: No Crossing (first proposed by Leben 1973) which stipulates that association lines must not cross, and Obligatory

Contour Principle (OCP, henceforth) which forbids identical adjacent segments.

McCarthy (1979, 1981 and 1986) extends the OCP to account for geminates and double verbs in non-concatenative morphology. His formalism is “in a given autosegmental tier, adjacent identical autosegments are prohibited” (McCarthy 1979:238). So, in stems with two identical segments, the melody is represented by just one of the identical segments which then spreads to two slots in the skeletal tier. As illustrated above, the vocalic tier for [kaatib] includes one /a/ which associates to two vocalic slots.

The Templatic Approach can successfully address a number of non-concatenative morphological tendencies, especially those pertinent to root and pattern morphology. It provides an empirical argument for a language game of Bedouin Hijāzi Arabic where a free mutation can only happen to the consonantal root but not to the template nor to non-root consonants. The vocalism may vary depending on the neighboring segments (McCarthy 1981:380). This game supports the assumption made by Templatic Morphology that the consonantal root is a single unit at the level of representation and operates at a different sphere. Any rule could apply to it without affecting the other two tiers. Moreover, stray erasure, which stipulates that unassociated skeletal or melodic elements can be elided, supports the separation of these three tiers as it could apply to individual tiers without erasing elements from others.

McCarthy (1981) argues that in deriving Arabic verbs, the rule will have to have access to the root only. McCarthy states “It [the rule] will have to be able to isolate the root from the vowel quality and from the canonical distribution of consonants and vowels” (pp.380). Assimilation rules in Arabic, Akkadian and Hebrew verbal

morphologies support the discontinuous nature of the morpheme in Templatic Morphology. These rules do not target the consonantal root even when their context is met. Rather, they target an infix *-t-* (in the eighth binyan of Arabic verbal paradigm but the passive and iterative *-t-* in Hebrew and Akkadian). Moreover, Akkadian has a nominal prefix *ma-* which dissimilates to *na-* if there is a labial root consonant. Only consonants in the root trigger this dissimilation as it fails to apply before a labial stem vowel (McCarthy 1981: 382). This rule provides support for having separate tiers to represent the notion ‘morpheme’ in non-concatenative morphological systems as it refers directly to the non-concatenative root.

Geminated roots, reduplication patterns and double verbs also demonstrate the success of Templatic Morphology. Moreover, the Templatic Theory accounts for a number of rules governing the co-occurrence of consonants within its tier; /ʕ/ and /ħ/ do not occur in the same consonantal root. Such tendencies prove that the morpheme notion is indeed relevant to the consonantal root. The same conclusion holds true for vocalism. McCarthy observes that there is no linguistic form in Arabic (except some borrowed words) that has the vowels /i/ and /u/ in the same tier and there is no verb that begins with /i/.

Couched under the umbrella of Templatic Morphology is melodic transfer (Hammond 1988; Bat-El 1994a) which offers an explanation to the behavior of clusters in denominal verbs of Hebrew and Arabic broken plurals. In melodic transfer, segmental materials of the stem are copied or transferred to the target derived template without a change in their positions. To illustrate, in Arabic broken plurals the linear order of the singular consonants are transferred to the broken plural template. Moreover, the length

or weight of the final syllable of the singular is copied without shortening or lengthening. As for Hebrew denominal verbs, when the nouns from which these verbs are derived have clusters, the verbs also surface with clusters.

Despite the crucial breakthroughs Templatic Morphology makes to address non-concatenative morphology, it is faced with many problems, which the newer proposals of Prosodic Morphology did not escape too. One of the major problems with the Templatic Theory to non-concatenative morphology is that it “existed in a world of its own, separate from other constraints on phonological and prosodic structure” (McCarthy and Prince 1993: 18). It does not provide access to information already there in the Universal Grammar such as the elements of prosody (syllables, feet and prosodic words). Moreover, the peculiar properties attributed to reduplicative and Templatic Morphology are independently motivated in Prosodic Morphology and can characterize phonological processes, stress and versification (McCarthy and Prince 1990b:2). Templatic Morphology also has ambiguous evidence for segment-sized skeletal units. Prosodic Morphology relates words to minimality requirements and explains non-concatenative morphological behaviors such as insertion of consonants, compensatory lengthening and the like. On the other hand, the Theory of Templatic Morphology is cumbersome in its nature and always forces some sort of re-definition and reference to meaningless templates. To illustrate, whenever there is a need to refer to a specific *binyan* (template) or verbal paradigm, we specify it using templates that in themselves offer no coherent explanation to the kind of phonological or morphological processes involved in their creation. In criticizing Templatic Morphology, McCarthy and Prince (1993) simulates CV templates with a ‘Tinker-Toy model’ where blocks and blocks of

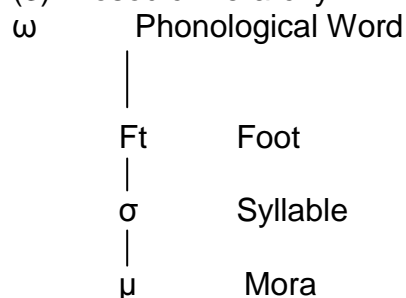


objects (in our case templates) are attached to other objects without recourse to conditions governing such attachment. Finally, Prosodic Morphology is more restrictive as it relies on the units of prosody which are independently motivated by Universal Grammar. The template in Templatic Morphology can be expanded without limits. So, template satisfaction in Templatic Morphology is in fact no more than prosodic parsing.

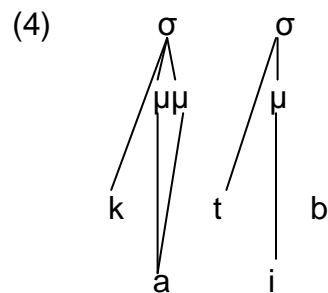
### **Prosodic Theory of Non-Concatenative Morphology**

Prosodic Morphology (McCarthy 1981; McCarthy and Prince 1990:209) was proposed to offer access to already existing tools (units of prosody) in the language instead of reliance on a proliferation of unmotivated mechanisms. It basically has three fundamental theses. First and foremost, it establishes the need to define CV templates in terms of the authentic units of prosody which are moras, syllables, feet and prosodic words. These are ordered in a hierarchy from the smallest atom making up a syllable to the prosodic word holding all elements together. The phonological word (a domain for stress assignment) contains at least one foot. A foot contains at least one stressed syllable while a syllable can be light CV with one mora or heavy CVV and CVC with two moras. To illustrate, in reduplication patterns, if the reduplicated element is a CV shape, then Prosodic Morphology does not describe it in terms of the template CV. Rather, it stipulates that the reduplicant is a syllable length. Below, I show the elements of prosodic hierarchy:

#### **(3) Prosodic Hierarchy:**



The following represents the phonological word [kaatib] ‘writer’ in prosodic morphological terms:



The final consonant at the right-edge of the above form is extrametrical and does not participate in the prosody of the language. This observation is made by McCarthy and Prince (1990b: 15-17) who support this belief on the basis of the behavior of linguistic forms in Arabic, such as stress assignment. Extrametricality is a breakthrough in the analysis of templatic morphologies and is a well-motivated device provided by Prosodic Morphology. It is confined to the edges of words only. However, the unifying account spelled by McCarthy and Prince (pp.15) is that in non-concatenative morphological systems an initial extrametrical consonant has the properties of syllable final position (i.e. moraic) while the final extrametrical consonant is nonmoraic. Thus, it bears the properties of syllable initial consonants.

The second fundamental thesis of Prosodic Morphology is Template Satisfaction Condition which stipulates that satisfaction of templatic constraints is mandatory and determined by the principles of Prosody, both Universal and language-specific (McCarthy and Prince 1990:3).

The third proposal relates to the domain to which a morphological process applies which needs to be delimited by prosody. In other words, it is assumed that

morphological operations target units of prosody and apply to them. This is known as Prosodic Circumscription and will be outlined in a separate section.

In the 1980s, Prosodic Morphology was proposed and it succeeded in explaining a huge range of non-concatenative morphological tendencies. McCarthy and Prince (1993a) reveal that Prosodic Morphology has successfully discovered independent and general principles that govern the linguistic properties of reduplication, root and pattern systems, circumscription, truncation, and the like. Prosodic Morphology expresses generalizations which cannot be expressed in purely templatic terms. It makes use of the information and principles in the grammar and avoids “proliferation of arbitrary formal apparatus” (McCarthy and Prince 1993: 19) for the description of any non-concatenative morphological process. They also argue that once analysis starts seeing the higher prosodic units, then reference to what the template CV does is not important or relevant. This is of course a very desirable consequence.

Prosodic Morphology offers well-motivated tools for the description of the maximal size of affixes and weight requirements. Using prosodic units, an affix is observed to be no longer than a syllable. Different languages may also place restrictions on the lightness and heaviness of affixes. Such restrictions are carried over to reduplicants. If we limit ourselves to Templatic Morphology, we will not be able to describe theoretically and convincingly the size and weight of affixes in any non-concatenative language. Another crucial prediction made under Prosodic Morphology is the ability to describe stress patterns and the rules governing the assignments of iambic or trochaic stress by reference to syllables and feet, the units of prosody.

Prosodic Morphology offers cogent explanation to reduplication patterns. For instance, in Axininca Campa, consonant initial roots reduplicate fully whereas vowel initial roots exhibit divergence from this pattern. If reference is made to the CV pattern of the reduplicant, then the truth of this type of reduplication is obscured. However, by referring to prosody, one can see that the suffixed reduplicant in this language is consistently consonant-initial. With this particular example, we are able to divorce the effect of CV templates, and utilize the units of prosody readily supplied by Universal Grammar.

Now, let us move one step higher and scrutinize the elegance of analyzing Axininca Campa reduplication within a theory like Optimality Theory. By reference to a well-motivated syllabic constraint and a faithfulness constraint against deletion, we are able to offer a straightforward analysis to an issue otherwise appearing to be cumbersome. The tenets of Optimality Theory will be discussed in a later section. Also, evidence is offered for how the satisfaction of well-defined templatic and prosodic templates is better translated into violable and competing constraints in Optimality Theory.

### **Prosodic circumscription**

The third crucial thesis Prosodic Morphology makes is Prosodic Circumscription (McCarthy and Prince 1990; McCarthy 2000). The core assumption of Prosodic Circumscription is to delimit the application of non-concatenative morphological processes to prosodic constituents like moras, syllables, and feet. As formalized by McCarthy and Prince, Prosodic Circumscription depends on a factoring function  $\phi$  (C, E, B) which parses out a prosodic constituent C standing at the edge E of the base B (pp.226). McCarthy and Prince (1990) identify two types of Prosodic Circumscription

that address a wide range of non-concatenative morphological operations: Positive and Negative. If the morphological operation targets a prosodic element at the right or left of a word, then it is referred to as positive prosodic circumscription. However, when the morphological operation applies to the rest of the word, then we have a negative prosodic circumscription. In spite of the fact that Prosodic Circumscription correctly addresses classical non-concatenative examples, it is not as powerful as Optimality Theory. For example, Prosodic Circumscription successfully analyzes Yidjn reduplication by extracting the foot at the edge of the linguistic forms and then a morphological operation (in this case reduplication) applies to it. After that, the rest of the word is concatenated to the changed foot. However, such an analysis is cumbersome and a short-cut analysis is available in Optimality Theory.

McCarthy (2000: 152-153) argues that the Optimality Theoretic approach based on prosodic faithfulness enjoys conceptual advantages over operational circumscription. According to McCarthy, faithfulness constraints are independently motivated since these constraints are supplied by Universal Grammar. It reduces dramatically the specific devices of Prosodic Morphology like circumscription, templates, or reduplicative copying. Most importantly, prosodic faithfulness eliminates infixation. It regards all affixes as either prefixes or suffixes based on their distance from the edge of the root. This distance can be translated into well-motivated constraints in Optimality Theory.

### **Optimality Theory**

Optimality Theory is a constraint-based approach (Prince and Smolensky 1993/2004; McCarthy and Prince 1993a &b) whose foremost premise is that surface forms are evaluated by a set of conflicting constraints and the optimal form or the actual output is the one that minimally violates constraints. In Optimality theory, there is a

conflict between two major families of constraints: Markedness and Faithfulness constraints. Markedness constraints evaluate how common cross-linguistically, easy to perceive or articulate, and less marked a linguistic form is, whereas Faithfulness constraints monitor identity between underlying forms and actual forms. I will present the framework of Optimality Theory and discuss its theoretical assumptions. I will then introduce Correspondence Theory and outline the premises of a family of Correspondence Theory constraints: Output-Output Correspondence. Finally, I will talk about alignment constraints.

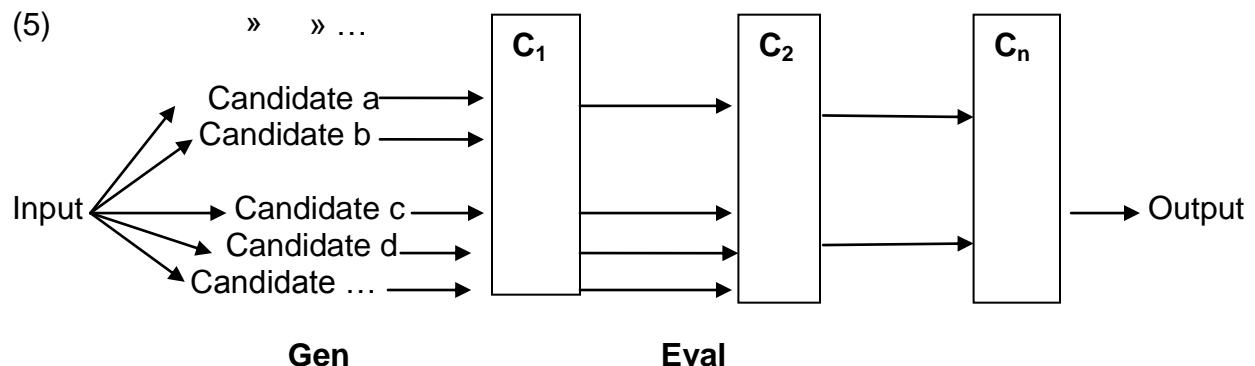
### **Optimality Theory Framework**

Optimality Theory assumes that the actual linguistic form stems from a competition between a set of conflicting violable constraints through a fixed ranking. Constraints are ranked with respect to each other, entailing that the output form must violate the lowest and less important constraints possible in order to be selected as the optimal.

Under the umbrella of Optimality Theory, Universal Grammar supplies universal constraints which exist in all languages but differ on whether they are active or passive and on the way they are ranked. In other words, constraints are ranked on a language specific basis. These constraints belong to two competing families of constraints: Markedness and Faithfulness. While Markedness constraints penalize marked structures in the surface forms, Faithfulness constraints strive to maintain absolute identity between the underlying forms and surface forms. When the output form exhibits a change from its underlying form, then Markedness constraints take precedence over Faithfulness constraints. On the other hand, when a marked structure is retained in the output form in order to be faithful to the underlying form, then Faithfulness constraints prevail over Markedness constraints.

In any given language, the conflict between Markedness and Faithfulness constrains is settled through a fixed ranking which gives priority to either Markedness or Faithfulness. In Optimality Theory, the Generator is in charge of generating potential and unlimited candidates from a specific underlying form. Thus, it creates an ambience for competition; these potential outputs compete with the actual output (also known as optimal) and are doomed because they violate higher ranking constraints by the function of Evaluator. The Evaluator checks each and every candidate against the ranked set of constraints. The most harmonic output which violates constraints very minimally or satisfies high ranking constraints at the expense of violating the lowest ones is selected as the winner.

Below, I illustrate the mapping of input to output in Optimality Theory grammar as proposed by Kager (1999:8). I add **Gen** and **Eval** at the bottom of the representation. In the representation below, the Generator generates a set of candidates a, b, c, d, ... from the input form. The Evaluator then evaluates each candidate against the ranked constraints  $C_1$ ,  $C_2$ ,  $C_n$ . The candidate, which wins the competition, exhibits satisfaction to the high ranked constraints at the left of the representation, and thus is selected as the actual output form.



If constraint **C<sub>1</sub>** outranks constraint **C<sub>2</sub>**, then the optimal output form has to be the most harmonic amongst other suboptimal outputs in that it exhibits the least serious violations to the constraints **C<sub>1</sub>** and **C<sub>2</sub>**. It can violate constraint **C<sub>2</sub>** at the expense of being faithful to constraint **C<sub>1</sub>** since **C<sub>1</sub>** dominates **C<sub>2</sub>**. In a tableau of ranking, **C<sub>1</sub>** must be to the left while **C<sub>2</sub>** must be to the right side and a solid line is drawn between them, indicating a strict domination. The opposite is true if constraint **C<sub>2</sub>** dominates **C<sub>1</sub>**.

In the following tableaux, when the constraint **C<sub>1</sub>** prevails over the constraint **C<sub>2</sub>**, then each candidate violating **C<sub>1</sub>** will receive an asterisk and a fatal violation mark indicated by (!). The optimal output is not the one that does not violate any constraint. On the contrary, it is the one that is most harmonic in that it exhibits less serious and minimal violations among other candidates. It obeys **C<sub>1</sub>** at the expense of violating **C<sub>2</sub>**. When both candidates violate **C<sub>1</sub>**, the optimal output must exhibit fewer violations. Thus, the doomed candidate should exhibit more violations to **C<sub>1</sub>** than the optimal output. However, when both candidates obey **C<sub>1</sub>**, then the optimal output must be more harmonic by exhibiting fewer violations to **C<sub>2</sub>**.

If the ranking between constraints is established, a solid line between the constraints is drawn in a tableau of constraints. However, a dotted line between the constraints indicates that a definite ranking cannot be established, and the constraints are in fact equally ranked. A pointy finger ☞ is placed before the winning candidate. The tableaux below illustrate how Optimality Theory functions:

**Tableau (1)**      **C<sub>1</sub> » C<sub>2</sub>**

<i>Candidates</i>	<b>C<sub>1</sub></b>	<b>C<sub>2</sub></b>
☞ a. Candidate A		*
b. Candidate B	*!	



**Tableau (2)**  $C_1 \gg C_2$ 

Candidates	$C_1$	$C_2$
☞ a. Candidate A	*	*
b. Candidate B	**!	

**Tableau (3)**  $C_1$  and  $C_2$  are unrankable with respect to each other

Candidates	$C_1$	$C_2$
☞ a. Candidate A		*
b. Candidate B		**!

The optimal output (Candidate (a) above) is more harmonic as it exhibits less serious violations.

### Theoretical Assumptions of Optimality Theory

There are five crucial principles that govern the framework of Optimality Theory. Universality entails that Universal Grammar is responsible for supplying the constraints which all the languages in the world have in their *repertoire*. However, as we move from language to language, constraints might be active in one language but dormant in another. They also may be highly adhered to in one language but freely violable in another. Ranking assigns priority or preference to constraints with respect to each other. Within a given language, some constraints are more important than others and must take precedence over others. Ranking determines how evaluation of constraints proceeds and on what basis the optimal output is selected. Violability holds that nothing is perfect; all constraints are potentially violable. The suboptimal output forms along with the optimal one violate constraints in one way or another. However, the ranking of the competing constraints is of a paramount importance, and it definitely matters if a candidate wants to be optimal or doomed. In order to be optimal, the candidate can violate the low ranked constraints but exhibits full respect to high ranked constraints. It must also, at all costs, be more harmonic and only minimally violate constraints.

Inclusiveness dictates that all candidates are admitted in the competition, and no one is excluded. In Optimality Theory, any candidate is a potential output and evaluation should decide the winner. Parallelism solves the cumbersome serial derivations proposed in earlier model. Thus, parallelism ensures that all changes whether in the phonological, morphological or prosodic structures of a linguistic form should be applied simultaneously. Evaluation justly and rightly checks candidates against all these diverse types of changes in a parallel way.

### **Markedness versus Faithfulness Constraints**

Prince and Smolensky (1993/2004) argue that the grammar of any language is reduced to a set of competing universal constraints. The resolution in the competition is made through the ranking which stipulates that one constraint is more important than another. In Optimality Theory, there are two major families of constraints: Markedness and Faithfulness. This section will elaborate more on the function of these constraints.

Markendess constraints detect marked linguistic structures in the output forms, ensuring that unusual or less common features or segments rarely or less often surface in the output form. The sets of constraints admitted in this family are quite huge in scope since the constraints that evaluate features, segments, syllables, feet, stress are many and the list may go on and on. Let us take a simple example that pertains to syllable structures. The less marked syllable structure has an onset with a nucleus and takes the shape CV. However, languages may admit marked structures. For example, they may permit clusters syllable initially or finally CCVCC. They may also have a sequence of vowels in a syllable CVV. Moreover, they may also have a syllable without an onset VC or a syllable without a vocalic nucleus but with a syllabic consonant. In Optimality Theory, syllabic markedness constraints penalize any deviance from the usual

unmarked syllable CV. So, a constraint such as ONSET will evaluate every syllable in the surface form for an onset. \*HIATUS penalizes syllables with a sequence of two or more vowels. \*COMPLEX does not prefer clusters syllable marginally and so on. In Jebbāli, there is an active markedness constraint NO-V which bans vowels in the output forms. This constraint abbreviates many phonotactic constraints, and interacts with a number of phonological and prosodic constraints in the language to yield that a plural form has a single vowel.

Correspondence constraints (encompassing Faithfulness, Identity, Input-Output and Output-Output constraints), on the other hand, monitor identity between compared forms. Thus, there are constraints which militate against insertion or deletion of features or segments. Furthermore, there are constraints which ban featural change. For instance, in Jebbāli, the constraint MAX-[+back]-SP<sup>27</sup> is crucial. It penalizes deletion of the feature [+back] from the output plural forms.

In recent Optimality Theory, prosodic elements such as moras, syllables, feet and prosodic words are also incorporated within Faithfulness constraints. Thus, constraints against the deletion or insertion of moras are proposed (c.f. McCarthy and Prince 1995b; Alderete et al 1999; Kager 1999; Crowhurst 2004, to list a few).

### **Positional Faithfulness Constraints**

One family of faithfulness constraints is the positional faithfulness set of constraints (Beckman 1998) which shows that certain positions in a word hold priority over other positions, and thus they maintain phonological distinctiveness. The fact that these positions keep identity or minimally alter identity suggests their prominence over

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<sup>27</sup> SP stands for the correspondence relation between the Singular and Plural.

other positions in a word. Beckman (1998) sketches some prominent positions that are more salient in any linguistic form:

Table A-4 Privileged and non-privileged positions

a. Privileged Positions	b. Non-Privileged Positions
- Root-initial syllables	- Non-initial syllables
- Stressed syllables	- Unstressed syllables
-Syllable onsets	- Syllable codas
-Roots	- Affixes, clitics, function words
-Long vowels	- Short vowels

(Beckman 1998:1)

One of the privileged positions outlined above is ‘root-initial syllables’. Beckman states “phonologically, initial syllables exhibit all of the asymmetrical behaviors typical of “strong-licensors”: they permit a large range of marked segments, trigger directional phonological processes and resist the application of otherwise regular alternations” (Beckman 1998:52). She further argues that the phonological privileged status of the initial syllables results from high-ranking positional faithfulness constraints. To illustrate, positional neutralization of vocalic contrasts outside the initial syllable is common in languages that have vowel harmony such as in Turkic, Tungusic, Mongolian, Finno-Ugric and Bantu. Initial syllables have vowels that are the whole set of the vocalic inventory of these languages while non-initial syllables are usually a sub-set of the whole vowel inventory and are less marked in terms of the available vowel contrasts. Furthermore, consonantal contrasts are also restricted to syllable initial positions as in Tamil. Beckman provides a whole set of consonantal ranges in many of the world languages, supporting the idea that initial syllables phonologically play a crucial role.

Beckman also discusses that initial syllables play an important role in the domains of lexical access, word recognition and speech production. She listed a number of

psycholinguistic studies that prove that initial syllables are prominent positions in any lexical entry.

In Jebbāli, when plurals with ablaut are formed, the initial syllables maintain a vocalic identity with the root-initial syllable of the singular forms. The vowels in ‘root-initial’ syllable of both the singular and plural forms are identical when plurality is marked in the following Jebbāli examples. I underline the ‘root-initial syllables’ of the singulars and plurals below:

(6) Plurals with ablaut

- |    |                             |                             |                |
|----|-----------------------------|-----------------------------|----------------|
| a. | <u>ɣat</u> <sup>ɕ</sup> ɪk’ | <u>ɣat</u> <sup>ɕ</sup> ok’ | dresses        |
| b. | <u>fagri</u>                | <u>fagru</u>                | Bedouins       |
| c. | <u>motən</u>                | <u>motən</u>                | flesh of backs |

Beckman proposes the following schema to address Positional Faithfulness:

**(7) IDENT-Position (F)**

Let  $\beta$  be an output segment in a privileged position P and  $\alpha$  the input correspondent of  $\beta$ .

If  $\beta$  is [yF], then  $\alpha$  must be [yF].

“Correspondent segments in a privileged position must have identical specification for [F]

(Beckman 1998:8)

In Jebbāli ‘ablaut’ plurals, I adopt the constraint IDENT- $\sigma_{\text{initial}}$ - [+back]-SP that basically monitors identity of the feature [+back] in both the initial syllables of both the singular and plural forms.

**Correspondence Theory**

As the scope of the investigated linguistic problems expands, new tools are introduced either to fill gaps in the theory or to complement it. For instance, McCarthy and Prince (1995) introduced Correspondence Theory to cover old Faithfulness constraints (Input-Output constraints as well as the new consequences of various Output-Output types) and to account for identity features in reduplication.

Correspondence Theory then catches on to offer a unified analysis for other sets of non-concatenative morphological tendencies. It admits a broader range of faithfulness constraints including those pertinent to prosodic constituents such as faithfulness to moras, syllables, feet and the like. Correspondence Theory posits that elements (input-output strings, and input- reduplicant strings) stand in correspondence. It entails that various phonological strings such as features, segments, syllables or feet can stand in a correspondent relation. The schema of the theory is outlined below:

#### **(8) Correspondence Theory**

Given two strings  $S_1$  and  $S_2$ , correspondence is a relation  $R$  from the elements of  $S_1$  to those of  $S_2$ . Segments  $\alpha$  (and element of  $S_1$ ) and  $\beta$  (an element of  $S_2$ ) are referred to as correspondents of one another when  $\alpha R \beta$ .

(McCarthy and Prince 1995:262)

One of the major families of constraints which has emerged from Correspondence Theory is Output-Output Correspondence. I will outline the tenets of this type of correspondence and review the major works which illustrate its success.

#### **Output output correspondence**

The success of Correspondence Theory in addressing shared elements in strings that stand in correspondence inspires Benua (1997) to extend it to correspondence relations between output forms. The Output Output Correspondence takes correspondence one step ahead by arguing that not only underlying and surface forms or reduplicants and bases stand in correspondence, but also morphologically related forms may also stand in correspondence.

Undoubtedly, words in a morphological paradigm share a number of salient linguistic features. In non-concatenative morphology, the consonantal roots along with their linear order are shared all the way down the paradigm. In such a paradigm, morphologically related words are surface forms and within themselves could serve as

related or corresponding forms to each other. Benua (1997) proposes constraints that regulate such output relations. Her constraints function normally as any other set of faithfulness constraints in Optimality Theory; they interact directly with 'phono-constraints or markedness constraints whose goal is to evaluate marked structures in linguistic forms. Benua, who laid down the whole premise which Output Output Correspondence depends on, states in support of her argument that "phonology is sensitive to morphology because phonological identity relations hold over paradigmatically related words..." (Benua 1997:227). In her model, non-concatenative morphological derivations such as internal plural, reduplication, truncation, affixation and others are all subsumed under Output Output Correspondence.

McCarthy (2000) regards the relation between singulars and their broken plurals in Arabic to be an Output Output correspondence. Many affinities between the singular forms and broken plurals are salient and support such a correspondent relation. To illustrate, in their discussion of foot and word in prosodic morphology, McCarthy and Prince (1990a) highlight some problems invoked by reliance on the consonantal root as an input for broken plurals in Arabic. They state "iambic plural systematically reflects aspects of the singulars that the consonantal root does not determine" (pp.218). The total identity of the last syllable's weight of both the singulars and plurals provides empirical evidence that fully supports adoption of Output Output Correspondence. Furthermore, the consonants along with their linear order are preserved in both the singulars and plurals.

Other evidence comes from Hebrew. Ussishkin (1999), in his analysis of denominal verbs in Hebrew, argues for the success of Output Output Correspondence.

Denominal verbs stand in correspondence with the nouns from which they are derived.

They retain the consonant clusters of these nouns, and maintain identity of the vowel and second consonants in them regardless of the phonological shape of the stem.

These theory-oriented pieces of evidence support an Output Output correspondence and exempt any direct relations between denominal verbs and their bare stems.

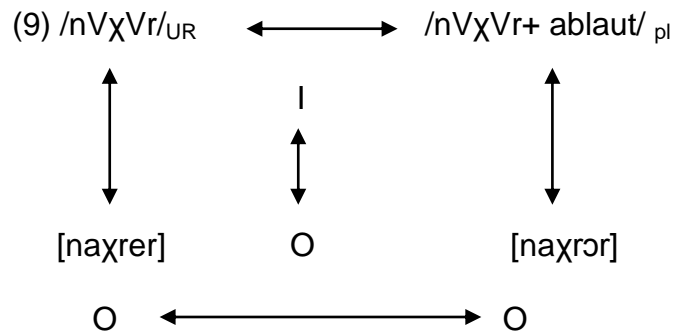
Gafos (2003), who provides a cogent Optimality Theoretic analysis to some of the distinct traits of Arabic verbal morphology, takes Benua's proposal one step further. As he focuses on the paradigmatic consequences of the verbal paradigm (particularly the asymmetries in the distribution of geminates and identical segments in doubled verbs in Arabic), he claims that stems in Arabic are also realized in the context of paradigms.

The fact that Arabic verbal stems ban initial geminates makes it "...reasonable to explore the extent to which stem properties, patterns in the lexicon and alternations, derive from this fact rather than being idiosyncratic" (pp.318). To relate this quote to doubled verbs in Arabic, Gafos maintains that there is a presence of two distinct stem realizations that would imply a violation of some Output Output correspondence whose stipulation requires identity between forms in the perfect paradigm (pp.325).

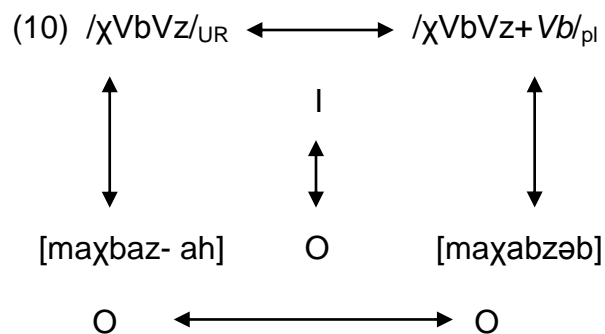
Without Output Output Correspondence, resemblance between output forms in a paradigm results only from sharing part of the input. In Semitic, in particular, this resemblance results from sharing the consonantal root. In the formation of Jebbāli plurals, noun plurals are derived from their singular forms and not from the consonantal root. The preservation of marked structures in the derivation of plurals can easily be attributed to the output singular. The following representations show the formation of two systematic plural processes in Jebbāli (ablaut and *Vb* infixation). Representation (9)



below shows the Underlying Representation (UR) /nVχVr/ for the plural [naχrər]. It reveals that Output Output correspondence is required for the derivation of the plural [naχrər], and UR alone is not enough.



In representation (10) below, the UR /χVbVz/ 'to bake, to make bread' cannot serve as an input to the plural [maχabzəb] 'bakery, pl.', which bears more similarity to the singular [maχbaz]. If I assume that the plural form [maχabzəb] is derived from the consonantal root /χVbVz/, it will be hard to explain {ma}, a shared sequence of segments in the output singular and plural.



### Alignment Constraints

Another crucial operative set of constraints in Optimality Theory is alignment constraints which demand certain edges in linguistic forms to align with some other edges of categories or constituents. For example, they may require the right edge of every syllable in a linguistic form to coincide with a certain morphological constituent.

The general formalism of the alignment constraints is couched in Generalized Alignment Theory (McCarthy and Prince 1993):

### (11) Generalized Alignment

Align (Cat<sub>1</sub>, Edge<sub>1</sub>, Cat<sub>2</sub>, Edge<sub>2</sub>) =<sub>def</sub>

$\forall$  Cat<sub>1</sub>  $\exists$  Cat<sub>2</sub> such that Edge<sub>1</sub> of Cat<sub>1</sub> and Edge<sub>2</sub> of Cat<sub>2</sub> coincide.

Cat<sub>1</sub>, Cat<sub>2</sub>  $\in$  Pcat  $\cup$  Gcat

Edge<sub>1</sub>, Edge<sub>2</sub>  $\in$  {Right, Left}

(McCarthy and Prince 1993:4)

Generalized Alignment demands that the right or left edge of every prosodic or morphological constituent of Cat<sub>1</sub> coincide with the right or left edge of some other prosodic or morphological constituent of Cat<sub>2</sub>. McCarthy and Prince (1993a) outline a number of typical alignments such as a. [PrWd [Stem (the left-edge of every stem is aligned to the left-edge of every prosodic word), b. ]Syllable]Stem (the right-edge of every stem aligns with the right-edge of every syllable), c. [PrWd [Ft (the left-edge of every foot is aligned with the left-edge of every prosodic word) and d. ]PrWd [Suffix (the right-edge of every suffix aligns with the right-edge of every prosodic word).

Alignment constraints have the advantage of “control[ing] the prosodic shape of morphological and other grammatical constituents” (Itô and Mester 1999: 188). It has been argued that although syllable well-formedness constraints can be readily translated into alignment constraints, alignment constraints produce more options in the typology of observed syllabic structures. They lay the foundation of prosodic-morphological analysis.

### Anchoring Constraints

Under Generalized Alignment, there is a set of constraints which demand correspondence between segments standing at the left and rights edges of forms in correspondence. The general formalism of this family of constraints is stated below:

### (12) {Right, Left} Anchoring

‘Any element at the designated periphery of  $S_1$  has a correspondent at the designated periphery of  $S_2$ .’

Let  $Edge(X, \{L, R\})$  = the element standing at the Edge=L, R of X

RIGHT-ANCHOR. If  $\alpha = Edge(S_1, R)$  and  $\beta = Edge(S_2, R)$ , then  $\alpha R \beta$

LEFT-ANCHOR. Likewise, *mutatis mutandis*.

(Kager 1999: 251)

In Jebbāli, the *Vb* is infixed medially (as in [maʁabdəl] ‘big loads’ derived from [maʁdɛl], so that it does not disrupt the corresponding left edge of the singular and plural forms. Therefore, LEFT-ANCHOR is undominated.

Finally, I will discuss Generalized Template Theory (McCarthy and Prince 1994a; Urbanczyk 1996a; Gafos 1995; among many more) which shows how templatic and prosodic requirements can be explained through the interaction of universal constraints supplied by Optimality Theory.

### Generalized Template Theory

The discussion throughout this chapter has outlined the advantages and disadvantages of Templatic and Prosodic Morphology approaches. I also discuss the tenets and theoretical assumptions of Optimality Theory. One of the great advancements of the Optimality Theoretic tools is the Generalized Template Theory that successfully eliminates templatic constraints since it assumes that the interactions of phonological and prosodic constraints can successfully yield the desirable templatic form. Below I describe the assumptions of Generalized Template Theory (GTT).

Generalized Template Theory (GTT) is a powerful theoretical tool offered by Optimality Theory to account for templatic patterns without reference to them. It assumes that templatic effects including CV patterns and the type of foot structure in a linguistic form are derived directly from the interactions of motivated constraints in the

Universal Grammar. Why refer to superfluous tools when a theory like Optimality Theory has access to information supplied by Universal Grammar? The adherence to Generalized Template exempts us from the need to formulate a templatic constraint. Constraints stipulating a particular CV shape for an affix. Stipulation about the size of a truncated form (e.g. TRUNC =  $\sigma$ ) or a reduplicant (RED =  $\mu$ ) are no longer needed. Moreover, there is no need to write constraints referring to the type of foot structure (e.g. IAMBIC or TROCHAIC).

In Generalized Template Theory, the appropriate ranking of related constraints generates the optimal output without referencing the kind of syllables or feet the linguistic forms have. For example, one of the mechanisms for forming plurality in Jebbāli involves attaching a suffixal template -VC with a fixed vocalism and a copy of the final base consonant, e.g. [ħut → ħtɔt] 'fish, sing and pl.' The final shape of the plural output must equal a syllable size. However, following GTT, I do not propose any templatic constraint that stipulates the size of the plural form (PL= $\sigma$ ) or a constraint referencing the length of the plural marker (SUFF =  $\sigma$ ). Instead, I assume that the interactions of phonological and prosodic constraints yield the syllable size without the need to address it templatically.

#### **Summary of Chapter Four**

Non-concatenative morphology is expressed by imposing a change into the stem, resulting in templatically diverse forms which cannot be analyzed into smallest isolable constituents. It can also be expressed by other operations such as ablaut whereby vocalic opposition is imposed on a derived form to keep it contrastive from its base, truncation whereby a prosodic constituent is elided from a stem, infixation in which an extra prosodic or templatic affix is inserted inside a linguistic word, or

reduplication which copies elements from the base. These mechanisms are highly complicated and impose a challenge to approaches which for long have successfully accounted for concatenative morphological systems.

In this chapter, I have reviewed two pre-optimality Theory approaches namely Templatic and Prosodic Approaches and discuss their advantages and disadvantages. I then outlined the theoretical assumptions of Optimality Theory whose impetus has marked a new era into the analysis of phonological and morphological processes. Three of the theoretical tools discussed include Output Output Correspondence, Alignment constraints and Positional Faithfulness. I also argued that the assumptions made by Templatic Morphology and Prosodic Morphology which do not benefit from the information in Universal Grammar are currently translated into universal constraints in the Optimality Theory framework.

The following chapter offers an integrated Optimality Theoretic analysis of the regular plural shapes of Jebbāli using the theoretical tools and assumptions discussed in this chapter.

## CHAPTER 5

### ANALYSIS OF THE REGULAR PLURAL SHAPES

In Jebbāli, the shapes which result from mapping singulars onto plurals are enormously diverse. Numerous non-concatenative morphological processes with concomitant phonological alternations mark plurality in the language. For example, plurality can be systematically marked by infixation of *Vb*, attaching a suffixal template -VC with fixed vocalism and a copy of the final base consonant, ablaut and mapping singulars with gemination onto a specific template. The singulars from which these plurals are derived range from bi-consonantal to tri-consonantal and quadri-consonantal singular forms. In addition to these morphological processes, plural forms exhibit vowel deletion, vowel insertion, assimilation and re-syllabification.

This diversity in plural formation can sometimes be systematic; the resultant plural shapes straightforwardly relate to the particular shapes of their singular forms. For instance, only bi-consonantal and uni-consonantal singular shapes can reduplicate one of their consonants to indicate plurality; tri-consonantal singular shapes are observed to pluralize by processes other than reduplication. Moreover, the majority of singular forms that take the infix *Vb* are quadri-consonantal with the canonical shape CVCCVC(-*Vt*). Bi-consonantal singulars whose second radical is geminated expand their segments and map onto a specific plural template.

Jebbāli plurality is also characterized by another intriguing tendency: doubly and triply marked plurality. For example, some Jebbāli singular forms take double plural markers (i.e. suffixation and *Vb* infixation together or two suffixes consecutively following one another -*un-tə*). In Arabic, the latter process is available and widely known as *plurality of plurality* whereby a specific template designates “plurality of plurality”.

However, in Jebbāli, this meaning is not carried out by these sets of plurals.

Semantically, they are plurals only. Simeone-Senelle (1997) identifies this tendency for Jebbāli and other Modern South Arabian languages.

Although, as has been mentioned previously, some plural shapes are systematically derived from specific singulars, others can hardly be related to their singulars. To illustrate, since bi-consonantal singulars, for example, may take various shapes of plural (ablaut, shaping into a specific template and attachment of a VC shape with fixed vocalism and a copy of the final consonant in the base), it is extremely unpredictable to assign a definite plural shape to a particular singular form.

Furthermore, establishing a general mechanism of plural formation for Jebbāli poses a challenge because there are many divergent plural patterns that cannot be solely attributed to the shapes of their singular forms. On the other hand, Jebbāli's diverse plural shapes exhibit common morphological and phonological characteristics or tendencies which are indicative of the grammar of the language as a whole.

This chapter offers an integrated analysis to the systematically and phonologically conditioned plural shapes. It accounts for a range of diverse shapes of plurals in Jebbāli within the Optimality Theory framework. The analysis first addresses the plurals with *Vb* infixation. It is then extended to account for the plurals attaching a suffixal template and plurals derived from geminated singulars. Finally, I offer three analyses to the plurals with vocalic opposition.

### **Analysis of Plurals with *Vb* Infixation**

One of the most prevalent patterns of plural formation in Jebbāli is plurals with *Vb* infixation. This pattern of pluralization is unique to Jebbāli; other Modern South Arabian languages do not mark plurality by *Vb* infixation. Moreover, none of the widely studied

Semitic languages is reported to have the *Vb* infix as a plural marker. Although it is not the default mode of pluralization in the language, it occurs quite frequently when pluralizing stationary items, old and new tools and generally loan words which relate to gear. For example, when Jebbāli speakers are asked to pluralize the Arabic word [mas<sup>ʕ</sup>t<sup>ʕ</sup>r-ah] ‘ruler’, they pluralize it by infixing *Vb*. Thus, [mas<sup>ʕ</sup>abt<sup>ʕ</sup>ər] is favored to \*[mas<sup>ʕ</sup>t<sup>ʕ</sup>ɪɾti], the potential suffixed and default plural form. It also occurs when pluralizing certain buildings such as offices, restaurants and hotels. I will first present representative examples of this pattern and then describe the locus of the infixation with detailed description of the singulars and resultant plural shapes:

(1) Plurals of *Vb* infixation

a. munxul	min <u>ɛ</u> bxəl	sieves
b. mærgəl	mir <u>ɛ</u> bgəl	cauldrons
c. maɾdɛl	maɾ <u>a</u> bdɛl	big loads
d. maħzɛm	maħ <u>a</u> bzɛm	cartridge belts

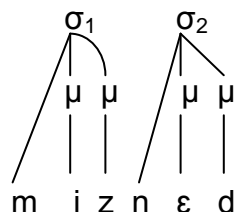
As observed in the above examples, quadri-consonantal singulars bearing the shapes CVCCVC or CVCCVC-*it* or CVCCVC-*ah* (the suffixes represent the feminine gender) take *Vb* infixation to mark plurality. The quality of the vowel in the infix can either be /ɛ/ or /a/ depending on the place features of the preceding consonant.

Although there are a few exceptions, /ɛ/ follows a coronal, velar or bilabial consonant while /a/ is preceded by a pharyngeal(ized), glottalized or a back consonant in general. The *Vb* infix resides towards the left edge of the plural form. The exact locus of this infix is the second syllable from the left edge of the plural after the C<sub>1</sub>VC<sub>2</sub> of the base singular form. So, the final plural shape is CVC**Vb**CVC.

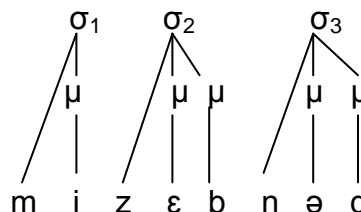


The following is a prosodic representation of  $miz.nəd \rightarrow mi.z\underline{\epsilon b}.nəd$  'rifle-bolts':

(2) *Sing.*



*Pl.*



To govern the locus of the *Vb* infix, I use an alignment constraint. The general formalism of the alignment family of constraints is repeated below:

### (3) Generalized Alignment

Align (Cat1, Edge1, Cat2, Edge2)=def

$\forall$  Cat1  $\exists$  Cat2 such that Edge1 of Cat1 and Edge2 of Cat2 coincide.

Cat1, Cat2  $\in$  Pcat  $\cup$  Gcat

Edge1, Edge2  $\in$  {Right, Left}

(McCarthy and Prince 1993)

In Jebbāli, *Vb* is aligned to the left edge of the output plural forms. It occupies exactly the second syllable of these forms as can be clearly seen in the following examples (the [.] indicates syllable boundaries):

(4) *Vb* infixed plurals with syllabification indicated

- |                          |                                   |                        |
|--------------------------|-----------------------------------|------------------------|
| 1. miz.nəd               | mi. <u>zεb</u> .nəd               | rifle-bolts            |
| 2. maχ.t <sup>ʕ</sup> ər | ma. <u>xab</u> .t <sup>ʕ</sup> ər | caravans, turns, times |
| 3. məs'.rəf              | mi.s' <u>εb</u> .rəf              | rations, supplies      |

One may argue that the *Vb* infix appears to be in the middle of these plural forms, and may be right aligned instead. However, if I assume it is right aligned, then \*miz.nV.bed surfaces, and that is not the actual output plural in Jebbāli. The analysis presented below will rule out this potential form because there is an active constraint in Jebbāli which restricts the size of the infix, and entails its segments {V and b} should be contained within a syllable. The infix cannot span across two syllables. In \*miz.nV.bed, the infix segments *Vb* are contained in two separate syllables.

To address the locus of infixation, I formulate the alignment constraint as:

**(5) ALIGN-Vb- L**      Align *Vb* to the left edge of the plural form

The violation of this alignment constraint is gradient. The actual output plural aligns *Vb* exactly after three segments  $\{C_1, V, C_2\}$  from the left edge of the plural form, so three violations of ALIGN-Vb- L are assessed. The *Vb* resides in the second syllable of the plural form, making  $C_2$  the onset of the *Vb* infix, and this will prove important to the analysis.

This alignment constraint is dominated by the language requirement to keep the right and left edges of the singular forms corresponding to the right and left edges of the plural forms. The infix *Vb* does not disrupt the edges of the singular form when plurality is marked. The set of constraints that keep the edges of the singulars and plurals in a correspondent relation are the anchoring family of constraints whose general formalism stipulates the following:

**(6) {Right, Left} Anchoring**

‘Any element at the designated periphery of  $S_1$  has a correspondent at the designated periphery of  $S_2$ .’

Let *Edge* ( $X, \{L, R\}$ ) = the element standing at the Edge=L, R of  $X$

(Kager 1999: 251)

The actual plural forms have the segments at the leftmost edge and the rightmost edge corresponding with those at the leftmost and rightmost edges in the singular forms. To address this fact, I use the following anchoring constraints:

(7) L -ANCHOR-PS<sup>28</sup>    the segment at the leftmost edge of the plural form corresponds with that at the leftmost edge of the singular form

(8) R -ANCHOR-PS    the segment at the rightmost edge of the plural form corresponds with that at the rightmost edge of the singular form

---

<sup>28</sup> PS stands for Plural - Singular, following other families of Correspondence constraints.

The violation of the above anchoring constraints is categorical; it occurs when the segments at the edges of both the singular and plural forms do not match. It stipulates that for the segments at the rightmost and leftmost edges of the plural form, there must be corresponding segments at the leftmost and rightmost edges of the singular form. While L-ANCHOR-PS is ranked above ALIGN-Vb- L in Jebbāli plurals to ensure that left edges of the singular and plural stand in correspondence, and stress the fact that plural marking is never observed in the left side of these plurals, R-ANCHOR-PS should be ranked lower than ALIGN-Vb- L, so that suffixation and other plurals marked to the right edge are not doomed. The following tableau shows the competition between the alignment constraint and the anchoring constraints.

**Tableau [1]** L-ANCHOR-PS » ALIGN-Vb- L » R-ANCHOR-PS

miz.nəd + Vb	L-ANCHOR-PS	ALIGN-Vb- L	R-ANCHOR-PS
☞ a. mi.z <b>ɛb</b> .nəd		m i z	
b. miz.nə.d <b>ɛb</b>		m i z n! ə d	*
c. <b>ɛb</b> .miz.nəd <sup>29</sup>	*!		

The tableau above illustrates the locus of the infix *Vb* which is determined by a competition between the alignment and L-ANCHOR-PS constraints. The optimal output (a) has the infix right after the first three segments, incurring three violations {m, i, z} to the low ranked constraint ALIGN-Vb- L. It obeys the high ranked constraint L-ANCHOR-PS, and incurs no violation to R-ANCHOR-PS by keeping the leftmost and rightmost edges in correspondence. Candidate (c), though it aligns *Vb* all the way to the left-edge and exhibits no violation to ALIGN-Vb- L, it violates L-ANCHOR-PS which is crucial for Jebbāli's plurals. The segment {m} at the leftmost edge of the singular has no correspondent in the leftmost edge of the plural form. Thus, it is doomed. As a matter of

<sup>29</sup> Other potential sub-optimal candidates such as [mebizned] will be dealt with in the next section.

fact, no Jebbāli plural form has a plural marker at its left edge. Candidate (b) aligns *Vb* to the right edge, skipping far more segments in the plural form than the segments skipped in the actual output. Moreover, it violates the right anchoring constraint. Therefore, it is out too.

In the actual output plural, the final C of the first syllable  $.C_1VC_2$  of the singular form  $C_1VC_2.C_3VC_4$  makes an onset to the *Vb* infix. Observe the following representation:

(9) *Sing.*            m i z                            n ε d  
                       |   |   |                        |   |   |  
*Pl.*                   m i z            εb    n    ə    d

In the singular form [miz.nəd], /z/ belongs to the first heavy syllable  $\#C_1VC_2$  and closes the first syllable. However, in the output plural, it serves as the onset to the infix *Vb*, a requirement relatively high in the language. So, a potential candidate such as miz.εb.nəd is out as it violates **ONSET**.

#### (10) **Onset**

Every syllable begins with a consonant. (McCarthy and Prince 1990b and 1993a)

Observe the following tableau which illustrates the fact that the locus of the *Vb* infix must conform with the prosodic requirements of the language. Although the right and the left edges of candidate (d) stand in absolute correspondence with the singular output, it violates ONSET.

**Tableau [2]**            L-ANCHOR-PS » ALIGN-Vb- L, ONSET » R-ANCHOR-PS

miz.nəd + <i>Vb</i>	L-ANCHOR-PS	ALIGN-Vb- L	ONSET	R-ANCHOR-PS
☞ a. mi.z <b>εb</b> .nəd		m i z		
b. miz.nə.d <b>εb</b>		m i z n! ə d		*
c. <b>εb</b> .miz.nəd	*!		*	
d. miz. <b>εb</b> .nəd		m i z	*!	

The actual output is the most harmonic candidate, as it exhibits the fewest violations to the proposed constraints. It exhibits three violations to ALIGN-Vb- L by aligning the infix three segments away from the left edge of the plural form. Candidate (d) equally violates ALIGN-Vb- L three times. However, it fatally violates the constraint requiring every syllable in the output form to begin with an onset. Thus, candidate (d) is doomed in the ranking above.

[mɛ.biz.nəd] is yet another possible candidate which needs to be considered for the ranking established above. This candidate violates ALIGN-Vb- L only once by skipping the segment {m} at the left of the plural form. Thus, it may seem more harmonic than our actual plural form. However, this candidate has the two segments {V and b} of the infix separated into two syllables. The optimal output has these two segments contained in one single syllable. Thus, mɛ.biz.nəd is doomed. Observe the following tableau:

**Tableau [3]** L-ANCHOR-PS » ALIGN-Vb- L, ONSET » R-ANCHOR-PS

miz.nəd + Vb	L-ANCHOR-PS	ALIGN-Vb- L	ONSET	R-ANCHOR-PS
☞ a. mi.z <b>ɛb</b> .nəd		m i z		
b. miz.nə.d <b>ɛb</b>		m i z n! ə d		*
c. <b>ɛb</b> .miz.nəd	*!		*	
d. miz. <b>ɛb</b> .nəd		m i z	*!	
☹ e. m <b>ɛ</b> .biz.nəd		m		

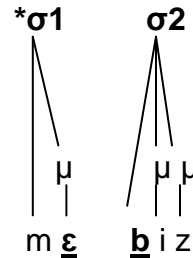
The ranking above requires the stipulation of a constraint that would favor mi.z**ɛb**.nəd over mɛ.biz.nəd (**infix bold-faced**). As seen, the only difference between these candidates that favors the winner is that the segments contained in the infix {ɛ and b} are contained in the same syllable in the winning candidate. Candidate (e) is different from the actual output in that it has the elements (ɛ and b) of the infix in separate syllables. The /ɛ/ serves as a nucleus to the preceding syllable while the /b/

makes the onset to the following syllable. So, the infix makes two syllables. The two segments of the infix in the actual output make a syllable and both must belong to that syllable. Observe the following representations which show the locus of the *Vb* infix in the actual output and a potential output:

(11) *Actual Output*



\* *Potential Output*



The representations above show that the infix in the optimal output is contained within a single syllable. Thus, it has the weight and size of a syllable. In the potential output, the segmental content of the infix gets separated; the vowel belongs to a different syllable from that that has the {b}. Crowhurst (2004) who studies the behavior of the reduplicants in Mangarayi, Mokilese and Tzeltal crucially states “while the Red[uplicant]s in Mangarayi, Mokilese and Tzeltal may not be syllables in segmental terms, each has the weight of a syllable” (Crowhurst 2004:131). She proposes a size-restricting constraint developed from the more conventional generalized alignment constraints, stating that “exemplars of the M<sub>Cat</sub> (Morphological Category) affix are restricted to no more than a syllable size by the constraint  $\text{Affix} \leq \text{syllable}$ ” (Crowhurst 2004: 129). She stipulates the following constraint to offer a sufficient analysis for the Morphological Category and Prosodic Category misalignment phenomenon:

**(12)  $\text{Affix} \leq \text{syllable}$**  the phonological exponent of an affix is not larger than a syllable

(Crowhurst 2004: 129)

Other evidence for restricting the size of an affix to a syllable comes from Saanich, a dialect of North Straits spoken on the Saanich Peninsula of north Victoria, British Columbia and neighboring islands. According to Kiyota (2003), the plural morpheme of Saanich is expressed by two non-reduplicative affixes (more specifically infixes) which are “typically less than a syllable” (p.1) and two reduplication patterns which are dependent on the stress pattern of the root. The infix *-l-* has two distinct realizations [-ʔlə-] and [-əl] but both are of a syllable length. This justifies the importance of the constraint  $\text{Affix} \leq \text{syllable}$  to rule out plural forms which infix only *-l-*.

The affix  $\leq$  syllable constraint rules out candidates whose affixes are larger than a syllable. Moreover, it can be extended to capture the size properties of affixes in general. Violation to this constraint is incurred by: (i) separating the content of an affix or (ii) having an affix that is bigger than a syllable. Incorporating the  $\text{Affix} \leq \sigma$  constraint into the analysis of the *Vb* infixed plural forms, the tableau below reveals the interaction of the size restricting constraint with the so-far-established constraints.

**Tableau [4]** L-ANCHOR-PS,  $\text{Affix} \leq \sigma$  » ALIGN-Vb- L, ONSET » R-ANCHOR-PS

miz.nəd + <i>Vb</i>	L-ANCHOR-PS	$\text{Affix} \leq \sigma$	ALIGN-Vb- L	ONSET	R-ANCHOR-PS
a. mi.z <b>ɛb</b> .nəd			m i z		
b. miz.nə.d <b>ɛb</b>			m i z n! ə d		*
c. <b>ɛb</b> .miz.nəd	*!			*	
d. miz. <b>ɛb</b> .nəd			m i z	*!	
e. m <b>ɛ</b> .biz.nəd		*!	m		

Candidate (e) is now doomed because of the higher ranking constraint  $\text{Affix} \leq \sigma$  which requires the segments of the infix to be contained in a single syllable. In this candidate, {ɛ} of the infix *ɛb* makes the nucleus to the first syllable at the left edge of the plural form while {b} is the onset to the following syllable, forcing the infix to span over two syllables and violating  $\text{Affix} \leq \sigma$ .

Jebbāli has a sub-pattern of *Vb* infix plurals which has peculiar morphophonological properties. Such properties make it diverge from the regular *Vb* infix shapes. For instance, some of the *Vb* infix plurals begin with a vowel, often a schwa, instead of the systematic initial #mVC. syllable. They take the shape [ə.CV**b**.CVC] and thus differ from the phonologically conditioned shape [mVC.CV**b**.CVC] in starting with an onsetless syllable plural-initially. They are derived from singular forms (13a-c below), which begin with a nasalized vowel (traditionally analyzed as a result of deleting a nasal /m/ in Johnstone, (1981); Nakano (1986) and Hofstede (1998). These forms may keep the nasal /m/ or delete it in their plural form. In other words, Jebbāli admits two plural shapes for these singulars: the regular phonologically conditioned [mVC.CV**b**.CVC] shape and the [V.CV**b**.CVC] with a deleted /m/ and initial vowel. In the singular forms, when /m/ deletes, the following vowel nasalizes [ĩ]. The singular forms may be pronounced with the initial [m] or [ĩ]. Jebbāli consultants accept the two variations as interchangeable and make no difference in semantics between the two options.

(13) Plurals with *Vb* infix and initial vowel

a. ĩftəħ/ mĩftəħ	əfəbtəħ/ mĩfəbtəħ	keys
b. ĩktəb/ mĩktəb	əkəbtəb/ mĩkəbtəb	offices
c. ĩglis/ mĩglis	əgeblis/ mĩgeblis	rooms for guests

The plurals with the nasal /m/ nicely fit into the proposed analysis as revealed in the above tableaux. If we assume that the plurals that start with a vowel are originally derived from a singular whose /m/ is deleted, then these forms also integrate well in the analysis as the following two tableaux show.



**Tableau [5]** L-ANCHOR-PS, Affix  $\leq \sigma$  » ALIGN-Vb- L, ONSET » R-ANCHOR-PS

$\tilde{g}lIs + Vb$	L-ANCHOR-PS	Affix $\leq \sigma$	ALIGN-Vb- L	ONSET	R-ANCHOR-PS
a. mɪ.g <b>ɛb</b> .lɪs			m ɪ g!		
☞ b. ə.g <b>ɛb</b> .lɪs			ə g	*	
c. <b>ɛb</b> .mɪg.lɪs	*!			*	
d. mɪg. <b>ɛb</b> .lɪs			m ɪ g	*!	
e. mɛ. <b>b</b> ɪg.lɪs		*!	m		

**Tableau [6]** L-ANCHOR-PS, Affix  $\leq \sigma$  » ALIGN-Vb- L, ONSET » R-ANCHOR-PS

mɪglIs + Vb	L-ANCHOR-PS	Affix $\leq \sigma$	ALIGN-Vb- L	ONSET	R-ANCHOR-PS
☞ a. mɪ.g <b>ɛb</b> .lɪs			m ɪ g		
b. ə.g <b>ɛb</b> .lɪs	*!		ə g	*	
c. <b>ɛb</b> .mɪg.lɪs	*!			*	
d. mɪg. <b>ɛb</b> .lɪs			m ɪ g	*!	
e. mɛ. <b>b</b> ɪg.lɪs		*!	m		

Jebbāli is a language that has intensive deletion. It deletes /m/ word-initially and /w/ and /b/ word-medially and replaces the deleted segments with nasalized or long vowels (Johnstone 1981; Nakano 1986; Hofstede 1998) although it is unusual to lose an onset and lengthen a vowel<sup>30</sup>. This trend of deletion also applies to the plural formation and reveals a violation to ONSET. Thus, it comes as no surprise that Jebbāli admits two plural shapes for the singulars with a deleted initial /m/ and retained one. In tableaux [5] and [6], both candidates (a) and (b) are optimal and admitted in the grammar of the language. However, it is important to note that the {b} of the plural infix never deletes since it is the main element indicating plurality in these forms. The retention of the {b} of the infix happens in spite of the fact that it is prone to delete in elsewhere contexts.

<sup>30</sup> The usual scenario in phonology is to lose a coda and lengthen the vowel preceding it. This is called “compensatory lengthening” and has been widely explored in many languages of the world (c.f. Hayes 1989 and Clements 1986, to mention very few).

## Summary of the Ranking for Plurals with Vb Infixation

To sum up, the analysis of the plurals with *Vb* infixation reveals the interaction of an alignment constraint and L-ANCHOR-PS to determine the exact locus of the infix in the output plural forms. As the infix resides in the second syllable of the plural form, it exhibits three violation marks to the alignment constraint at the expense of obeying the left anchoring constraint. The positioning of the infix has to conform with the language requirement to have onsets; thus, ONSET plays a role in Jebbāli's phonology, and rules out suboptimal candidates with an onsetless syllable. Moreover, the segments of the plural infix must be contained in a single syllable and be of a syllable size. The constraint which addresses this fact is  $\text{Affix} \leq \sigma$ . The following illustrates the overall ranking of the proposed constraints:

(14) L-ANCHOR-PS,  $\text{Affix} \leq \sigma$  » ALIGN-Vb- L, ONSET » R-ANCHOR-PS

The left anchoring constraint monitoring the segment at the leftmost edge of the singular and plural forms along with the constraint restricting the size of the infix outrank the alignment constraint and the prosodic constraint. Since suffixation and other plural markers occur to the right edge of the plurals in Jebbāli, R-ANCHOR-PS is low ranked.

## Analysis of Plurals with Suffixal Template

The second systematic noun plural pattern in Jebbāli involves attachment of a suffixal template with fixed segmentism and a copy of the final consonant of the base. This mode of pluralization relates to borrowed nouns from Arabic; approximately 15 out of the 19 collected forms (78%) pertain to borrowings from Arabic and related dialects of Arabic. In Omani Arabic (henceforth OA), these forms pluralize by reduplicating the final consonant in the base preceded by a long vowel /u:/. Similarly, the majority of the

Jebbāli forms take reduplication with fixed vocalism. Observe the following examples comparing Jebbāli with OA:

(15) Jebbāli and Omani Arabic bi-consonantal plurals

Singulars	Plurals in Jebbāli	Plurals in OA	Gloss
a. ʁaf	ʁfɔf	ʁfu:f	feet, soles
b. ʁad	ʁdɔd	ʁdu:d	cheeks
c. rɛf in Jebbāli raf in OA	ɛrfɔf	rfu:f	shelves, racks, bulks
d. kɛf in Jebbāli kaf in OA	ɛkfɔf	kfu:f	palms of the hand; claws

The semantics of these forms is not restrictive to one particular category and range from animate beings like brothers, roosters, fish,... to inanimate objects like axes, books and letters. Moreover, the class of the plurals taking the suffixal template with partial reduplication is diverse in nature and the words collected can equally be divided between the feminine and masculine class groups.

Bi-consonantal singular forms of mostly CVC shape, whose vocalic quality varies greatly among /a/, /u/, /o/ and /ɛ/, exhibit attachment of a VC template whereby V is invariantly /ɔ/ and the final consonant slot is filled by a reduplicated consonant from the base (V)CC<sub>x</sub>ɔC<sub>x</sub> (C<sub>x</sub>C<sub>x</sub> denotes a reduplicant). The parenthesized vowel in the template (V)CC<sub>x</sub>ɔC<sub>x</sub> is *prosthetic*, and often gets inserted word-initially if the word begins with a consonant cluster. However, it is hard to establish a pattern which explains when exactly this *prosthetic* vowel is realized. It is not always the case that certain consonant combination triggers insertion of this vowel. Below, I show how various combination of consonant clusters may and may not surface with the *prosthetic* vowel:

**(16) Combination of consonants with prosthetic vowel**

liquid + fricative as in [ɛrfɔf], *but not in* [lʁɔɪ]  
 nasal + fricative as in [ɛmsɔs], *but not in* [nfɔf]  
 stop + fricative as in [ɛkfɔf], *but not in* [kfar]  
 fricative + stop as in [ɔʁgɔg], *but not in* [skun] and liquid + liquid as in [ɛrti]

However, it is important to note that Jebbāli tolerates consonant clusters at the margins of syllables. In some cases, the *prosthetic* vowel harmonizes with /ɔ/ in the suffixal template (form (f) below).

This pattern of pluralization has three characteristics that are crucial to the proposed analysis. First, the suffixal template has the size of a syllable .VC. Secondly, it contains a constant or fixed segment /ɔ/ and a copy of the final consonant in the stem. Third, the final shape of the plural form is a syllable length due to the collapse of the syllable of the base singular form (CVC) into consonant clusters CC+VC.

Fixed segmentism has been explored in Alderete et al (1999) and is defined as “the phenomenon where a reduplicative morpheme contains segments that are invariant rather than copied” (Alderete et al 1999:327). Since /ɔ/ is not copied from the base nor is it a realization of an unmarked vowel, the segment as such is considered marked cross-linguistically, and the suffixal reduplication in Jebbāli falls under the phenomenon of morphological fixed segmentism, which is a type of affixal morphology.

Ratcliffe (1996: 299) provides at least three pieces of evidence to support that this type of reduplication is not real, and thus falls under templatic expansion. First, this type of plural targets bi-radical and mono-radical consonantal singulars. Second, the quality of the vowel in the templatic suffix is similar to the vowel that occurs between the C<sub>2</sub> and C<sub>3</sub> in three-consonant internal plural. To illustrate, in one of the three templatic plural patterns in Jebbāli, the vowel /ɔ/ occurs between the second and third consonants in a few tri-consonantal forms (e.g. *jek’ɔf* ‘roofs’). Third, we may expect to find a default consonant rather than the reduplicated consonant in these plural types. Finally, Ratcliffe observes that if this pattern occurs in tri-consonantal singulars, then one of the

consonants must be glide (hollow form). I add to these arguments the fact that this type of plurals often maps onto a single syllable, which lends support to its being templatic in nature.

The /ɔ/ attached to the reduplicated consonant is realized simultaneously with that consonant and they both make a suffix in the final shape of the plural form. It is important to analyze this plural pattern as both a suffixal template with fixed segmentism and reduplication of the final consonant.

(17) Partial suffixal reduplication

a. ħut	ħtɔt	fish
b. nuf	nfɔf	selves
c. rɛf	ɛrfɔf	shelves, racks, bulks
d. mus	ɛmsɔs	razors
e. kɛf	ɛkfɔf	palms of the hand; claws
f. ħag	ɔħgɔg	pilgrims

Singular forms which are bi-consonantal, similar to the aforementioned ones, also take a suffixal template. However, they have /ɛ/ or /e/ in the suffixal template instead of the marked vowel /ɔ/ (forms (a)-(c) below) and a copy of the final consonant. In these plural forms, there is a vowel between the first two consonants unlike the previous ones, making a total of two syllables in the final shape of this plural type.

(18) Exceptional reduplicated forms

a. ħel-ɛt	ħelɛl	dry leaves
b. xel-ɛt	xelɛl	lavatories
c. hab-ot/ hib-ot	hbeb/ heb	songs

Like shallow verbs in Arabic, Jebbāli plurals with the suffixal template reveal an asymmetry in the distribution of identical consonants. Plural forms with an initial sequence of identical consonants \*ħħɔt, \*ħħt are absent from the noun plurals listed above. On the other hand, noun plurals with only a final sequence of identical consonants abound.

To address the fact that initial consonants are never doubled in Semitic in general and in Modern Hebrew denominal verbs in particular, Ussishkin (1999) proposes a type of Anchoring constraint (STRONG ANCHOR-L), which disallows doubling of a consonant at the left edge and compels doubling to occur only at the right edge of a word. Before I discuss the STRONG ANCHOR-L constraint, let us first recall the general ANCHOR-L constraint as a conditional expression:

(19) ANCHOR-L:

$$\forall x, y, [(x = \text{Edge}(S_1, L)) \ \& \ (y = \text{Edge}(S_2, L))] \rightarrow [x \ R \ y]$$

(Ussishkin 1999:413)

The above constraint stipulates that if  $x$  is at the left edge of  $S_1$  and  $y$  is at the left edge of  $S_2$ , then  $x$  corresponds to  $y$ . It is violated when the leftmost segments of  $S_1$  and  $S_2$  do not stand in correspondence. Ussishkin then flips the order of constraint (19) to rule out doubling of the leftmost segment. He calls constraint (20) below a STRONG-ANCHOR-L and formulates as:

(20) STRONG-ANCHOR-L

$$\forall x, y, [(x = \text{Edge}(S_1, L)) \ \& \ (x \ R \ y)] \rightarrow [y = \text{Edge}(S_2, L)]$$

(Ussishkin 1999: 414)

The above constraint stipulates that if  $x$  stands at the left edge of  $S_1$ , and if  $x$  corresponds to  $y$ , then  $y$  stands at the left edge of  $S_2$ . According to Ussishkin, STRONG-ANCHOR-L “disallows internal correspondents of input-left-edge elements, and in particular, has the effect of disallowing multiple correspondents of a segment that is at the left edge of the input.” (pp.414). It also “entails that for an input-initial element, every correspondent of that element must be initial in the output: the correspondent of an

edge element must itself be an edge element” (pp.414), ensuring a unique correspondent of element at the left edge of forms. This constraint is crucial in the derivation of Jebbāli plurals with a VC template, as it forbids doubling of the leftmost segment in the plural form. I illustrate the effect of STRONG-ANCHOR-L below:

(21) STRONG-ANCHOR-L

	<i>satisfied</i>	<i>violated</i>	<i>violated</i>
S <sub>1</sub>	[ <sub>L</sub> ħ <sub>1</sub> u <sub>2</sub> t <sub>3</sub> ] <sub>R</sub>	[ <sub>L</sub> ħ <sub>1</sub> u <sub>2</sub> t <sub>3</sub> ] <sub>R</sub>	[ <sub>L</sub> ħ <sub>1</sub> u <sub>2</sub> t <sub>3</sub> ] <sub>R</sub>
S <sub>2</sub>	[ <sub>L</sub> ħ <sub>1</sub> t <sub>3</sub> ɔt <sub>3</sub> ] <sub>R</sub>	[ <sub>L</sub> ħ <sub>1</sub> ħ <sub>1</sub> ɔt <sub>3</sub> ] <sub>R</sub>	[ <sub>L</sub> ħ <sub>1</sub> uħ <sub>1</sub> ɔt <sub>3</sub> ] <sub>R</sub>

In order to allow the rightmost segment to double, then I need a comparable constraint (STRONG-ANCHOR-R), which is outranked by STRONG-ANCHOR-L. Observe the formalism of STRONG-ANCHOR-R:

(22) STRONG-ANCHOR-R

Let C<sub>f</sub> = the rightmost consonant of a string:

$$\forall x, y, [(x = (S_1, C_f)) \ \& \ (x \ R \ y)] \rightarrow [y = \text{Edge}(S_2, R)]$$

(Ussishkin 1999:415)

STRONG-ANCHOR-R penalizes doubling of rightmost consonant. Therefore, STRONG-ANCHOR-L outranks STRONG-ANCHOR-R and INTEGRITY (a faithfulness constraint which bans multiple correspondence of a segment), and this ensures doubling of the rightmost segment only. Observe the following tableau:

**Tableau [7]** STRONG-ANCHOR-L » STRONG ANCHOR-R, INTEGRITY

[ħut + V C]   ɔ	STRONG ANCHOR-L	STRONG ANCHOR-R	INTEGRITY
☞ a. ħtɔt		*	*
b. ħħut	*!		*
c. ħuħt	*!		*

Since the vowel in the suffixal template is constantly and invariantly /ɔ/ regardless of the vowel in the last syllable of the base singular form, the analysis assumes that the suffixal template VC in the plural forms comes with a pre-specified or fixed segment in the base output form. The V slot is attached to /ɔ/:

Therefore, the constraint MAX-V-SUFFIX is undominated in these plurals. Since the vowel in the root is lost in these plural forms, then MAX-V-SUFFIX outranks MAX-V-ROOT.

**(25) MAX-V-SUFFIX** the vowel in the pre-specified vocalic position in the suffix must be realized.

(26) \*COMPLEX      \*<sub>[σ</sub> CC and      \*CC]<sub>σ</sub>      ('Onsets and Codas are simple')

In the tableau below, deletion of the vowel in the root is tolerated at the expense of keeping the vowel in the suffix intact. \*COMPLEX is violated in the optimal output.



**Tableau [8]**

MAX-V-SUFFIX » MAX-V-ROOT, \*COMPLEX

[ħut + V C]   ɔ	MAX-V-SUFFIX	MAX-V-ROOT	*COMPLEX
☞ a. ħtɔt		*	*
b. ħutut	*!		
☹ c. ħutɔt			

Candidate (a), the optimal plural output, violates \*COMPLEX and MAX-V-ROOT since it has clusters syllable initially and loses its root vowel. These constraints are low ranked and can freely be violated in Jebbāli. (a) also violates MAX-V-ROOT because it deletes the vowel in the root. The pre-specified suffix vowel in the suffixal template is lost in candidate (b), violating fatally MAX-V-ROOT. There is a conspiracy between MAX-V-SUFFIX and MAX-V-ROOT which results in deleting the vowel in the root at the expense of keeping the vowel in the suffixal template intact. Since MAX-V-SUFFIX, which says ‘delete the vowel in the suffix’, outranks MAX-V-ROOT, which stipulates the deletion of the vowel in the root, the output form always surfaces with the vowel of the suffixal template and loses the vowel in the root. This stems from the fact that plurality in these forms is marked by the vowel and consonant of the suffixal VC template together. Therefore, the loss of the vowel in the root is less costly as long as plurality is marked by another vowel. Candidate (c) obeys the constraints above but it is not selected as the actual output because it has one more vowel than the optimal output does. The subsequent discussion will rule it out.

The final shape of the output plural is a syllable length as a result of (1) deleting the root vowel and (2) maintaining the vowel in the suffix and preserving its quality in the output form. Thus, I need a constraint that translates these crucial facts. Such a constraint should be able to rule out suboptimal outputs like \*[ħuthut] and \*[ħuthɔt]

which copy the entire base string without deleting the vowel in the base, and \*[ħutħot] which preserves the two vowels of the base and suffix and extends the final C. I adopt the markedness constraint No-V which penalizes “whatever vowel (that) needs to be deleted” (Baković 2005: 299) in the output plural forms. This constraint abbreviates a whole set of phonotactic requirements which interact with the constraint MAX-V-SUFFIX to ensure that the final shape of the plural form has only one vowel, that of the suffix.

**(27) No-V** No vowels appear in the output form

This constraint interacts with the constraints preserving the vowel in the suffix at the expense of deleting the vowel in the root. Observe the following ranking:

**Tableau [9]** MAX-V-SUFFIX, No-V » MAX-V-ROOT

[ħut + V C]   ɔ	MAX-V-SUFFIX	No-V	MAX-V-ROOT
☞ a. ħtɔt		*	*
b. ħtut	*!	*	*
c. ħutħot		**!	
d. ħtt	*!		*
e. ħutɔt		**!	

Candidates (c) and (e) lose because they fail to delete the vowel in the root, surfacing with one more vowel than that in the optimal output. Thus, they impose one more violation on ‘No-V’ constraint than the optimal output (a). Candidate (b) deletes the vowel in the suffix and fatally violates MAX-V-SUFFIX, an undominated constraint in the ranking above. Candidate (d) which loses the vowels of the root and suffix incurs a fatal violation to the high ranking constraint MAX-V-SUFFIX. It also violates syllable constraints like the one requiring a nucleus in a syllable (NUC). Thus, it is out too. Candidate (a) faithfully obeys MAX-V-SUFFIX at the expense of violating the low ranked

constraint MAX-V-ROOT. It incurs one violation to NO-V, and thus is the most harmonic amongst the other candidates. Therefore, it wins the competition.

Incorporating the above ranking with the so far established ranking for this shape of Jebbāli yields MAX-V-SUFFIX, NO-V » \*COMPLEX, MAX-V-ROOT. Tableau [10] summarizes the effect of the interaction among these constraints. Candidate (a) has a consonant cluster word-initially as a result of losing the vowel in the root. It violates \*COMPLEX and MAX-V-ROOT which are low ranked. It also incurs one violation to NO-V which penalizes all vowels in the output forms. In comparison to candidates (c) and (d) which have two violations to NO-V, candidate (a) is the most harmonic output and it wins the competition. Candidate (b) loses the pre-specified vowel in the suffix, incurring a fatal violation to MAX-V-SUFFIX. Thus, it is doomed. Candidate (e) has two violations of NO-V, a highly ranked constraint.

**Tableau [10]** NO-V, MAX-V-SUFFIX » \*COMPLEX, MAX-V-RT

[ħut + V C]   ɔ	NO-V	MAX-V-SUFFIX	*COMPLEX	MAX-V-RT
☞ a. ħtɔt	*		*	*
b. ħtut	*	*!	*	*
c. ħutħut	**!	*		
d. ħutħot	**!			
e. ħutɔt	**!			

### Summary of the Ranking for Plurals with a Suffixal Template

The picture of how these constraints crucially interact to yield the optimal output is now clear. The analysis is elegant as it adheres to the principles of Generalized Templatic Theory which disfavors templatic constraints, and assumes that interaction of phonological and prosodic constraints produce the desired result. The analysis here does not refer to templatic constraints such as PL =σ to derive the final shape of the

plural form. Instead, it assumes that a set of phonological constraints and NO-V, which penalizes vowels in the output forms, yield the fact that a syllable has only a single vowel. NO-V interacts with MAX-V-SUFFIX to limit the occurrence of any unnecessary vowels in the output plural. Therefore, the full ranking established for these forms is:

(28) MAX-V-SUFFIX, NO-V » \*COMPLEX, MAX-V-ROOT.

## Analysis of Templatic Plurals

### Plurals Derived from Geminated Singulars

Geminated singulars in Jebbāli taking the shape CVC<sub>x</sub>C<sub>x</sub> (C<sub>x</sub>C<sub>x</sub> denotes a geminate) are mapped onto a particular template when they pluralize. They take the shape CVC<sub>x</sub>VC<sub>x</sub> whereby the geminate is broken up by a vowel.

(29) Plurals derived from geminated singulars

a. tɛll-ɛt	tɛlɛl	hills
b. ɸall-ɛt	ɸalɛl	towns; small villages
c. dɛll-ɛt	dɛlɛl	coffee-pots

Few noun plurals derived from geminated singulars lose the vowel between the first consonant and the geminate, forming the shape CC<sub>x</sub>VC<sub>x</sub> (examples (30.a) below). Having a consonant cluster at the margins of syllables is tolerable in Jebbāli. In some instances, these clusters are resolved by a *prosthetic* vowel which gets inserted before the initial consonant clusters #(V)CC (example (30.b) below).

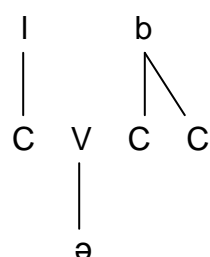
(30) Plurals losing the consonant between C<sub>1</sub> and C<sub>2</sub>

a. ləbb-ɛt	lɛbɛ	kernels
b. rəzz-ɛt	ɛrzɛz	heavy wooden bolts of a door

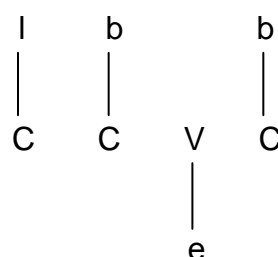
Underlyingly, the singular forms contain two consonants; the first consonant is C<sub>1</sub> in the template C<sub>1</sub>VC<sub>x</sub>C<sub>x</sub> while the second consonant has two instances of /C<sub>x</sub>/. Thus, singular forms such as forms (30) above must be analyzed as bi-consonantal /l b/ and mapped to a tri-consonantal template from left to right. The geminate consonant in the

singular form represents a single melodic segment. In the plural form, however, the second consonant is spread to the final consonant slot of the template; it spans over two positions with a vowel intervening between the consonants forming a "long-distance" geminate, as the representation below illustrates:

(31) *Singular*



*Plural*



Because the geminate of the singular form is broken up by a vowel in the plural form, it has two correspondents in the plural form violating the constraint called INTEGRITY in Optimality Theory. INTEGRITY penalizes relations between a form  $S_1$  (here, the Singular) and another related form  $S_2$  (here, the Plural), where a segment in  $S_1$  has more than one correspondent in  $S_2$ .

The subscripts portray pairs of correspondent segments, so that the segment /l/ in [ħall-ɛt] enters into two (hence violation of INTEGRITY) correspondent pair of segments:

(ll<sub>i</sub>) → (l<sub>i</sub>, l<sub>j</sub>).

**(32) INTEGRITY-SP .....**

No segment of the singular has multiple correspondents in the plural.

(33) INTEGRITY-SP violation: ħall<sub>i</sub>, S (Singular), [ħall-ɛt]<sup>31</sup>

ħ a l<sub>i</sub> e l<sub>j</sub> P (Plural), [ħalel]

<sup>31</sup> The suffix is excluded as it does not contribute to the consonantal root of the form.

Noun plurals derived from geminated singulars have an extra vowel which breaks up the consonant cluster, violating DEP-V-PS which militates against an insertion of a vowel in the plural form:

**(34) DEP-V-SP<sup>32</sup>** Vowels in the plural form must have vowel correspondents in the singular form ('No insertion')

An alternative repair to the geminate is to shorten it as in [ħal]. This candidate, compared to the actual output [ħalel], is ruled out by the constraint IDENT<sup>Q</sup>, which requires that the skeletal quantity of segments in the stem must be preserved or transferred to the surface (Dell & Elmedlaoui 1992; Gafos 2003). Specifically, in the actual output [ħall-ɛt] → [ħalel], the /l/ in [ħall-ɛt] is linked to two skeletal C slots, but the correspondent of /l/ in [ħal] is linked to a single C slot. IDENT<sup>Q</sup> penalizes this mismatch.

**(35) IDENT<sup>Q</sup>** A segment in S1 and its correspondent set in S2 have identical quantities (number of C slots)

(36) Actual Output:      ħ   a   l   e   l      // is linked to two C slots  
                                  |   |   |   /  
                                  C   V   C  
 But in:                   ħ   a   l      // is linked to ONLY one C slot

This reveals that IDENT<sup>Q</sup> outranks both INTEGRITY-SP and DEP-V-SP. The following tableau illustrates the relation among these constraints:

**Tableau [11]**      IDENT<sup>Q</sup> » INTEGRITY-SP, DEP-V-SP

[ħall-ɛt] /ħal-pl/	IDENT <sup>Q</sup>	INTEGRITY-SP	DEP-V-SP
☞ a. ħalel		*	*
b. ħal	*!		

The winning candidate (a) has /l/ split into two /l/ correspondents by inserting a vowel to break up the consonant clusters. Thus, it violates the low ranked constraints INTEGRITY-SP and DEP-V-SP at the expense of obeying IDENT<sup>Q</sup> which requires identical

<sup>32</sup> This constraint is also violated in the plurals attaching a suffixal VC template.

number of C slots for the two identical segments /l/ in the output singular and plural forms. On the other hand, candidate (b) loses one of the C slot devoted for the /l/ in the output singular and surfaces with one C slot for a single /l/; thus, it violates the high ranking constraint IDENT<sup>Q</sup>. Therefore, it is doomed!

Another potential candidate to consider is [ħall] whose geminate consonants are not broken up by a vowel. This candidate also looks the same as the output singular form except that it does not have the feminine suffix -*ɛt*. It violates REALIZEMORPH, a constraint which stipulates that a morpheme (be it an affix or an internal change) is imposed into a form when a particular meaning or a morphosyntactic function is expressed by that form.

### (37) REALIZEMORPH

Let  $\alpha$  be a morphological form,  $\beta$  be a morphosyntactic category, and  $F(\alpha)$  be the phonological form which  $F(\alpha+\beta)$  is derived to express a morphosyntactic category  $\beta$ . Then RealizeMorph is satisfied with respect to  $\beta$  iff  $F(\alpha+\beta) \neq F(\alpha)$  phonologically.

(Kurusu 2001:39)

[ħall] also violates the Typology of Geminates, which stipulates that intervocalic geminates VGGV are the most common<sup>33</sup> while geminates which do not have vowels on both sides \*VGG# are the most rare (Muller 2001 who did a survey of 40 languages with geminates). Observe the following ranking:

**Tableau [12]** IDENT<sup>Q</sup>, \*VGG# » INTEGRITY-SP, DEP-V-SP

[ħall-ɛt] /ħal-pl/	IDENT <sup>Q</sup>	*VGG#	INTEGRITY-SP	DEP-V-SP
☞ a. ħalel			*	*
b. ħal	*!			
c. ħall		*!		

<sup>33</sup> The geminate in the output singular is thus evenly syllabified between the preceding and following syllables. They occur intervocalically adhering to the Typology of Geminates.

Candidate (c) is doomed as it fatally violates \*VGG#. Candidate (b) loses the competition because it violates IDENT<sup>Q</sup> by losing one of the C slots. The ranking established for the noun plural forms derived from geminated singulars:

(38) IDENT<sup>Q</sup>, \*VGG# » INTEGRITY-SP, DEP-V-SP.

### Templatic Plurals Losing the Vowel between C<sub>1</sub> and C<sub>2</sub>

Jebbāli tolerates consonant clusters at the margins of syllables. Therefore, the noun plural forms such as [lbeb] ‘kernels’ and [hmum] ‘concerns’ which have consonant clusters word-initially freely surface in the language, violating the low ranked constraint \*COMPLEX. The ranking established above still holds true for these plurals. However, to rule out a sub-optimal candidate with a vowel between C<sub>1</sub> and C<sub>2</sub> word-initially, I use the markedness constraint No-V which is previously used to account for plurals with the suffixal VC template. I repeat the definition of this constraint below.

(39) **No-V** No vowels appear in the output form.

**Tableau [13]** IDENT<sup>Q</sup>, \*VGG# » INTEGRITY-SP » No-V » DEP-V-SP, \*COMPLEX

[ləbb-ɛt] /ləb-pl/	IDENT <sup>Q</sup>	*VGG#	INTEGRITY-SP	NO-V	DEP-V-SP	*COMPLEX
a. lbeb			*	*	*	*
b. ləbeb			*	**!	*	
c. ləb	*!			*		
d. ləbb		*!		*		

In the tableau above, the potential candidate [ləbeb] does not lose the vowel between C<sub>1</sub> and C<sub>2</sub> in the singular output, incurring one more violation to No-V than the optimal output. Thus, it is out.

Not all the forms with a geminated consonant behave the same with regards to No-V. Hence, the definite ranking with respect to No-V cannot be established for these forms. I observe that the majority of the plurals derived from geminated singulars retain



the vowel between the first consonant while a few of them lose it. A justification for such a behavior is unknown, but the language may optionally have clusters plural initially.

### **Summary of the Ranking for Templatic Plurals Derived from Geminated Singulars**

To sum up, the noun plural forms derived from geminated singulars are mapped onto a particular template which results from a reconciliation between the constraint requiring identical quantity of consonants and that militating against having multiple correspondents in the plural for the geminate in the singular. The constraint enforcing the typology of geminate syllabification also comes into play; it bans geminates syllable-finally. Therefore, the overall ranking for the plurals derived from the geminated singulars:

(40) IDENT<sup>Q</sup>, \*VGG# » INTEGRITY-SP » DEP-V-SP, \*COMPLEX.

### **Analysis of Plurals with Ablaut**

The fourth operation for forming plurality in Jebbāli involves a vocalic alternation. However, the vocalic change is not always systematic or phonologically conditioned. Quite a large number of plurals, which are marked by ablaut, are morphologically conditioned or come with extra morphology on them, posing a challenge to integrate them with the analysis adopted to account for the phonologically ‘ablaut’ plurals.

To begin with, the majority of tri-consonantal and quadri-consonantal singular forms undergo a vocalic change in the final syllable (forms 41a-e below). However, there are many irregular plurals which undergo vocalic change in both the first and final syllables (forms 42a-e).

It is observed that the majority of plurals with ablaut consistently have one direction for the vocalic change, namely backing. However, back vowels significantly range in height. For instance, the most recurring vowel in the plural forms is /ɔ/ but it is

not uncommon to find plurals with /u/, /a/ or /o/. There are very few exceptional forms which surface with a front vowel in the last syllable; at least three forms in the collected data, [hit] ‘rice, pl’, [k’el] ‘tribe, pl.’ and [fet<sup>ʕ</sup>] ‘towels’. I classify Jebbāli plurals with ablaut into phonologically and morphologically conditioned groups. I observe that while phonologically conditioned ablaut plurals only target one vocalic change, morphologically conditioned plurals may have more than one vowel change. To illustrate, plurals in (41) change the vocalic quality in the final syllable only, whereas the plural forms in (42) express plurality by imposing a vocalic change into each vowel in the plural form. Thus, the vowels of the singulars and plurals are distinct.

(41) Phonologically conditioned ablaut plurals

- |                              |                           |                                 |
|------------------------------|---------------------------|---------------------------------|
| a. <u>χat<sup>ʕ</sup>ɪk’</u> | <u>χat<sup>ʕ</sup>ok’</u> | dresses                         |
| b. <u>fagri</u>              | <u>fagru</u>              | Bedouins                        |
| c. <u>motən</u>              | <u>moton</u>              | flesh of backs                  |
| d. <u>χəsmim</u>             | <u>χəsmum</u>             | small pieces of wood            |
| e. <u>maxfəf</u>             | <u>maxfof</u>             | shortened waistcloths (for men) |

(42) Morphologically conditioned ablaut plurals

- |                              |                           |                |
|------------------------------|---------------------------|----------------|
| a. <u>ʔətim</u>              | <u>ʔitəm</u>              | orphans (m.)   |
| b. <u>s<sup>ʕ</sup>əfrir</u> | <u>s<sup>ʕ</sup>əfror</u> | flowers        |
| c. <u>xadər</u>              | <u>xədor</u>              | isolated homes |
| d. <u>taqim</u>              | <u>təgum</u>              | cheeks         |
| e. <u>mɪxided</u>            | <u>məxdod</u>             | partings       |

Secondly, bi-consonantal singular forms, with exactly the same shape as the one taking a suffixal template with fixed vocalism and a copy of the final consonant in the base, take ablaut to indicate ‘plural’ meaning. In Table A-5 below, bi-consonantal forms (a) and (b) take ablaut as a marker of plurality while the forms (c) and (d) whose shapes are exactly like (a) and (b) attach a suffixal template to mark plurality.

Table A-5 Ablaut Vs. suffixal template in bi-consonantal forms

<i>Bi-consonantal forms pluralizing by Ablaut</i>	<i>Bi-consonantal forms pluralizing by suffixal template</i>
---	--

Sing.	Pl.	Sing.	Pl.
a. nid8	nud8	c. dik	dkək
b. ɤeg	ɤag	d. ham	hmum

This requires sub-categorization for the bi-consonantal singular forms because they map onto distinct plural shapes though one might expect a single plural formation process to target all the singulars of the same shape.

Previous works on Jebbāli like Johnstone (1981) and Simeone-Senelle (1997) mention ablaut as a pervasive mode of pluralization in the language. According to Johnstone, plural meaning in Jebbāli is expressed by back rounded vowels in the final syllable of the plural forms (forms 41a-e above). Although the collected plurals with ablaut generally conform to Johnstone's finding, I also observe a number of plurals that are marked by back but not rounded vowels. In these plurals, /a/ occurs in the final syllable.

(43) Ablaut plurals with /a/ in the final syllable

a. bʒut	bʒam	date stones
b. gilil-t	gɪlɪl	bullets
c. sinor-t	sinar	cats
d. ʕed-ɪt	ʕad	sardines

As mentioned previously, the type of singular bases ablaut triggers can either be simplex (a sole syllable base of the shape CVC) or diverse (tri-consonantal and quadri-consonantal singulars). Below I show examples of both singular bases with their plural forms:

(44) Singular bases of the shape CVC

a. θiɫ	θoj	sheep
b. nid8	nud8	water skins
c. k'ud8	k'ad8	ropes

(45) Singular bases of various shapes

- |    |                                 |                               |                |
|----|---------------------------------|-------------------------------|----------------|
| a. | s <sup>ʕ</sup> afri <u>r</u>    | s <sup>ʕ</sup> əfr <u>ɔ</u> r | flowers        |
| b. | χad <u>ə</u> r                  | χəd <u>o</u> r                | isolated homes |
| c. | es <sup>ʕ</sup> f <u>ə</u> r-ɔt | es <sup>ʕ</sup> f <u>o</u> r  | birds          |

To reiterate, the plurals with ablaut are characterized by a number of tendencies. I

sum up the major observations made about the plurals with ablaut below:

1. Generally speaking, the majority of ‘ablaut’ plurals of the shape CVC undergo “vowel backing”. However, the back vowel ranges in height. Front vowels in the singular forms shift the quality of their vowels to back vowels. The singular forms have different ranges of vowels but the plurals seem to be characterized by back vowels.
2. In plurals that have more than one syllable, the final syllable undergoes the vocalic shift. In a few cases, the first and last syllables experience a vowel alternation as in [ʔɔtim → ʔɪtɔm] “orphan/ orphans”.
3. Sometimes, the vowel change is unpredictable. For example, in a few cases, there is no vocalic change observed; the vowel stays intact as plurality is formed. Morphologically, this is called conversion whereby a different morphological function is assigned to a word, yet the word does not change or take a marker for the new meaning as in [ʔhit-it → ʔhit] ‘rice’.
4. However, by and large, a change in the vowel quality must happen to mark plurality. In other words, the majority of the plurals have some sort of a vocalic change.
5. In some cases, the vowels in the plurals have the same height as that of the singular’s vowels (i → u). In other cases, the height is different (i → o).

Since, in the phonologically ‘ablaut’ plurals, the vocalic quality of the initial syllable of the plural forms is identical to that in the initial syllable of the singular forms, I assume that IDENT-σ<sub>initial</sub>- [± back]-SP is undominated in these plural forms.

**(46) IDENT-σ<sub>initial</sub>- [± back]-SP** [± back] in the initial syllable of the singular form is identical to [± back] in the initial syllable of the plural

In Chapter Four, I have outlined evidence supporting the prominence of the root-initial syllable cross-linguistically. The evidence reveals that initial syllables have more priority and more privilege than other positions in a form based on a number of

psycholinguistic and phonological studies. Moreover, in terms of learning and processing, a root-initial syllable remains distinctive from other syllables. Thus, adopting a positional faithfulness constraint to account for the behavior of the initial syllable in these plural forms is justified.

In the phonologically conditioned ‘ablaut’ plurals, which are characterized by a back vowel in the last syllable, I also assume that there is the feature [+ back] that needs to be parsed in output plural forms. This feature comes associated with the singular forms to derive these plural forms. It is violated when [+back] is not parsed in any syllable of the plural output forms. In Optimality Theory, the constraint that militates against the deletion of this feature is:

**(47) MAX-[+ back]<sup>34</sup>** the feature [+ back] must be parsed in the output plural

This constraint is highly ranked since [+back] must be realized to mark plurality in these noun plural forms.

It is observed that in many plural forms the first syllable contains a back vowel too. For instance, in the plural [χat<sup>ʕ</sup>ok’], both the first and last syllables contain back vowels. However, the vowel in the last syllable is the one that needs to be distinct from the last syllable of the singular form while the vowel in the initial syllable stays intact. Thus, both MAX-[+ back] and IDENT-σ<sub>initial</sub>- [± back]-SP are crucial in Jebbāli ‘ablaut’ plurals. MAX-[+ back] rules out candidate (c) in tableau [14] below. This candidate has a back vowel in the first syllable but does not in fact parse the feature [+ back] which should be realized in the final syllable.

---

<sup>34</sup> An alternative analysis would be RealizeMorph, in which [+ back] is the plural morpheme that needs to be realized in the output plural form. I will show how an alternative analysis with RealizeMorph may produce exactly the same results reached by Max-[+back] in a subsequent section.

In order to capture the fact that at least one syllable in the plural forms undergoes a vocalic change to [+back] from its corresponding syllable in the singular forms, I adopt a general faithfulness constraint that checks identity of backness of the vowels in the syllables of both the singular and plural forms. This constraint will be dominated as there is often that tendency to alter the quality of the vowel in at least one syllable to indicate ‘plural’ meaning.

The plurals with ablaut have up to two syllables only; no form has more than two syllables. In the majority of these plurals, the last syllable undergoes the vocalic change. It specifically undergoes “backing” to mark plurality. I assume a general faithfulness constraint that checks backing of vowels in the syllables of the plural forms. This constraint is dominated by the positional faithfulness constraint outlined above.

**(48) IDENT-V- [±back]-SP** [± back] of the vowels of the singular form is identical to [± back] of the vowels of the plural

In tableau [14] below, candidate (a) alters the vocalic quality of the final syllable to [+back], incurring one violation to IDENT-V- [±back]-SP. However, the [± back] of the vowel in the initial syllable of candidate (a) is kept unaltered and matches the [back]ness of the vowel in the initial syllable of the singular. Therefore, it wins the competition. Candidate (b), a loser, has [+back] in the last syllable. However, the first syllable has a front vowel, altering the [back]ness of the initial syllable. Thus, it violates IDENT-σ<sub>initial</sub>- [±back]-SP, which is undominated, and it is doomed. Candidate (c) stays faithful to the output singular and violates none of the proposed constraints. What rules it out? The following lines will answer this question.

<b>Tableau [14]</b> IDENT-σ <sub>initial</sub> - [±back]-SP » IDENT -V- [±back]-SP		
nax.rer + [+ back] <sub>PL</sub>	IDENT-σ <sub>initial</sub> - [±back]-SP	IDENT -V- [±back]-SP

☞	a. na $\chi$ .rɔr		*
	b. nexrɔr	*!	**
☹	c. na $\chi$ .rer		

In tableau [15] below, candidates (c) and (d) fail to parse [+back] in the last syllable. They both impinge on MAX-[+ back], a highly ranked constraint which marks plurality in these forms. Therefore, they are doomed. Candidate (d) goes to the extreme and surfaces with a front vowel in both its initial and final syllables. Thus, it also incurs a violation to IDENT- $\sigma_{\text{initial}}$ - [±back]-SP. Candidate (b) violates IDENT- $\sigma_{\text{initial}}$ - [±back]-SP by altering the vowel in the initial syllable. It is out too. The optimal output (a) is faithful to both constraints equally.

**Tableau [15]** MAX-[+ back] » IDENT- $\sigma_{\text{initial}}$ - [±back]-SP

na $\chi$ .rer + [+ back] <sub>PL</sub>	MAX-[+ back]	IDENT- $\sigma_{\text{initial}}$ - [±back]-SP
☞ a. na $\chi$ .rɔr		
b. nexrɔr		*!
c. na $\chi$ .rer	*!	
d. nex.rer	*!	*

Since plural forms must parse [+back] at the expense of losing identity of the vocalic quality in the final syllable, then MAX-[+ back] must outrank IDENT- V-[± back]-SP. However, is there a strict ranking between IDENT- $\sigma_{\text{initial}}$ - [±back]-SP and MAX-[+ back]?

Tableaux [16] and [17] below examine how crucial IDENT- $\sigma_{\text{initial}}$ - [±back]-SP in the ranking of the phonologically conditioned ‘ablaut’ plural forms. In tableau [16], both the first and last syllables of the plural form have back vowels. The optimal output parses [+back] in the last syllable but leaves the [back]ness of the initial syllable intact. Thus, both IDENT- $\sigma_{\text{initial}}$ - [±back]-SP and MAX-[+ back] seem to be unrankable with respect to one another. The optimal output in tableau [17] also parses [+back] in the last syllable. The initial syllable has a vowel that matches the vowel in the initial syllable. To illustrate,

the {ə} of the initial syllable stays intact in both the singular and plural forms. Ablauted plurals with two syllables do not show whether MAX-[+ back] outranks IDENT- $\sigma_{\text{initial}}^-$  [±back]-SP or whether they are unrankable with respect with each other. However, ablauted plurals which have a simplex base reveal a strict ranking between these two constraints. The subsequent analysis of ablauted plurals with a simplex base will illustrate that MAX-[+ back] outranks IDENT- $\sigma_{\text{initial}}^-$  [±back]-SP. Therefore, a strict line must be drawn between these constraints in a tableau of ranking.

**Tableau [16]** MAX-[+ back] » IDENT- $\sigma_{\text{initial}}^-$  [±back]-SP » IDENT-V- [±back]-SP

naχ.rer + [+ back] <sub>PL</sub>	MAX-[+ back]	IDENT- $\sigma_{\text{initial}}^-$ [±back]-SP	IDENT-V- [±back]-SP
a. naχ.rər			*
b. naχ.rer	*!		
c. nexrər		*!	**
d. nexrer	*!	*	*

**Tableau [17]** MAX-[+ back] » IDENT- $\sigma_{\text{initial}}^-$  [±back]-SP » IDENT-V- [±back]-SP

χəsmim + [+ back] <sub>PL</sub>	MAX-[+ back]	IDENT- $\sigma_{\text{initial}}^-$ [±back]-SP	IDENT-V- [±back]-SP
a. χəsmum			*
b. χəsmim	*!		
c. χusmim		*!	*
d. χusmum		*!	**

To reiterate, tableau [17] also reveals that the most important thing for the output form is to have [+back] in the last syllable; however, it requires identity of the vowel quality in the first syllable of both the singular and plural form. Thus, the overall ranking for ‘ablaut’ plurals is MAX-[+ back] » IDENT- $\sigma_{\text{initial}}^-$  [±back]-SP » IDENT- [±back]-SP.

Let us apply the proposed analysis to the ‘ablaut’ plurals that are simplex and of the shape CVC.

**Tableau [18]** MAX-[+ back] » IDENT- $\sigma_{\text{initial}}^-$  [±back]-SP » IDENT-V- [±back]-SP

θi't + [+ back] <sub>PL</sub>	MAX-[+ back]	IDENT- $\sigma_{\text{initial}}^-$ [±back]-SP	IDENT-V- [±back]-SP
a. θoj		*	*
b. θi't	*!		



Candidate (a) realizes the [+ back] in the final syllable of these plural forms. Thus, it is selected as the optimal output. Candidate, (b), however, does not parse the feature [+ back] which is a crucial requirement for marking plurality in these forms. Therefore, it is out.

### **Summary of the Ranking for Plurals with Ablaut**

This concludes the discussion of the plurals marked with ablaut. I assume that there is a feature [+ back] that targets the final syllable of the plural form and comes associated with the output singular forms. This feature is translated into the constraint MAX-[+ back] that ensures the parsing of [+ back] into the output plural forms. Because the vocalic change affects the last but not the first syllable of the plural, I further posit that IDENT- $\sigma_{\text{initial}}$ - [+ back]-SP outranks IDENT- V [+back]-SP. So, the final ranking established for these plurals is:

(49) MAX-[+ back] » IDENT- $\sigma_{\text{initial}}$ - [+back]-SP » IDENT-V- [+back]-SP

### **Anti-Faithfulness Constraints: Alternative Analysis to Ablaut Plurals**

The vocalic change or ablaut in Jebbāli plurals is driven by their inherent morphophonological tendency to observe a change from their morphologically related pair, the singulars in this case. This morphophonological tendency “to be different” is pursued by Aldrete (1999a and 2001) who extends the notion of faithfulness into Anti-faithfulness constraints that operate on related words and “serve to strengthen opposition between two morphological classes” (Alderete 2001:203). Anti-faithfulness constraints account for morphophonological alternations that both faithfulness and markedness constraints alone may fail to sufficiently address. These include affix-driven alternations like accent shift, deletion or retraction. Alderete also argues that “morphophonology encompasses a much wider range of phonological processes than

simple feature insertion” (pp.4) Although he provides no direct analysis for ablaut within the anti-faithfulness model, he assumes that ablaut can definitely be subsumed under this model. His evidence comes from stem vocalism in Arabic (McCarthy 1979 et seq).

In discussing accent in Japanese, Aldrete (2001) shows that it has two types of suffixes: dominant accented suffixes (roots' accent has priority over suffix accent) and dominant unaccented suffixes (suffix accent controls root's accent). Aldrete (1999) outlines three major reasons for arguing that dominant unaccented suffixes follow from anti-faithfulness: (1) morphologically triggered, (2) stem mutating and (3) grammar dependent (pp.vi). Suffix accent forces contrast in a pair of related words since it makes two word classes contrast. It also affects words in a paradigm which means its effect is on words sharing the same stem. Finally, its specific effects follow from the whole grammar of the language.

Jebbāli ablaut bears similar characteristics to the Japanese accented suffixes; it marks plurality in morphologically related forms (singulars and plurals) in a paradigm. Singular and plural forms share the same stem and the change is induced by a contrast between these two classes. The anti-faithfulness constraint integrates well in the ranking established to hold true for the grammar of Jebbāli. In other words, the rest of the grammar determines the surface structure, and the constraints assumed to be inviolable in the language are not disrupted by the integration of anti-faithfulness constraints.

Anti-faithfulness constraints impose a change by simply requiring a violation to a faithfulness constraint. Aldrete (1999a and 2001) formulate this theory as follows:

**(50) Anti-Faithfulness (Alderete 1999a)**

For every faithfulness constraint F, there is a corresponding anti-faithfulness constraint

¬F that is satisfied in a string S iff S has at least one violation of F

To apply this theory into the analysis of ablaut plurals in Jebbāli, I propose the following constraints:

**(51) SP-IDENT-V-[+back]:** corresponding vowels in the singular and plural forms agree in the feature of [+back]

**(52) SP-¬IDENT-V-[+back]:** it is not the case that corresponding vowels in the singular and plural forms agree in the feature of [+back]

If SP-¬IDENT-V- [+back] outranks SP-IDENT-V-[+back] and all other related faithfulness constraints, then we expect a change in all the vowels contained in the plurals; they are forced to be different than those in the singulars in terms of the feature [+back]. However, in Jebbāli, the vowel in the first syllable of the singular form is kept unaltered in the first syllable of the plural. Thus, the positional faithfulness constraint IDENT-σ<sub>initial</sub>- [+back]-SP is not outranked and must in fact outranks the antifaithfulness constraint. However, the anti-faithfulness constraint should, in turn, outrank the general faithfulness constraint checking the feature [+back] in the vowels of the plural forms. Observe the following tableaux which show how the anti-faithfulness constraint produces the surface form but not in isolation from the other crucial constraints in the language.

**Tableau [19]..... IDENT-σ<sub>initial</sub>- [+back]-SP» SP-¬IDENT-V- [+back]» IDENT-V- [+back]-SP**

naχ.rer	IDENT-σ <sub>initial</sub> - [+back]-SP	SP-¬IDENT-V- [+back]	IDENT-V- [+back]-SP
☞ a. naχ.rər		*	*
b. naχ.rer		**!	
c. nexrər	*!		**
d. nexrer	*!	*	**

**Tableau [20]..... IDENT-σ<sub>initial</sub>- [+back]-SP» SP-¬IDENT-V- [+back]» IDENT-V- [+back]-SP**

χəsmim	IDENT-σ <sub>initial</sub> - [+back]-SP	SP-¬IDENT-V- [+back]	IDENT-V- [+back]-SP
☞ a. χəsmum		*	*
b. χəsmim		**!	
c. χusmim	*!	*	*

d. $\chi$ usmum	*!		**
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The optimal output constraints in tableaux [19] and [20] tolerate a single violation of the anti-faithfulness constraint SP- $\rightarrow$ IDENT-V- [+back] at the expense of keeping the vocalic quality of the vowel in the initial syllable intact. On the other hand, the anti-faithfulness constraint must outrank the general faithfulness constraint to ensure a change keeping the two forms distinct from one another. The suboptimal output (b) in both tableaux violate SP- $\rightarrow$ IDENT-V- [+back] twice. Therefore, it is doomed. Changing the feature [+back] in all the syllables of the plurals and satisfying the anti-faithfulness constraint does not solve the problem either, as it incurs a fatal violation to the positional faithfulness constraint which demands retention of the [+back]ness of the initial vowel of both the singular and plural forms. Thus, candidates in both tableaux (d) are doomed.

Since Anti-faithfulness constraints are as general as faithfulness constraints, they do not specify a certain location for the mutation or change. In a footnote, Alderete (2001:12) states “the location of the mutation in this case is not predicted directly by the transderivational anti-faithfulness constraint, and so other constraints in the grammar, including markedness, positional faithfulness, and positional antifaithfulness constraints, may have a role in pin-pointing the affected element”. This observation is crucial for the analysis of Jebbāli ablaut plurals and justify adoption of a positional faithfulness constraint to rule out a change of [+back] in the initial syllable.

Alderete argues against the use of an alternative DISTINCTFORM which also motivates a morphophonological change because it is too general and fails to describe “morphologically induced allomorphy” (Alderete 2001:13). He presents many advantages for anti-faithfulness constraints and shows its ultimate success in capturing

a large set of morphophonological processes. Anti-faithfulness constraints successfully capture ablaut in Jebbāli since the anti-faithfulness constraint integrates well with the already established ranking and does not incur a mutation in the phonology of ablaut plurals. This is manifested through its dependence on the positional faithfulness constraint which outranks it.

### **Summary of the Ranking for the Alternative Analysis of Plurals with Ablaut**

In conclusion, I presented an alternative analysis to ablaut plurals in Jebbāli using antifaithfulness constraints. The analysis corroborates Alderete's claims that Anti-faithfulness provides a cogent analysis to morphophonological processes. They are grammar dependent and should be in harmony with the ranking believed to be true of a particular language. Thus, they do not disrupt the ranking which assumes to operate in the language as a whole. They are general and do not specify which vowel in the plural form should look distinct from the one in the singular form. A positional faithfulness constraint determines the locus of the contrast in the vocalic change. Since a change must be realized in the plural forms, then the anti-faithfulness constraint outranks the general faithfulness constraint. The overall ranking is:

(53) IDENT- $\sigma_{\text{initial}}$ - [+back]-SP » SP- $\neg$ IDENT-V- [+back] » IDENT-V- [+back]-SP.

### **RealizeMorpheme: Alternative Approach to Ablaut Plurals**

The previous two sections showed two distinct approaches (Positional Faithfulness and Anti-Faithfulness) that provide elegant accounts for the ablaut plurals in Jebbāli. The Positional Faithfulness, in particular, successfully addresses two distinct shapes of ablaut plurals: those with simplex bases and those with two syllables. Anti-Faithfulness, though it very cogently addresses the ablaut plurals of two syllables, may not work so well for the analysis of ablaut plurals with a single syllable. Since the

analysis shows that the positional faithfulness constraint IDENT- $\sigma_{\text{initial}}$ - [+back]-SP is not outranked and must outrank the other proposed anti-faithfulness constraints, we are in a dilemma as to what the initial syllable is in those simplex ablaut plurals. As illustrated, simplex ablaut plurals exhibit a change in the vocalic quality of the only vowel they have. Therefore, those plurals constitute a challenge to the Anti-Faithfulness proposals despite its apparent success in accounting for ablaut plurals with two syllables.

This section offers a third alternative to the analysis of plurals with ablaut. It reveals a third mechanism supplied by Optimality Theory that can successfully explain ablaut plurals. This mechanism is RealizeMorpheme<sup>35</sup> which posits that a change (be it a morpheme affix or internal change) must be realized in the output form when expressing a particular semantic or morpho-syntactic function. In Jebbāli ablaut plurals, plurality, a morph-syntactic function, is expressed by realizing [+back]: the plural morpheme. Therefore, a constraint such as RealizeMorpheme or Realize[+back] will certainly yield the optimal output plural. I formalize and define the constraint as follows:

**(54) REALIZEMORPH**      the plural morpheme [+back] must be realized in the output plural

REALIZEMORPH serves as a substitute to the constraint Max-[+back] which makes sure that the feature [+back] is parsed in the output plural. It outranks the positional faithfulness constraint IDENT- $\sigma_{\text{initial}}$ - [±back]-SP by ensuring that the plural morpheme:[+back] must be realized at the expense of altering the vocalic quality of the vowel contained in the initial syllable. This is especially manifested by the change in the only syllable of the simplex ablaut plurals. In the previous analysis, I have also proven

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<sup>35</sup> I supplied a formal definition of RealizeMorpheme in a previous section. Please refer to (37) above.

that IDENT- $\sigma_{\text{initial}}$ - $[\pm\text{back}]$ -SP must, in turn, outrank the constraint keeping identity of  $[\pm\text{back}]$ ness in the vowels of the output form. Observe the following tableaux which showcase the two distinct shapes of ablaut plurals: simplex and complex.

**Tableau [21]** REALIZE MORPH » IDENT- $\sigma_{\text{initial}}$ - $[\pm\text{back}]$ -SP » IDENT-V- $[\pm\text{back}]$ -SP

$\theta i't + [+ \text{back}]_{\text{PL}}$	REALIZE MORPH	IDENT- $\sigma_{\text{initial}}$ - $[\pm\text{back}]$ -SP	IDENT-V- $[\pm\text{back}]$ -SP
☞ a. $\theta o j$		*	*
b. $\theta i't$	*!		

**Tableau [22]** REALIZE MORPH » IDENT- $\sigma_{\text{initial}}$ - $[\pm\text{back}]$ -SP » IDENT-V- $[\pm\text{back}]$ -SP

$na\chi.rer + [+ \text{back}]_{\text{PL}}$	REALIZE MORPH	IDENT- $\sigma_{\text{initial}}$ - $[\pm\text{back}]$ -SP	IDENT-V- $[\pm\text{back}]$ -SP
☞ a. $na\chi.r\ddot{o}r$			*
b. $na\chi.rer$	*!		
c. $ne\chi r\ddot{o}r$		*!	**
d. $ne\chi rer$	*!	*	*

The above tableaux show that the winning candidate (a) must realize the plural morpheme:  $[+\text{back}]$  at the expense of violating IDENT- $\sigma_{\text{initial}}$ - $[\pm\text{back}]$ -SP (simplex ablaut plurals) and IDENT-V- $[\pm\text{back}]$ -SP (simplex and complex ablaut plurals). They also show how the involvement of REALIZE MORPH serves to provide a unified analysis of the ablaut plurals in Jebbāli.

### Summary of the Ranking for the Second Alternative Approach to Ablaut Plurals

I have argued for a third approach for the analysis of ablaut plurals in Jebbāli. The approach hinges on RealizeMorpheme which ensures the realization of some sort of change (the feature  $[+\text{back}]$  in this case) in the output plural. RealizeMorpheme, like Positional Faithfulness, successfully addresses two distinct types of ablaut plurals, and nicely accords with the proposals made for the ablaut plurals. The overall ranking of the ablaut plurals based on the RealizeMorpheme analysis is:

(55) REALIZE MORPH » IDENT- $\sigma_{\text{initial}}$ - $[\pm\text{back}]$ -SP » IDENT-V- $[\pm\text{back}]$ -SP.

## Summary of Chapter Five

This chapter has offered an integrated analysis to the most regular and phonologically conditioned plural shapes in Jebbāli. It first accounts for the plurals with the *Vb* infix, then the analysis is extended to account for plurals with a suffixal template *VC* and templatic plurals derived from geminated singular forms. A set of well-motivated constraints in Optimality Theory successfully captures the systemcity in these plural shapes. Later, I presented a Positional Faithfulness theoretic account for the ablaut plurals and offered an alternative analysis using antifaithfulness theory. The last section uses RealizeMorpheme to tackle ablaut plurals, a third approach that successfully addresses plurals with ablaut in Jebbāli.

Below I repeat the different rankings established for the regular plural patterns of Jebbāli in order to present a ranking that holds true for the grammar of noun plurality in the language.

(56)

- (a) L-ANCHOR-PS, Affix  $\leq \sigma$  » ALIGN-Vb- L, ONSET » R-ANCHOR-PS
- (b) MAX-V-SUFFIX, No-V » \*COMPLEX, MAX-V-ROOT
- (c) IDENT<sup>Q</sup>, \*VGG# » INTEGRITY-SP » No-V » DEP-V-SP, \*COMPLEX
- (d) MAX-[+ back] » IDENT- $\sigma_{\text{initial}}$ - [ $\pm$ back]-SP » IDENT-V- [ $\pm$ back]-SP
- (e) IDENT- $\sigma_{\text{initial}}$ - [+back]-SP » SP- $\neg$ IDENT-V- [+back] » IDENT-V- [+back]-SP.
- (f) REALIZEMORPH » IDENT- $\sigma_{\text{initial}}$ - [ $\pm$ back]-SP » IDENT-V- [ $\pm$ back]-SP

The constraints which appear to be violated frequently by the analyzed noun plurals are \*COMPLEX, MAX-V-ROOT and DEP-V-SP. \*COMPLEX and MAX-V-ROOT are violated by the plurals attaching a suffixal template *VC* and the templatic plurals derived from geminated singulars. DEP-V-SP is violated when Jebbāli plurals insert a *prosthetic* vowel word-initially to break up a cluster of two consonants, and when a vowel makes a geminate in the base singular long distance in the plural form.



One of the faithfulness constraints that is strictly obeyed by the plural forms is MAX-V-SUFFIX. At least two plural types (*Vb* infixed plurals and those attaching a *VC* template) fully adhere to this constraint and forbid the loss of the vowel in the affix. This sometimes happens at the expense of losing the vowel in the root. Finally, the constraint NO-V factors in the formation of plurals attaching a *VC* template and those derived from geminated singulars. It outranks MAX-V-ROOT, revealing Jebbāli's tendency to delete the root vowel. However, since this constraint radically gets rid of any vowel in a plural form, its effect has to be minimized by the constraint MAX-V-SUFFIX which outranks it.

The ranking that applies to the diverse noun plural patterns is: MAX-V-SUFFIX » NO-V » \*COMPLEX, MAX-V-ROOT, DEP-V-SP. Below, I show a tableau of how these common constraints interact in the formation of different noun plurals and their sub-patterns in Jebbāli.

**Tableau [23]**

	MAX-V-SUFFIX	NO-V	*COMPLEX	MAX-V-ROOT	DEP-V-SP
<i>Vb infixed</i>					
1. migeɓnəm		***			
1a. ətʰabɕam		***			
<i>with VC template</i>					
2. dkək		*	*	*	
2a. ɛfɔf		**		*	*
<i>ablauted</i>					
3. sʰəfrɔr		**			
3a. maxɔf		**			
3b. ɛagɔ		*			
<i>templatic</i>					
4. ɰalel		**			*
4a. nbeb		*	*	*	*

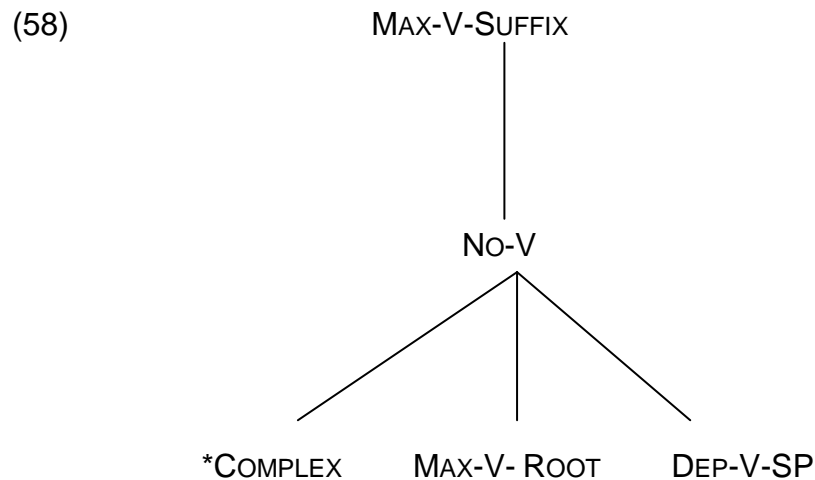
Ratcliffe (1998: 202) mentions that Jebbāli has the ‘nisba’ type of adjectives with the suffix *–i* that takes ablaut in its plural formation. Observe the following examples:

(57) ‘Nisba’ adjectives

- |          |        |           |
|----------|--------|-----------|
| a. xarfi | xarfo  | monsoonal |
| b. fəgri | fəgroʔ | bedouin   |

In the above examples the final vowel of the adjective plurals is [back]ed similar to the noun plurals that take ablaut. This means that the ranking stipulated for the ablauted noun plurals may be extended to apply for the adjective plurals too. The feature [+back] needs to be parsed in the output, yielding a back vowel in the final syllable of the adjective plurals.

I summarize the ranking I establish for the grammar of noun plurality in Jebbāli in a form of a lattice:



Indeed, Optimality Theory, with the tools and constraints it entails, can successfully offer an integrated analysis to these diverse noun plural shapes. The final ranking of constraints conforms to the prosody and grammar of the language as a whole. Moreover, I avoid the stipulation of any templatic constraints, and assume that the interaction of phonological and prosodic constraints derive the final template,

following the proposals outlined in Generalized Template Theory. The analyses of plurals with ‘ablaut’ using the anti-faithfulness constraints and RealizeMorpheme elegantly address some of the morphophonological tendencies of these plurals, and integrate well in the overall ranking assumed to hold true for Jebbāli.

## CHAPTER 6 EXCEPTIONAL PLURAL SHAPES

In the previous chapter, I have presented a thorough discussion of the most common and systematic noun plural patterns in Jebbāli and analyzed them using a number of well-motivated constraints in Optimality Theory. The proposed analysis captures the regularity of these shapes, addresses their diversity and reveals how a set of crucially rankable constraints serves as a clue to the grammar of noun plurality in Jebbāli. For example, the analysis of the diverse plural shapes shows that Jebbāli plurals may violate MAX-V-ROOT and \*COMPLEX at the expense of obeying some other constraints such as MAX-V-SUFFIX that governs the shape of the plural marker. The noun plurals accounted for include plurals with *Vb* infix, plurals attaching the suffixal template *VC* with fixed vocalism /ɔ/ and a copy of the final consonant in the base, templatic plurals derived from geminated singulars and ablaut plurals.

Like other plural formation processes world-wide, the process of plural formation in Jebbāli involves exceptional and irregular plural shapes that pose a challenge of incorporating them into the proposed Optimality Theory analysis. For instance, in addition to the suppletive, templatic and miscellaneous shapes for which it is hard to establish a general mechanism, some of the regular plural patterns have a few sub-patterns which do not follow the general procedure for forming their regular patterns. To illustrate, under the *Vb* infixed plurals, there is a sub-pattern which involves some inexplicable peculiarity which clashes with the phonological properties of the regular *Vb* infixed plurals. Moreover, where regular ablauted plurals parse [+back] in the final syllable only, irregular ablauted plurals diverge from the prevalent mechanism and parse [+back] in both the initial and final syllables.

This chapter discusses the peculiarity of the exceptional plural shapes in Jebbāli. It addresses the divergent phonology and morphology of the sub-patterns for whose patterns an integrated phonological analysis has been proposed. In particular, a discussion of how the unusual shapes, which take the *Vb* infix, cannot be incorporated into the analysis of their regular pattern is presented. Then, I will discuss the exceptional shapes starting with the templatically expanded plurals. Later, I will deal with the truncated plurals, templatic shapes and miscellaneous forms. I also discuss a group of exceptional noun plurals with [oɪ]. Finally, I will offer a thorough discussion of the plurals that stack more than one plural marker in the plural forms to mark plurality.

This chapter also explores a number of Optimality Theoretic accounts that deal with exceptionality and lexical marking. Some of these approaches devise extra theoretical tools which will take time and proof to integrate well into the model of Optimality Theory. Others suggest modification to the existing Optimality Theory framework. The approaches listed in this chapter have been used to address morphophonological and lexical phenomena observed in some languages. They will be applied to account for exceptionality of plural formation in Jebbāli.

### **Sub-Pattern of *Vb* Infix Plurals**

In addition to the regular *Vb* infixed noun plurals, for which an integrated Optimality Theory account was supplied in the previous chapter, Jebbāli has a sub-pattern that greatly diverges from the regular *Vb* infixed plurals and poses a challenge to the proposed analysis. This sub-pattern of the *Vb* infixed plurals is derived from bi-consonantal and tri-consonantal singulars, compared to the fixed quadri-consonantal singulars (CVCCVC) from which the regular *Vb* infixed plurals are derived. The singular form (1.a) has two consonants and maps onto a plural shape  $C_1bVC_2$  with an infix {b}

after the first consonant. Consonant clusters word-initially are allowed but why is the *V* of the *Vb* infix lost in these forms? Is it because the singular form, from which this plural is derived, has an irregular shape too? The singular form (1.b) is tri-consonantal with a consonant cluster word-initially. The plural form inserts a *prosthetic* vowel and is shaped into VCCbVC, a shape divergent from the regular *Vb* infixed plural. The singular forms (1.c) and (1.d) are tri-consonantal but each map onto distinct shapes. While the plural form (1.d) takes CCbVC, form (1.c) map onto the regular shape of the *Vb* infixed plural, with an extra /m/ resurfacing. I propose that the singular form (1.c) has underlyingly an initial /m/ which deletes and then re-appears in the plural form. This word is most probably borrowed from Arabic [malgam] ‘muzzle, sing.’. As Jebbāli borrows this word, it deletes the initial nasal /m/. However, contrary to the typical trend, it does not nasalize the vowel following it. Instead, it deletes it along with the /m/ preceding it.

(1) Plurals with (V)b infix of varying shapes

a. χər	χbər	news
b. tʃəl	ətʃbəl	drums
c. lɣəm	milabgəm	muzzles
d. tʃʰadɤ	tʃʰbedɤ	Zizyphus Spina Christi

Due to the vast diversity of these shapes, it is hard to tell what the underlying singular shape from which these irregular *Vb* infixed plurals are derived as there is not a single one. Besides, the *V* of the *Vb* infix is lost and there is no obvious phonological explanation that conditions this loss. Moreover, the plural forms (1.a) and (1.d) have a consonant clusters plural-initially which the other shapes do not have. These phonological properties make it impossible to integrate these plurals into the proposed analysis. Various rankings of constraints would be needed for each individual case,

which would undermine a core element of Optimality Theory which stipulates a single ranking in the whole grammar.

### **Templatically Expanded Plurals**

In these noun plurals, plurality is marked by the appearance of an extra consonant or the re-appearance of a consonant which may be deleted in the singular forms. For instance, the plural forms (2.a) and (2.b) below have an extra sound /l/ word medially which the singular forms lack. In the noun plural (2.c), a /j/ appears after the first closed syllable  $C_1VC_2$ . The plural forms (2d-g) have eclectic consonants reappearing or appearing in the plural forms: /m/ word-initially which is not present in the singular form (form 2d), /w/ after the initial C in the singular forms (form 2e), the re-appearance of a deleted /m/ and /n/ (form 2f) and /j/ after an open syllable  $C_1V$  (form 2g). I assume that these forms underlyingly have a consonant that is deleted in the singular form. However, there is a variation in the type of consonants deleted in the singulars or inserted in the plurals, which poses an insurmountable challenge to offering an integrated Optimality Theory analysis to these forms. It is hard to propose an underlying shape from which these diverse plurals are derived. Moreover, the locus of the insertion is not fixed throughout the whole forms.

The singulars, from which these noun plurals are derived, range in shape from bi-consonantal (2.a, b, and e) to quadri-consonantal (2.g). However, the templatic shape these plurals prefer to map onto match the prosody and the phonological tendencies of Jebbāli. The resultant template adheres to certain prosodic facts about Jebbāli such as the fact that onsetless syllables are licensed to occur word-initially and consonant clusters may also occur.

## (2) Templatically expanded plurals

a. xof-it	xalif	windows
b. kob	kolob	dogs
c. faʕor	faʕjor	young bulls
d. ikber	məkbər	sweethearts
e. kər	e:kwər	chiefs
f. ʔitu)t	ʔitəmtən	orphans (f.)
g. ʕas <sup>ʕ</sup> ər	ʕej <sup>ʕ</sup> sər	nights

In Optimality Theory, the fact that there is an underlyingly extra consonant in the plural form, which is inserted in the singular form, is translated into the violable faithfulness constraint DEP-C. However, it will be hard to step beyond this statement; there is no specific and phonologically fixed segment that gets inserted in the singular forms, nor is there any obvious motivation for inserting them. Another problem lies in the locus of the insertion. Although Optimality Theory supplies theoretical tools for addressing the position of the inserted segments, these plurals will require abundant constraints to address their various “inserted” locations. Thus, no cogent single analysis will succeed in capturing them all.

### Truncated Plurals

Opposite to the process described above, these plurals involve deletion of some sort to indicate plurality. However, the locus of the deletion is different in each form, making it hard to express it systematically. Since the language is known for the vast deletion of consonants such as the nasal {m}, {w} and {b}, it is not uncommon for {m} or {b} to get deleted frequently in the data collected. For instance, the plural forms (3a-c) delete {b} which occupies the third C slot in the singular forms. The plural forms (3d-f) delete {m}; forms (d) and (f) also delete {m} which resides in the third C slot of the singular forms. The plural form (f) loses the initial .mo. syllable and retains the lateral fricative in the plural form (the only plural with a feminine marker). Finally, the plural



forms (g) and (h) below delete one of the long distance geminated consonants in the singular forms.

### (3) Truncated Plurals

a. e:s <sup>ʕ</sup> ba <sup>ʕ</sup>	e:s <sup>ʕ</sup> o <sup>ʕ</sup>	fingers
b. muχbut <sup>ʕ</sup>	moχot <sup>ʕ</sup>	cartridges
c. e:rbɛħ-t	e:roħ	fans
d. ma <sup>ʕ</sup> məd-t	m <sup>ʕ</sup> od	pillars
e. mi <sup>ʕ</sup> smar	ma <sup>ʕ</sup> or	nails
f. mo <sup>ʕ</sup> t-ɛt	t-ɛt	livestock
g. mχit <sup>ʕ</sup> ot <sup>ʕ</sup>	moχot <sup>ʕ</sup>	sings marked on the ground
h. t <sup>ʕ</sup> ənk'ot <sup>ʕ</sup> -ət	t <sup>ʕ</sup> ənk'ot <sup>ʕ</sup>	characters

Just like the templatically expanded plural forms, the nature of the truncation plus the locus of the deleted consonants is diverse, and there is no fixed and easy-to-establish pattern that can be used to come up with a cogent Optimality Theory analysis to these forms. Moreover, it is not obvious what exactly conditions the deletion of a consonant in these forms. The deletion does not happen to resolve a syllable shape or for a syllabic phonotactic purpose. The templatic shapes onto which the singulars are mapped vary greatly. Some forms begin with a vocalic element, others with a consonant clusters, and yet a few more with a single consonant plus a feminine marker which is believed not to contribute to the meaning of the consonantal root. The only obvious aspect of plural marking for these shapes is 'delete a consonant' and a violation of MAX-C. Beyond this aspect, Optimality Theory cannot handle uncertainties about the indefiniteness of the shape and locus of the deleted segment.

### Templatic Plurals

Singular forms of various shapes can be mapped onto three templates to mark plurality. These templates are CVCVC, CVCC and CCVC. Despite being able to determine the template, it is hard to establish a particular mechanism for forming these plurals. Moreover, no phonological condition is discernable to state what shape of a

singular form maps onto which template. There is also nothing special about the phonology and morphology of the singular forms which make them map onto these templates, and not take other systematic plural formation mechanisms.

The data below reveal that these noun plurals are derived from diverse singular forms which take different templates like VCCVC (4.c), CCVC (4.a, 6.d) and CVCC (4b-d, 5a; 5c and 6a; b). However, mostly tri-consonantal singulars map onto templatic plural shapes.

(4) Plurals taking the template CVCVC

a. bʕal-ɛt	bəʕəl	female possessors
b. salʕ	seʕəʕ	cheeks
c. əshib	sahab	waves
d. k'arb-at	k'irab	special pots made of cow's skin used for milking
e. naʕl-ɛt	naʕal	palm trees

(5) Plurals taking the template CCVC

a. dīmʕ-ut	dmaʕ	tears
b. səkən	skun	communities
c. ʕaʔf-et	ʕʔaf/ ʕʔəftə	holes bored in the ear
d. ʔiʕ-ot	ʔiʕil	honeycombs

(6) Plurals taking the template CVCC

a. ʕabz-ɛt	ʕəbz	bread
b. kəlθ-ot	kəlθ	stories

There is no correlation between the shapes of the singular and plural forms. Moreover, a statement about whether the consonants contained in these forms play a role in deciding which template a singular maps onto cannot be stated. The only intriguing property of some of the listed words is that the loan words from Arabic (forms 4.d, 4.e and 6.a) are pluralized into the same templatic shapes (CVCVC and CVCC) these plurals take in Arabic (qirab, naʕil and ʕubz respectively). This shows that Arabic nouns are borrowed along with their plural templates into Jebbāli.

## Miscellaneous Shapes

Jebbāli has a group of miscellaneous shapes which cannot be classified to belong to any of the above plural shapes. These plurals have extra phonology and morphology on them which is inexplicable. For example, some of the plurals belonging to this group have a consonantal shift (form 7.c) which changes the /t<sup>ʕ</sup>/ in the singular form to /b/ in the plural form. In the plural forms (7.b) and (7.d), a *prosthetic* /e/ gets inserted before /r/ word-initially and the final shape they take is V<sub>1</sub>CV<sub>2</sub>C, whereby V<sub>1</sub> is /e/. The plural form (7.a) loses the masculine suffix *-in* and the feminine suffix *-at* in the plural form and gets attached to /o/.

### (7) Miscellaneous shapes

a. səbrin/ səbr-at	səbro	ghosts
b. reʃ	ereʃ	heads
c. ħinʔat <sup>ʕ</sup>	ħinʔab	beads
d. ɔɾχ	erɔχ	months

Such diversity is hard to carve into a unified Optimality Theory analysis. Just like the above irregular plural patterns, this pattern has no definite underlying form and definite plural marker. The shapes these plurals map onto are diverse in nature, which poses a challenge to proposing a unified set of constraints and ranking.

## Suppletive or lexical plurals

Like all languages, Jebbāli has a number of lexicalized or suppletive plurals. The sounds of both the singular and plural forms are highly distinct, and the semantics of these plurals is restrictive as they mostly relate to human beings such as women, boys, sons, daughters and babies or infants. Moreover, some of these plurals are attached to plural suffixes like *-i*, *-ti* and *-Vn*. However, the whole shapes of both the singular and plural forms are unrelated to one another. It is, thus, hard to tell which plural a singular form may take.

#### (8) Suppletive plurals

a. bri	ʔiʔni	sons
b. briʔi	ʔonʔi	daughters
c. ʔiʔjaθ	inθinʔi	women

#### Plurals ending with [oɪ]

Jebbāli has a few noun plurals that end in [oɪ]. These plurals are derived from bi-consonantal (9.d) or tri-consonantal (9.a-c) singulars. There is no justification for mapping these singulars onto this shape and not other shapes of plurals; the phonology and morphology of these shapes do not condition them to map onto this shape.

Besides, some plural forms delete a consonant in the singular forms like the plural forms (9.a) and (9.b) below which delete the final /b/ in the singular forms. The plural forms (9.c) and (9.d) attach [oɪ] without deleting the final consonant. Again, there is no definite shape from which these plurals are derived. Moreover, the plurals do not have a single templatic shape and vary in the number of consonants they each have. Some plurals start with a consonant clusters while others have a nice .CV. CV syllable shape. With all this intricate diversity, these shapes pose a challenge for an Optimality Theory to account for them.

#### (9) Plurals ending with [oɪ]

a. mɛlb-ɛt	moloi	corners
b. k'ətʰb-ɛt	k'tʰoi	carved wooden dolls
c. mɪnk'-at	mɪnk'oi	monitor lizards
d. lʰ-ɛt	lʰoi	beards

#### Doubly and triply marked plurals

Jebbāli has a number of noun plurals which stack two to three plural markers in a row to mark plurality. The majority of this type of plurals attach two plural suffixes namely –Vn and –tV in this order as in forms (10.d-f) below. Other plural forms have the infix -(V)b- plus the default suffix –tV. A few other plurals attach the -(V)b- infix along

with the –*Vn* suffix like form (10.g). In the collected data, I only find one plural form which is triply marked; it has two plural suffixes and the -(*V*)*b*- infix preceding them.

Just like the other irregular shapes, the singular forms from which these plurals are derived are so diverse in nature; they can be bi-consonantal (10.a,g), tri-consonantal (10.b,c, d and f) or quadri-consonantal (10.e and h). They may have consonant clusters word initially or simple CV syllable shapes. Moreover, there is no phonological conditioning which serves as an indicator for these singulars to take more than one plural markers when ‘plurality’ is expressed. In other words, phonologically and morphologically the singular forms which derive these plurals look the same as other singulars deriving other plural patterns. Forms (10d-f) are loan words from Arabic; these take broken plurals in Omani Arabic (*saja:ji:r*, *kara:fi* and *zawa:li* respectively).

The diversity of the bases makes it hard to determine a unified underlying representation for these forms. Also, there is no obviously distinct morphology that would urge form (10.h) to take three plural markers and not just two like the other forms. Therefore, these constitute a problem for an integrated Optimality Theoretic analysis to be proposed.

#### (10) Doubly and triply marked plurals

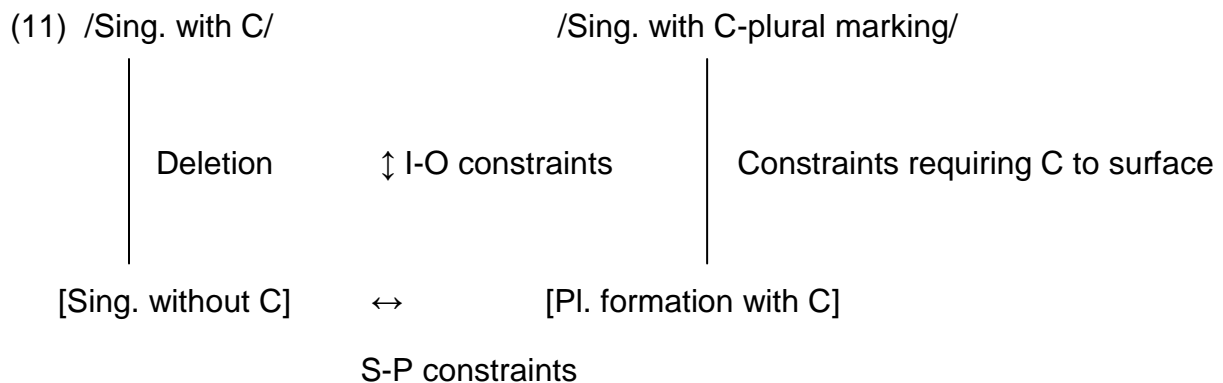
a. ʒet	l <b>bt</b> <u>ə</u>	monitor lizards
b. lʕot	lʕ <b>bt</b> <u>ə</u>	nipples
c. tʔet	tʔ <b>bt</b> <u>ə</u>	monitor lizards
d. sɪje:r-əh	sɪje:r <b>unt</b> <u>ə</u>	cars
e. kɪrfe:j-əh	kɪrfe:j <b>unt</b> <u>ə</u>	beds
f. zol-it	zol <b>unt</b> <u>ə</u>	carpets
g. k'ar	k'ab <b>rin</b>	graves
h. miʔhəl	miʔh <b>ablunt</b> <u>ə</u>	chameleons

### Approaches to Exceptionality in Optimality Theory

The previous sections have collaboratively highlighted the peculiar phonology and morphology of the exceptional plural shapes in Jebbāli and elaborate on the difficulty

they impose in proposing a cogent account for them using the principles of Optimality Theory. To recapitulate, there are five major problematic issues that these plurals confront us with:

1. There is no direct underlying form from which these plurals can be straightforwardly derived. Each plural form seems to be derived from an underlying representation distinct in shape from those deriving other plurals belonging to the same category.
2. The changes happening in the plural forms are eclectic in nature that renders it hard to propose a definite set of constraints that deals with all the changes. For example, the inserted and deleted segments are diverse and the locus of the insertion and deletion is not the same across the board.
3. There is no motivation for inserting or deleting segments; recourse to obvious syllabic phonotactic restrictions to explain the reasons cannot be determined.
4. Some singulars, which are borrowed from Arabic, have undergone consonantal deletion {m, b, or w}. The plurals of these forms retrieve these consonants for no plausible phonological reason. For these particular plurals, complexities arise. Are the output plurals in Jebbāli faithful to their Arabic singular versions? Are they derived from the Jebbāli forms which delete their consonants? Is there an intermediate level where deleted consonants in the Jebbāli singulars re-surface before the derivation of the plural forms? The answers to these questions are complicated and require quite a complex mapping between different forms of singulars and plurals. Observe the following representation:



5. Along the same line of thoughts raised in point (4), markedness constraints in Optimality Theory assess the output forms alone and do not care about the structural changes happening to the input. Moreover, the Optimality Theory account abandons reference to intermediate levels of representations. For Jebbāli plurals, proposing a constraint which says “insert a consonant” in the plural output is risky since the site of insertion could be the same as the deletion site in the base singular forms.

Satisfactory answers to these broad issues continue to raise debates among phonologists and Optimality theorists. Kager (1999) lists a number of Optimality Theory approaches that have been proposed to advance cases which cannot be resolved within the current model of Optimality Theory. In this section, I will only list some of the relevant approaches to dealing with lexical marking and exceptionality in the Optimality Theory framework. The approaches discussed pertain to the problems faced when dealing with the exceptional noun plural forms in Jebbāli. Among the solutions that have been proposed to tackle these problems are eliminating the underlying representation, REALIZE MORPH, two-level wellformedness and multi-level well-formedness, a realization model of Optimality Theory, specification of the exceptionality in Lexical Entry in a form of diacritic, containment approach, constraint indexation and selector constraint and RealizeMorpheme.

### **Eliminating Underlying Representation and REALIZE MORPH**

As Optimality Theory eradicates re-write rules and abandons the serial orderings of generative phonology, it retains the assumptions that one underlying representation derives the surface forms. However, many surface forms do not show a one-to-one relationship between a unique underlying representation and its allomorphs. Other surface forms like the exceptional plurals of Jebbāli do not seem to be derived from a single underlying representation. Thus, they conflict with the notion of a uniform underlying representation. To solve this issue, attempts to eliminate the underlying representation from the model have been made (Russel 1995; Burzio 1996). Kager (1999) argues that elimination of the underlying representation will consequently eliminate abstractness since the input will be identical in every respect to the output form, ignoring structural changes. The output forms will explain observed alternations and the output

form is then selected based on its being harmonic to the ranking of constraints assumed to be active for the grammar of that language or the grammar of the linguistic phenomenon under study. This, in turn, will reduce the role of grammar to a “checking mechanism” (Kager 1999:414). Kager argues that “the lexicon no longer supplies a unique UR for each morpheme, but instead it supplies a set of shape variants of the morpheme, allomorphs, chunks ready for insertion in various morphological contexts” (Kager 1999:415). This model is observed to provide a conceptual account for neutralization and allophonic variations.

To extend this solution to the truncated and templatically expanded plural forms in Jebbāli, I assume that every distinct truncated or templatically expanded plural form is not derived from a concrete underlying representation. Thus, the different phonology characterizing each output form is derivable from the competition of available constraints in the grammar of Jebbāli, which will select the optimal output. Constraints such as \*Complex, Onset, MAX-C and DEP-C are violated for these plural shapes. REALIZE MORPH (Samek-Lodovici 1994) may solve the problem temporarily since there is always a force that coerces the output to be distinct from the input. Besides, REALIZE MORPH is a constraint highly ranked in the grammar of plural formation in Jebbāli; almost every Jebbāli plural looks different from its singular derivative. The following representative tableaux reveal conspiracy between faithfulness constraints and the force to realize a certain change to mark plurality for the truncated and templatically expanded plural forms respectively. I put the word ‘*candidates*’ in the slot designated for the input form.



**Tableau [1]: Truncated plurals**      REALIZE MORPH » MAX-C

	<i>Candidates</i>	REALIZE MORPH	MAX-C
☞	a. moxot <sup>c</sup>		*
	b. muxbut <sup>c</sup>	*!	

**Tableau [2]: Templatically expanded plurals**      REALIZE MORPH » DEP-C

	<i>Candidates</i>	REALIZE MORPH	DEP-C
☞	a. gɔɭɔd		*
	b. gɔd	*!	

Alderete (2001) presents some problems of adopting REALIZE MORPH in the analysis of irregular phonological processes or morphophonology in general. REALIZE MORPH is unable to capture allomorphy and incapable of distinguishing between two distinct allomorphs pertinent to a single morphological phenomenon. For instance, Alderete mentions that there are two distinct patterns of subtractive morphology involved in the formation of Koasati plurals. These two patterns have totally different order of constraints. REALIZE MORPH, in light of being contentless and abstract, is unable to describe and distinguish between these two types of allomorphy. Different Koasati plurals end up attaching the wrong allomorph when REALIZE MORPH is used, since it can license any kind of change in a form. Moreover, REALIZE MORPH has a number of conceptual problems. For instance, Kurisu (2001) assumes that the change imposed in the output form results from morphology. This entails that morphemes may produce marked structures which cannot be extended to or supported by the phonology of the language as a whole. Consider, for example, the formation of deverbal nouns in Icelandic which produces more marked structures that violate \*Complex-Coda (a constraint which is completely obeyed elsewhere in the language). Finally, RealizeMorpheme is abstract and is satisfied by any sort of change in the output form.

In the analysis of the regular plural patterns, I assume an Output-Output correspondence between the singulars and their plurals. I further illustrate that UR is not enough for the derivation of these plurals. For the templatically expanded and truncated plurals, I eliminate UR completely, and assume that the output plural results from a competition between a rankable set of constraints. There is a high possibility that these exceptionally shaped plurals are derived from their Arabic singular forms. So, their UR correlates with their Arabic singulars. However, this is a very radical idea since in Optimality Theory correspondence always happens between forms in the same language. I argue that elimination of the UR is fairly consistent with my analysis of the regular plurals. First and foremost, the elimination of UR does not contradict my assumption that plurals in Jebbāli are derived from their singular output and not from URs. Second, the exceptional plural output, similar to the regular plural, results from a competition of constraints whose minimal violation determines the winner. However, what seems to be problematic here is that I need to state Max-C and Dep-C clearly in order to avoid random deletion or insertion of segments. In Jebbāli, the type of deleted and inserted segments is vast, and there is always a risk of an unrestrained function of Max-C and Dep-C.

### **Two-level Well-formedness**

Kager (1999:378) discusses an approach that permits reference to the input by direct well-formedness constraints. He calls it “two-level well-formedness” and assumes that its effects are similar to those in Correspondence Theory with the exception that the latter admits faithfulness and not markedness constraints. In accounting for opacity of vowel harmony whose triggering vowel is syncopated and left a trace on an adjacent vowel in the output form in Tunica, Kager proposes a constraint that refers to a

different input vowel because the output vowel resembles another vowel's input and not its own. He formalizes this constraint as follows:

**(12) HARMONY-IO**

If input  $V_1 \dots V_2$  and  $V'_2$  agree in backness and rounding



The above constraint states agreement between vowels in backness and roundness at different levels of representation. This agreement is carried out by the direct correspondence between  $V_2$  and  $V'_2$ .

For the deleted consonant in Jebbāli plurals, I propose the constraint MAX-OO but extend their correspondence to two levels. Since the Jebbāli plurals underlyingly have consonants that correspond to the consonants in the Arabic singulars, which when borrowed in Jebbāli delete these consonants, I formalize these constraints as follows:

**(13) MAX-OO** the segments in the Jebbāli plural correspond to the segments contained in the Arabic singular

To illustrate, instead of having the deleted segment in the output Jebbāli singulars correspond to the segments in their output plurals in Jebbāli, the constraint will evaluate the plurals with the singulars in Arabic. In such a case, the plurals are paralleled to different Underlying singular forms, those in Arabic.

According to Kager, these two-level constraints are not without any problems. For example, they fail to address types of opacity that neither relate to the input nor to the output. They also fail to reference opacity occurring at the prosodic level since prosody is absent at the input level. One renowned example is compensatory lengthening whereby a coda is deleted and the preceding vowel is lengthened. Moreover, they function like rules because they stipulate a structural change and a

repair at the same time. They are unrestrictive in that they may posit any type of change. Finally, they blur the distinction between markendness and faithfulness constraints (Kager 1999:412). Furthermore, for the plural forms in Jebbāli, I had to extend these two level constraints across languages (Jebbāli and Arabic), a very radical idea. Similar to the previous approach to exceptionality, two-level well formedness assumes correspondence between elements belonging to two languages. This certainly removes restrictiveness from the approach, and undermines the assumption that Jebbāli plurals are derived from their singulars and not from their Arabic correspondents.

### **Multi-level Well-formedness or Intermediate Levels**

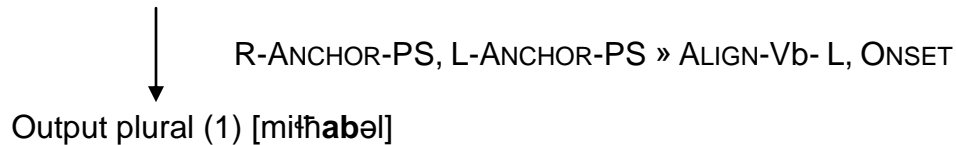
This approach to exceptionality assumes that the grammar of Optimality Theory is organized into multiple levels; each has its own functions of Gen and Eval. The output of the previous level serves as an input to the the subsequent level. The ranking of constraints within each level may be minimally different, “involving only re-ranking of a well-formedness constraint and a faithfulness constraint” (pp.383). This model can capture word domain effects, affix ordering, structure preserving and cyclicity (Kager 1999: 382).

In Jebbāli, a number of plurals take two to three plural markers. The plurals with three plural markers take the *Vb* infix along with two plural suffixes *–un* and *–tV* in this order while those with two markers stack the two suffixes one after the other. Based on the multi-level, I propose that each plural marker gets attached at a different level. The order of the affixes in these doubly and triply marked plurals result from well-formedness constraints and the ranking assumed to hold true for Jebbāli. I will present

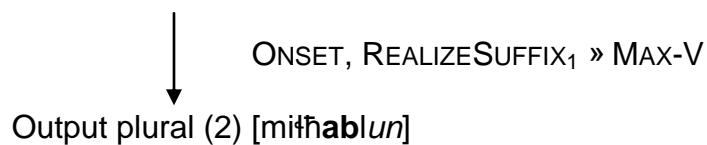
the following analysis for the triply marked plural [miṯhəl] → [miṯhabluntə] ‘chameleons’, sing. and pl.’:

(14)

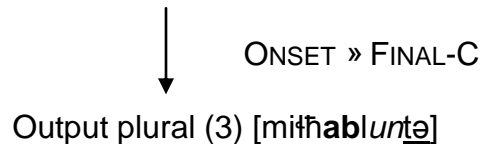
**Level (1):** Underlying Form (1) [miṯhəl]



**Level (2):** Underlying Form (2) [miṯhabəl]



**Level (3):** Underlying Form (3) [miṯhablun]



The forms belonging to this type of plural formation are not systematic and each doubly marked plural will require a representation different from the above sketched one. Moreover, their phonology varies greatly when compared to the phonology of the regular plurals attaching the same plural markers. For example, the locus of the *Vb* infix is different from where it resides in the regular forms; it is infixed after the fourth and not the third consonant at the left edge of the plural form. Form (b) in tableau [3] below is more harmonic than the optimal output form (a). For candidate (a) to be more harmonic than candidate (b), some constraint must outrank ALIGN-Vb- L. This constraint cannot be a well-formedness constraint; both candidates have equally one open CV syllable and two closed CVC syllables. So, their syllabic composition is basically the same. The only difference between them lies in the number of consonants which ALIGN-Vb- L violates.

To approach this problem, I resolve to sympathy (McCarthy 1998). Looking closely at [miʔ.ha.bəl] and [mi.ʔab.həl], I see that the only advantage of faithfulness the former may have over the latter is linearity which stipulates that the order of segments in the underlying representation reflects that of the output. The infix Vb disrupts the linear order of segments in the output plural. [miʔ.ha.bəl] is more harmonic as it disrupts the order of two segments from the right (the output singular is [miʔhəl]) when compared to three violations for [mi.ʔab.həl] which are {h, ə, l}. Thus, the sympathetic or ☼ candidate [mi.ʔab.həl] matches the regular Vb infixed plurals.

The next step is to formulate a sympathetic constraint that demands faithfulness to the ☼ candidate [miʔ.ha.bəl]. The winning output (a) which would lose in the normal scenario to the most harmonic candidate (b) now becomes optimal due to its fewer violations to LINEARITY-☼ O. Thus, the output of level (1) is due to the ranking R-Anchor-PS, L-Anchor-PS » LINEARITY-☼ O » Align-Vb- L, Onset:

**Tableau [3]** R-ANCHOR-PS, L-ANCHOR-PS » LINEARITY-☼ O » ALIGN-Vb- L, ONSET

miʔhəl + Vb ☼ candidate [miʔ.ha.bəl]	R- ANCHOR -PS	L- ANCHOR- PS	LINEARITY-☼ O	ALIGN-Vb- L	ONSET
☞ a. miʔ.ha.bəl			**	miʔh	
☼ b. mi.ʔab.həl			***!	miʔ	
c. ab.miʔ. həl		*!			*
d. miʔ.həl.ab	*!			miʔhəl	

The output to level (1) serves as the input to the next level where {ə} gets deleted to avoid making an onsetless syllable and the second-level plural marker attaches:

**Tableau [4]** ONSET, REALIZESUFFIX<sub>1</sub> » MAX-V

miʔhəbəl + un	ONSET	REALIZESUFFIX <sub>1</sub>	MAX-V
☞ a. miʔ.hab.lun			*
b. mi.ʔab.həl.un	*!		
c. miʔhəbəl		*!	

The output to level (2) is fed as an underlying representation for the third level. No phonological changes are imposed into the final output plural in level (3) except the attachment of a third-level plural marker. *-un* comes linearly before *-tə* due to the high ranking ONSET. The optimal output below violates FINAL-C by ending in a vowel.

**Tableau [5]** ONSET » FINAL-C

mitħablun +tə	ONSET	FINAL-C
☞ a. mit.ħab.lun. <u>tə</u>		*
b. mi.ħab.ħəl. <u>tə</u> .un	*!	

Kager discusses the pros and cons of using ‘sympathy’. Although it preserves the format of constraints, it weakens correspondence by extending it to candidate-candidate faithfulness (pp.392), making the theory less restrictive.

One desirable consequence of this approach to exceptionality is that the *Vb* infix is derived from the same set of constraints that derive the regular *Vb* infixed plural. So, it is consistent with the analysis established for the regular *Vb* infixed plurals. As other plural markers get attached to these exceptional plural markers, I need to refer to the prosodic and syllabic well-formedness canons of the language to rule out potential plural outputs. However, I may need to tackle each and every doubly marked plural individually since different affixes attach to different forms.

### **Realization Optimality Theoretic Account to Multiple Plural Markers**

Xu and Aronoff (2011) develop a Realization Optimality Theoretic account for “extended exponence” and blocking. Extended exponence occurs when multiple exponents in a word realize the same morphosyntactic function. Blocking, on the other hand, bans the realization of multiple exponents expressing a single feature value. Since Jebbāli plural forms do not exhibit blocking, I will limit the discussion of Xu and

Aronoff's analysis to extended exponence and apply it to doubly marked plurals in Jebbāli.

The core spirit of their analysis relies on the markedness constraint \*FEATURE SPLIT, which militates against the multiple realization of a single morphosyntactic value. \*FEATURE SPLIT favors simple exponence which is a less marked tendency cross-linguistically (pp.2-3). Thus, when \*FEATURE SPLIT is ranked lower than two or more realization constraints, extended exponence or multiple morphosyntactic markers are realized in a single form. In some instances, \*FEATURE SPLIT may rank between two competing exponents.

Xu and Aronoff successfully provide a unified account to Tamazight Berber and Classical Arabic extended exponence morphology using an *inferential-realization model of morphology* within Optimality Theory. Accordingly, grammatical functions which realize morphosyntactic features need to be posited through realization constraints. The basic formalism for realization constraints is shown below:

**(15) {Morphosyntactic feature} : {Morphophonological form}**  
**: is read as “realized by”** (Xu and Aronoff 2011: 7)

In their analysis, Xu and Aronoff also assume the ‘Pāṇini’s Theorem on constraint Ranking’ proposed by Prince and Smolensky (2004) in order to show that “a constraint realizing a feature set outranks another constraint realizing a non-null subset of the features.” (pp.8)

**(16) Pāṇini’s Theorem on Constraint Ranking**

Let constraints S and G stand as specific to general in a Pāṇinian relation.

Suppose these constraints are part of a constraint hierarchy CH, and that G is active in CH on some input *i*. Then if  $G \gg S$ , S is not active on *i*.

(Prince and Smolensky 2004: 99)



Realization constraints may also specify the position of a morph by encompassing both realization and alignment constraint. Thus, a realization constraint like {noun plural} :-tV may be decomposed into {noun plural} : tV which states that the plural morph tV must be realized and an alignment or morphotactic constraints which specifies that it must be realized as a suffix.

In Jebbāli plurals with double plural markers are exemplified in (19) below. The majority of these plurals attach the default plural suffix –tV and the less common suffix –Vn. I assume the realization constraints to address this particular shape of plurals:

**(17) {noun plural} : -un-** which stipulates that the noun plural is realized by the morph *un* which must follow the singular base and precede another morph.

**(18) {noun plural} : -tV** which states that the noun plural is realized by the morph *tV* which must be a suffix.

(19) Plurals with double exponents

- |    |            |             |         |
|----|------------|-------------|---------|
| a. | sije:r-əh  | sije:runtə  | cars    |
| b. | kirfe:j-əh | kirfe:juntə | beds    |
| c. | zol-it     | zoluntə     | carpets |

Since both these plural markers co-occur in a single plural form, they both must outrank \*FEATURE SPLIT. The ranking of the above realization constraints with respect to one another is indeterminate as I cannot establish evidence showing that the former outranks the latter. However, the realization constraints conform to the specificity condition which “requires a constraint with more specific morphosyntactic or semantic content to outrank a less specific realization constraint” (pp.9). \*FEATURE SPLIT is ranked lower than those realization constraints to allow for the occurrence of doubly marked plural forms.

(20) {noun plural} : -un-, {noun plural} : -tV » \*FEATURE SPLIT

**Tableau [6]** {PL}: -un , {PL}: -tV » \*FEATURE SPLIT

zol-it, -un-, -tV	{PL}: -un-	{PL}: -tV	*FEATURE SPLIT
a. zol <u>un</u> tə			*
b. zol <u>un</u>	*!		
c. zol <u>tə</u> un	*!	*	*
d. zol <u>tə</u>	*!		

Candidate (a) realizes plurality by splitting the morphosyntactic features for plurality into two, violating the low ranked constraint \*FEATURE SPLIT. Candidate (b) realizes the plural marker –un- as a suffix (where it should be an infix), while candidate (c) shifts the order of the plural markers. Both violate the specificity conditions stipulated by the realization constraints, which requires specific positions for the extended exponents. Candidate (d) fails to realize the realization constraint {PL}: -un-. Thus, it is out.

Xu and Aronoff also argue that a candidate such as (d) above, which does not realize all the required morphosyntactic elements, can be ruled out by FAITH constraints. They further stipulate FAITH1 and FAITH2 which associate with each morphosyntactic marker (pp.24). In Jebbāli, I can assume FAITH1 relate to –*un*- while FAITH2 relate to –*Vt*. Therefore, FAITH1 must outrank FAITH2 to rule out the opposite order of these plural markers. Moreover, they argue for the constraint PRIORITY which can also rule out any candidate that does not stack the plural markers based on their order in the actual surface plural form.

According to Xu and Aronoff, this approach to realization morphology is language specific in that not all languages allow for extended exponence in their grammar. This entails that realization constraints, which are in essence morphologically oriented and language particular and not phonologically determined, play a crucial role in handling morphological phenomena. Along the same line, Kiparsky (2005) propose the

constraints ECONOMY and EXPRESSIVENESS to handle blocking and extended exponence. If ECONOMY ranks higher, then blocking occurs. The opposite holds true for extended exponence. However, as Xu and Aronoff argue, Kiparsky's approach entails two distinct rankings to handle blocking and extended exponence while the realization theory can predict a single grammar that handles both successfully.

In summary, the realization optimality theoretic approach can handle to some extent the cases of doubly marked plurals. It elegantly addresses doubly marked plurals in Jebbāli and accords well with the assumptions made for the regular plurals. To illustrate, I assumed that the output plurals are derived from their singular outputs and not from their UR. Similar to the regular marked plurals, I argue that the plural markers come with the singular outputs, and must be parsed in the plural outputs. This is consistent with the analysis established for the regular plural patterns.

### **Specification of the Exceptionality in Lexical Entry**

The most employed approach for dealing with lexically and morphologically driven phonology is to assume that the inexplicable segments such as the various deleted and inserted segments are specified in the lexical entry of the form (Archangeli and Pulleyblank 1994; Rose 1997; among others). For example, Kiyota (2003) assumes that "Saanich lexicon has two underlying allomorphs (syllable with a mora) and // for the four realizations of the plural morpheme. The invariant shapes of the plural morpheme are then derived by the interaction among generalized templates, markedness constraints and Base-Reduplicant Faith constraints."

Lexically idiosyncratic plural forms also require lexical specification. For instance, Jebbāli has a number of templatic plurals in which singular forms map onto three distinct templates. The singulars from which these templates are derived look similar in

the number of consonants and shape; there is no motivation for mapping onto distinct plurals forms based on the shape of the singular. For these plurals, I assume their singular derivatives come with a template specified in their lexical entry:

(21)

bʕal-ɛt + CVCVC<sub>PL</sub>

dɪmʕ-ut + CCVC<sub>PL</sub>

kəlθ-ot + CVCC<sub>PL</sub>

The above serves as the underlying representation for the templatic plurals and a set of competing constraints produce the optimal output. In this case, FAITH-TEMPLATE is high ranked for these plurals. In the following tableau, a vowel is inserted at the cost of obeying the templatic shape pre-specified in the lexical entry of these forms. Candidate (b) stays faithful to the output singular and does not shape into the target template.

Thus, it is doomed.

**Tableau [7]** FAITH-TEMPLATE » DEP-V

bʕal-ɛt + CVCVC <sub>PL</sub>	FAITH-TEMPLATE	DEP-V
☞ a. bəʕɛl		*
b. bʕal	*!	

This approach to exceptionality undermines Generalized Template Theory which assumes that templatic effects are rather derivable from markedness and prosodic constraints and not from templatically specified constraints. For the analysis of regular shapes with a suffixal template, I assume that the final templatic shape of the plural which equals a syllable size is derived from markedness and faithfulness constraints. Thus, I did not have to introduce any templatic constraint to rule out potential outputs.

Specifying a template for these plurals is not consistent with my analysis to the regular plural patterns.

### Containment Approach

One of the earlier approaches to insertion and deletion in Optimality Theory proposed by Prince and Smolensky (1993) assumes that segments are not literally removed from output structures. Rather, deleted segments are represented as “prosodically unparsed”. Thus, they are not pronounceable and do not have any phonetic interpretation (Kager 1999:378). Since these elements are still contained in the output forms, they can play a phonological role of some sort. To elaborate, Jebbāli plurals that surface with an extra consonant than its output singular may be assumed to have this segment contained in the singular output but not pronounceable. The underlying representations, from which these plurals are derived, have these segments unparsed as illustrated in (22) below:

#### (22) Templatically expanded plurals

a. $\chi o < l > f - i t$	$\chi a l i f$	windows
b. $k o < l > b$	$k o l o b$	dogs
c. $f a \zeta < j > o r$	$f a \zeta j o r$	young bulls
d. $< m > i k b e r$	$m \acute{a} k b o r$	sweethearts
e. $k < w > \epsilon r$	$e : k w a r$	chiefs

This approach allows for a direct relation between the plurals with extra consonants and their Jebbāli singular forms. Thus, no reference to the Arabic singular forms is made to account for the re-appearance of extra consonants in the plural forms. Since the formation of these plural forms with the appearance of inexplicable consonants seems abstract, a reference to a shared input can be a solution. However, not all the plurals collected have equivalent forms in Arabic. So, the problem is really partially solved.

This approach definitely solves the problem of correspondence across two languages. It further shows the exact kind of deleted and inserted segments, restraining the functions of Max-C and Dep-C and avoiding deleting and inserting random segments in the output plurals.

### **Constraint Indexation**

Pater (2000 and 2004) argues that markedness and faithfulness constraints in Optimality Theory can be lexically indexed to capture the exceptional or lexical behavior of certain morphemes. He states “morphemes that trigger a process are indexed for the application of a lexically specific markedness constraint, and morphemes that block a process are indexed for the application of a lexically specific faithfulness constraint.” (pp.1). According to him, these constraints are universal markedness or faithfulness constraints whose application relates to lexical items.

His hypothetical example for the application of these constraints comes from a language with coda deletion which is blocked in certain lexical forms. He argues that the exceptional items can be accounted for by a lexically indexed faithfulness constraint (MAX-L whereby L stands for lexical). In this case, the ranking that holds for these lexical items is MAX-L » NoCODA » MAX.

(23) MAX-L » NoCODA » MAX

Regular form: /pitak/ -> [pita] Exception: /timak<sub>L</sub>/ -> [timak]

(Pater 2004:1)

In the lexicon, the exceptional items are also indexed by ‘L’ as seen in the example above or the ranking attached to them. This will consequently exclude any plausible ranking variation for these lexical items.

In Jebbāli, the insertion of a *prosthetic* vowel in plural forms attaching a suffixal VC template is not phonologically determined. Some forms that have consonant clusters

word initially insert a *prosthetic* vowel to break up the cluster while other forms do not.

This can be analyzed by the ranking \*COMPLEX » DEP-V

**Tableau [8]** \*COMPLEX » DEP-V

msɔs	*COMPLEX	DEP-V
☞ a. .ɛm.sɔs.		*
b. .msɔs.	*!	

The blocking of insertion of a vowel to break up the consonant clusters word-initially is conditioned by the indexed faithfulness constraint DEP-V-L which ranks above \*COMPLEX and applies only to lexical items that do not insert a vowel.

Grammar: DEP-V-L » \*COMPLEX » DEP-V

Lexicon: [ɛmsɔs] [ħk'ɔk']<sub>L</sub>

**Tableau [9]** DEP-V-L » \*COMPLEX » DEP-V

Output Sing.	Output Pl.	DEP-V-L	*COMPLEX	DEP-V
msɔs	☞ a) .ɛm.sɔs.			*
	b) .msɔs.		*!	
ħk'ɔk' <sub>L</sub>	☞ a) .ħk'ɔk'.		*	
	b) ɔħ.k'ɔk'.	*!		*

Pater (2004) shows that this approach can successfully capture exceptionality through well motivated constraints whose different sub-rankings produce typological ranking observed cross-linguistically. Furthermore, he also argues that this approach is of some interest to learnability in that learners can easily “clone” any markedness or faithfulness constraint and index it to exceptional forms. Thus, they do not need to memorize the numerous rankings that hold for a lexical phenomenon.

This approach assumes that constraints in Optimality Theory are lexically indexed to account for the shapes that diverge from their regular patterns. Plurals that surface with a *prosthetic* vowel do not follow a certain phonological pattern (for instance, sonority of the initial consonants do not determine whether a form gets a *prosthetic*

vowel or not). Therefore, there is a need to have constraints with extra information about these lexically shaped plurals.

The output plurals are derived their singular outputs and not from their URs. This is consistent with my assumption that plurals are derived from their singular outputs. There is a competition between the expected (potential and regular) plural and the resultant (exceptional) plural. Only a highly ranked indexed constraint will be able to determine the actual output form (the exceptional shape). The strategy and consequence reached from this approach are consistent with the analysis of the regular plural shapes in the language.

### **Selector Constraint and RealizeMorpheme: Plurals with Double Exponents**

In Jebbāli, noun plurals which take double plural morphemes display three distinct shapes based on the plural markers they attach to. The first type (represented by forms (24) below) takes the infix *-(V)b-* and the less common plural suffix *-(V)n*. The majority of the singular forms from which these plurals are derived take the shape CaC. The singular form (d) has a total of three consonants CCVC, with a cluster of two consonants word initially. The plural shape for all of the forms listed in (24) is CabCin, in which an infix *b* and the plural suffix *-in* are attached to mark plurality. There is no a phonological reason why these forms take multiple plural markers to express plurality. Bi-consonantal shapes in Jebbāli are observed to pluralize by either attachment of a suffixal VC template as in [dkək] and [ħtət] derived from [dik] ‘rooster’ and [ħut] ‘fish’ respectively or by ablaut as in [nudɘ] derived from [nidɘ] ‘water skin’ and [ɬag] derived from [ɬeg] ‘man’. What coerces these forms to take double plural markers is quite unknown yet. They can readily attach the suffixal template or be pluralized by ablaut.



(24) The infix *Vb* and plural suffix *-in*

Sing.	Pl.	Gloss
a. k'ar	k'abr <u>in</u>	graves
b. ɤar	ɤabr <u>in</u>	wells
c. θar	θabr <u>in</u>	fractures
d. ʕjɔs	ʕabs <u>in</u>	flue
e. ðal	ðabl <u>in</u>	tails

The second group of plural exemplified in (25) below has the plural infix *(V)b* and the default plural suffix *-Vt*. Only three forms of this doubly marked plural are found in a pool of 25 forms. These plurals are derived from tri-consonantal (form (a) and (c) below) or quadri-consonantal (form (b) below) singulars. The final shape of the plural is not the same across the board. It may take *CCɔbtə*, whereby the first two Cs come directly from the singular form. The second attested plural shape begins with a *prosthetic* vowel (schwa) and has another inserted vowel between the final repeated Cs in the base.

(25) The infix *Vb* plus the suffix *-tV*

a. tɬ'et	tɬ'ɔ <b>bt</b> <u>ə</u>	monitor lizards
b. lɕɔt	lɕɔ <b>bt</b> <u>ə</u>	nipples
c. k'et	ək' <b>b</b> ə <b>t</b> <u>ɔt</u>	food

The final and most common attested pattern of plurals with double exponents includes the plural suffixes *-Vn* and *-tV*, which follow each other in a fixed order. In all the collected forms, the default plural suffix *-tV* occupies the last position in the plural form. The singular forms which take these plural suffixes are eclectic; they range in shape from bi-consonantal to quadri-consonantal. It is important to note that some singular forms come with the suffixes *-t* and *-Vh* which are the feminine gender suffixes, and subsequently get deleted before the attachment of the plural suffixes take place. Semantically, it is important to note that the majority of these forms are borrowed words from Arabic. Moreover, many of the consonants that appear in the correspondent plural

form, and are not originally in the singular form are in fact deleted consonants and retrieved in the plural (shared input between the Arabic singular and Jebbāli plurals).

(26) Two suffixes -Vn and -tV

<i>Sing.</i>	<i>Pl.</i>	<i>Gloss</i>
a. dɪfdeʃ-t	dɪfdaʃontə	traditional Omani male gowns
b. səħar-ah	səħaruntɪ	traditional Omani boxes
c. ʒɪflaʃ	ʒɪflontɪ	Dhofari women
d. sɪje:r-əh	sɪje:runtə	cars
e. ʕər	ʕamoruntə	sayings
f. saʕ-əh	saʕuntə	clocks
g. təkj-əh	təkjuntə	pillows
h. jan	əjuntə	shares/ rights
i. tʃar	tʃaruntə	eye lashes
j. ʁɪjbg-it/ ʁabg-ot	ʁagnɪti	girls
k. k'elɒm	ak'lɪntɪ	pens
l. faʕam	fʕontə	legs

I make the following observations about the formation of doubly marked plurals in Jebbali:

1. Although Jebbāli marks plurality by a diverse set of non-concatenative processes including ablaut, attachment of a VC template and mapping singulars onto plural templates, only two plural suffixes and an infix participate in double plural marking. It has been attested that for multiple plural exponence, one suffix and one internal change may together mark a morpho-syntactic process. For Jebbāli, the case is different; two suffixes mark double plurality or an infix plus a suffix mark double plurality.

2. The plural markers are not phonologically identical but semantically identical. Interestingly enough, in some Modern South Arabian languages and in Arabic, the exploitation of two plural markers can express 'plural of the plural'. However, in Jebbāli, no additional meaning is emphasized by the extra plural marker. In other words, how many plural markers a form attaches to does not contribute to a special meaning. These forms are still plural. They can easily be attaching one plural marker like the majority of plural forms in the language. But, these have two or even three morphemes to mark 'plural'.

3. For bi-consonantal nouns, I assume it occurs to meet some templatic requirements of the language. The bi-consonantal nouns in Jebbāli are quite interesting. They may take ablaut to mark plurality or expand by attaching a VC template with a fixed vocalic element and a copy of the final base consonant. So, a total of three plural marking processes are enjoyed by bi-consonantal nouns in Jebbāli.

4. Some sort of fusion occurs when plural markers are attached such as deletion of the infix vowel and retention of the b alone. In some cases, it is not clear if the stem vowel is

the one attached with the plural infix or actually the plural infix assimilates to some sort of vocalic change. More interestingly, where /b/ is deleted elsewhere in the language, it is never deleted in the plural infix despite the fact that in both of these cases, /b/ is intervocalic.

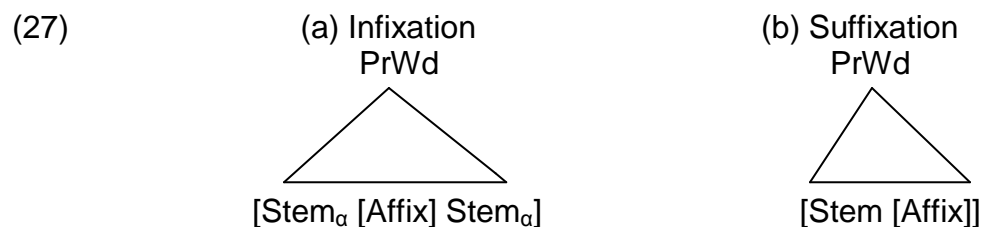
Since the majority of plural forms in Jebbāli take the suffix –tV to mark plurality, I argue that this suffix is a default plural marker for at least two reasons: (1) borrowed and nonce forms always take it as a plural marker (2) many diverse plural forms attach this plural suffix to mark plurality. I further argue that, in theory, attachment of this plural suffix is a sufficient phonological change to express plurality. However, since another plural marker accompanies this suffix, there is a possibility that this suffix is made invisible<sup>36</sup> to REALIZE MORPHEME and carries no plural meaning in these plurals, or it is not sufficient for it alone to express plurality. There is a need to attach another plural marker, or else impose a phonological change on the stem to mark such a morphological function. If I assume that there is a domain for a double phonological change that cannot be applied where the first change has taken place, then we assume that such plural forms will definitely need a second plural marker to express the morphological process ‘plurality’. This idea is inspired by Kurisu (2001) who establishes a selector constraint. To explain what the selector constraint does, assume that the entire doubly marked plural in Jebbāli contains a suffix (specifically –Vt) as well as a stem, but “the suffix is invisible, hence morphological opacity” (pp.194). Kurisu, when discussing German plurals which take umlaut and a suffix, states “the suffix behaves as if it were not present in the structure, making only the stem available as a visible

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<sup>36</sup> Following proposals made in Kurisu (2001:191-194), I assume that the presence of the default plural suffix -Vt in the doubly and triply marked plurals is enough to satisfy the constraint REALIZE MORPHEME. However, a second plural affix is added when no suffix exists underlyingly because the affix is the only eligible strategy to avoid a violation of REALIZE MORPHEME. So, -Vt is made invisible to REALIZE MORPHEME and its presence alone violates REALIZE MORPHEME.

element.” (pp.194). Because of that, the stem with the invisible suffix violates REALIZEMORPHEME, and the stem requires a phonological change (a second plural marker or an internal change) due to the pressure of REALIZEMORPHEME. According to Kurisu, “this is in effect tantamount to articulating a system to exclude the suffix from the word domain... and is achieved by assuming  $\text{Stem} \equiv \text{PrWd}$  as the selector constraint.”

He proposes a selector constraint that can be applicable for the three varieties of affixation observed cross-linguistically (prefixation, suffixation and infixation). The relevant morphological processes involved in the formation of doubly marked plurals are infixation and suffixation for which the following selector constraints have been proposed:



For example, the selector constraint (27b) makes the domain of a stem accord with that of a prosodic word. Therefore, an output that satisfies it has the structure in which the suffix is disregarded from the prosodic word domain. Since REALIZEMORPHEME is sensitive to the prosodic word domain, then such an output violates REALIZEMORPHEME. Thus, a second plural marker is needed to satisfy REALIZEMORPHEME when a stem with an invisible suffix violates it. In other words, a plural form which bears only one plural marker (suffixation only) is doomed since it satisfies the selector constraint which makes it invisible to REALIZEMORPHEME, and a violation of RealizeMorpheme occurs. However, the optimal form satisfies

RealizeMorpheme since a change is made in the domain prescribed by the selector constraint.

In the analysis of the regular plural patterns, I used well motivated constraints in Optimality Theory. The selector approach refers to a constraint whose motivation is not well established in the framework of Optimality Theory. However, the constraint appears to successfully capture the plurals with double exponence.

### **Unified Approach to Exceptionality in Jebbāli**

The previous sections have explored eight distinct Optimality Theoretic approaches that address exceptionality, irregularity in the formation of sub-patterns of systematic plural and lexical marking characterizing the formation of a few Jebbāli plural forms. I also showed that each exceptional pattern exploits a different way to realize the plural morpheme, which imposes difficulty to the morphophonological models proposed to date. As a result, I argued that these diverse morphophonological tendencies associated with the formation of plurals may be advanced by miscellaneous approaches to fully capture their richness and intricacy. For example, while templatic plurals take a specific template, there is no driving phonological motive that forces the singulars to take that template, except the need for a plural to be distinct from its singular form. Templatically expanded and truncated plurals insert and delete eclectic segments in contexts that are not phonologically triggered. The potential of integrating these diverse patterns into a unified theory thus seems far-fetched given the fact that the most powerful phonological theories like REALIZEMORPH (henceforth; RM) will confront many insurmountable problems when attempting to group these exceptional shapes under the same umbrella. Below, I will first review the Realizational Morphology Theory (RMT) as advanced in Kurisu (2001), and show the success it enjoys conceptually and

empirically. I then present the difficulties Jebbāli plurals impose in applying this theory to address the exceptionality of Jebbāli cogently and unifyingly.

Kurusu's (2001) has made promising theoretical contributions to the constraint REALIZE MORPH by delimiting its powerful consequence and offering a better understanding to its interactions with well-motivated Optimality Theory constraints. His doctoral dissertation devoted to "The Phonology of Morpheme Realization" argues that Realize Morpheme couched under the Realizational Morphology Theory (RMT) can capture a whole range of phonological exponence of morphemes and allow for unification of both concatenative and non-concatenative processes in natural languages. I will first present the formalism of Realizational Morphology Theory as proposed in Kurisu (2001), and then illustrate its effects on various morphological processes:

### **(28) Realize Morpheme (RM):**

Let  $\alpha$  be a morphological form,  $\beta$  be a morphosyntactic category, and  $F(\alpha)$  be the phonological form from which  $F(\alpha + \beta)$  is derived to express a morphosyntactic category  $\beta$ . Then RM is satisfied with respect to  $\beta$  iff  $F(\alpha + \beta) \neq F(\alpha)$  phonologically.  
(Kurusu 2001: 262)

According to Kurisu, "RM simply requires every morpheme to receive some surface phonological manifestation, so it is not a constraint special to non-concatenative morphology" (pp.72). This assertion is supported by showing how a range of affixational and non-concatenative operations nicely fit into the RMT and produce observed typological systems in natural languages. Kurisu argues that RM provides a unifying account to subtractive and templatic truncation ("what is deleted is phonological invariable in subtractive morphology whereas the residue remaining after deletion is constant in templatic truncation" (pp.7)), long thought to be unrelated and hence must be

captured distinctly. According to Kurisu, the difference lies in the presence or absence of templatic constraints which interact with RM and other faithfulness constraints such as MAX. This will subsequently delimit the size of the output form in the case of templatic morphology. RM also addresses truncation and reduplication without recourse to templatic constraints such as TRUNC and RED. Finally, Kurisu shows that RM, along with the sympathy theory, succeeds in accounting for double morphemic correspondence whereby zero to two morphemes mark a morphosyntactic value. RM predicts no language that has more than two morphemes for a singular morphosyntactic phenomenon. It also predicts that affixation and subtractive morphology never co-occur. This sums up Kurisu's arguments for the motivation of Realize Morpheme and rejection of anti-faithfulness constraints.

Based on the above summary of RM, it seems that RM can admit all kinds of processes assumed to be analyzed by anti-faithfulness constraints (Alderete 1999), and even go beyond by accounting for cases which anti-faithfulness constraints have failed to address<sup>37</sup>. Kurisu stipulates that the overall ranking RM >> Faith addresses morphophonological cases where the change is triggered by parsing an underlying material or exhibited by stem modification. As established in phonology, phonological changes result from a competition between markedness and faithfulness constraints while morphophonological phenomenon display features of both phonological alternations and morphological marking. Therefore, Kurisu assumes that stems are necessarily devoid of any morphosyntactic value. For example, stems which are

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<sup>37</sup> In addition to bringing a redundant tool in Optimality Theory, anti-faithfulness constraints are only operative in surface-surface mappings and cannot be extended to lexical-surface dimension. It also fails to account for phonological polarity which is associated with morphological conditioning (kurisu 2001:74).

realized morphosyntactically as singular forms without any phonological change do not violate RM. However, when they undergo a change to mark plurality, they exhibit violation to RM. This, according to Kurisu, enhances RM since it accords with Optimality Theory's assumption that all constraints are violable and that RM is no exception. Kurisu also considers REALIZEMORPH to be a morphological faithfulness constraint which is supported by the fact that affixational and non-concatenative morphology both display allomorphy in their actual forms. Kurisu stipulates that not only does RM require a stem modification but also demands a morpheme attached to an underlying form to get phonologically realized in the output form. As Kurisu develops the RMT, he proposes that indexed faithfulness constraints may be sandwiched between RM to produce the actual output of a language, that imposes certain restrictions about its shape and prosody.

Pursuing Kurisu's insightful thoughts into the formation of the exceptional plural shapes in Jebbāli may accelerate the abortion of his fancy ideas about RM. First, if I assume that templatically expanded plural forms result from RM >> DEP and templatically truncated plurals surface as a result of the competition between RM and MAX, then the analysis will need to stop here and no further progress can be made. For one thing, the inserted and deleted elements are not the same across the board. I cannot delimit the definition of the faithfulness constraints so that the inserted or deleted portions are clear and exact. In some instances, a syllable is chopped from a singular form to mark its plural counterpart. For another, the size of the final plural form is not constant all the way through. This makes a stipulation of a prosodic constraint to forbid excess insertion or deletion is quite impossible. Jebbāli plurals are a real challenge to



RM because they impose difficulty to restrain the power of RM. In fact, any change is admitted by RM. But, what makes the theory worthy of consideration is the kind of constraints that play a role to direct the focus of the change.

Kurisu also presents insightful analyses to double marked morphology that can be carried over to explaining doubly and triply marked plurals in Jebbāli. Since doubled marked plurals in Jebbāli bear a suffix along with an infix *-Vb-*, I assume that the plural suffix is invisible to the singular-plural mapping due to  $\text{Stem} \equiv \text{PrWd}$ <sup>38</sup> (Kurisu 2001:246). According to Kurisu, double marked morphology like German plurals which have both a suffix plural marker and stem change can be accounted for if we assume that the suffix is invisible as a plural marker. This entails that a stem + the plural suffix alone violates *RealizeMorpheme*, which needs to be ranked below  $\text{Stem} \equiv \text{PrWd}$  to ensure double realization of plurality in German.

Applying RM to templatic plurals produces more desirable results since there is a definite template that these plurals take. So, both RM and a templatic constraint stipulating a final template together derive these plurals. However, I am confronted with the problem of proposing a unified constraint that is ranked lower than RM and *TEMPL*. The thing is that there is no phonologically driven cause which entails these singulars to take a templatic pattern and not any other pattern. A whole range of diverse singulars which take a definite template makes this move discouraging. Is it possible that numerous plurals (range from bi-, tri- and quadri-consonantal) prefer that template with no reason? I conclude that Jebbāli exceptional plurals pose a challenge to even the most powerful devices of Optimality Theory proposed to date. One may think that RM,

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38 Kurisu (2001:206) states “this constraint is formally understood as constraint conjunction of anchor-L (stem, PrWd), Anchor-R (stem, PrWd) and contiguity stem”

being abstract and non-stipulative, will be able to offer a unified analysis to these notoriously shaped plurals. However, RM comes with many drawbacks too. Finally, Kurisu predicts that the maximal numbers of morphemes that may mark a morphosyntactic value is only two. However, we have seen that Jebbāli has up to three plural markers attached to a form to mark plurality. Therefore, RM miserably fails to unifyingly address these exceptional plural patterns.

### **Summary of Chapter Six**

Plurality in Jebbāli is characterized by a number of peculiar and exceptional shapes, which pose a challenge of incorporating them with the proposed Optimality Theory analysis. There is a huge diversity attributed to the singular forms from which these plurals are derived which makes it hard to propose a unified underlying representation for them. The plural shapes are also distinct from each other; some start with a consonant clusters and others have an initial vowel. There is no specific singular template that derives a specific template. Moreover, the plural marker is sometimes not clear or easy to state for these plurals. For instance, plurals may come with a vocalic change or consonantal shift along with a plural marker. Moreover, three templatic shapes result from mapping distinct singular shapes. It is hard to classify singulars based on their specific shapes into classes taking a particular template and not other templates. All these difficulties constitute a big obstacle in offering a unified Optimality Theory account for these unusual shapes.

This chapter also outlines some approaches to dealing with exceptionality and lexical marking in Optimality Theory such as eliminating the underlying representation, REALIZEMORPH, two-level well-formedness, realization optimality theoretic account, intermediate levels, specification of the exceptionality in Lexical Entry, containment

approach, constraint indexation and selector constraint. I finally explore the potential success and failure of Realize Morpheme Theory in offering a unified analysis to the exceptional plurals in Jebbāli.

## CHAPTER 7 CONCLUSION

Throughout this dissertation, I have addressed the diversity and intricacy involved in the formation of noun plurality in Jebbāli, an underrepresented language in Semitic. In documenting the enormously diverse shapes of plurals, I explored a number of non-concatenative morphological processes under which these plurals can be classified. Previous work, which shed light on plural formation in the language, concerns only listing noun plurals in accordance with their CV shapes, and does not identify the crucial morphological processes involved in the formation of noun plurality. I further showed that many noun plurals in Jebbāli are productive and systematic in their formation. Therefore, they can be analyzed theoretically using a powerful generative framework like Optimality Theory. Nor does this dissertation stop with the exploration and analysis of the systematically formed plurals; it also explains, in depth, the exceptional plural patterns which seem to be *ad hoc* in their overall shapes. These are also formed by processes different from the systematic non-concatenative processes triggering the formation of their systematic counter-part plurals. They, thus, constitute a challenge to integrating them into the proposed analyses of the regular plural shapes.

To close this dissertation, I summarize the major results and contributions made in the previous chapters, especially in chapter five, and finally present ideas for further research on the noun plurality of Jebbāli.

### **Results and Contributions**

Jebbāli is a linguistically rich language. This is manifested through its intriguing tendencies characterizing its phonology and morphology. First and foremost, Jebbāli has quite a large phonemic inventory when compared to Arabic, a dominant neighboring

language. This phonemic inventory exploits 35 phonemes or more in other varieties of Jebbāli, has expansive vocalic contrasts, and involves an abundant variety of syllable structures. It encompasses two prominent stresses which are assigned in words of two syllables or more. Moreover, the phonology of this language is intricately structured with all the possible phonological processes being operative; some of these processes are contrasting, for example fortition versus lenition and insertion versus deletion, which operate simultaneously to produce surface forms in the language. More relevant is that Jebbāli plurals exhibit many of the attested and non-attested non-concatenative morphological processes. An example of the non-attested shape is the *Vb* infixed plural which appears to be unique to Jebbāli, since other Modern South Arabian languages and Semitic do not have such a plural pattern. This rich morphology extends to embrace exuberant exponence manifested by the doubly and triply marked plurals. It has been argued that triple exponence is non-existent cross-linguistically but Jebbāli admits it in its grammar of plural formation. Kurisu (2001) confidently states that Multiple Morphemic Exponence is limited in range: languages may have from zero morpheme to maximally two to express a certain morphosyntactic function. He speculates that “an exhaustive survey of all human languages is beyond anyone’s capacity, but there is no counterexample to this generalization to the best of my knowledge” (pp.249). According to Kurisu, triple morphemic exponence is “an impossible state of affairs” (pp.249). He reaches this conclusion based on his theoretical assumptions and the system he used to analyze the scope of Multiple Morphemic Exponence.

The first contribution of this dissertation has been to document the above mentioned linguistic tendencies, and more.

Apart from exploring noun plurality of the language, it has been a goal of this dissertation to reveal the phonology of Jebbāli, using modern devices and well established tools available in current phonological theory. This has been done through the faithful adoption of the International Phonetic Alphabet (IPA), which hopefully clears all the misconceptions and difficulties made by the confusing and informal notations employed in all the previous work on the language. At the very beginning of embarking on this research, I was overwhelmed by the inconsistent transcription composed of utterly confusing symbols used to transcribe Jebbāli examples in a huge number of references. It was very hard to identify the exact phonological processes prevalent in Jebbāli described in these references, considering the fact that the symbols are unclear. I hope that I have laid out the fundamentals in chapter two of this dissertation, and will provide a reliable reference on the sounds, syllable structures and phonological processes of the language for future researchers.

Careful readers will also notice a comprehensive literature review of the major linguistic and non-linguistic work that has been done in Jebbāli and other Modern South Arabian languages in the last century or so, some of which do not directly relate to the work presented in this dissertation. However, I included everything I could find about this language to supplement my goal of offering a reliable reference to Jebbāli, to help future researchers find brief synopses on the previous work, and to encourage building up on previous work. Needless to say, documentation of previous work will definitely save time and speed up the process of any revitalization project for the language in the future. Last but not least, I myself found the literature review section very helpful, and I was able to get ideas for future research.

The exploration and analysis of the regular plural patterns in Jebbāli presented in Chapter Five of this dissertation is my major original contribution. First, I identified the four systematic non-concatenative processes exploited in the formation of noun plurality in Jebbāli: *Vb* infixation, ablaut, attachment of a VC template and templatic patterns. I described these patterns thoroughly and analyzed them using the framework of Optimality Theory. For some patterns, I showed more than one possible approach, which allows the overall analyses to take a complete shape. To illustrate, in analyzing the plurals with ablaut, I explored three distinct approaches: Positional Faithfulness, Anti-Faithfulness and RealizeMorpheme. I further showed that while Positional Faithfulness and RealizeMorpheme are able to account for the two distinct shapes of ablaut plurals (simplex and complex), the Anti-faithfulness model may encounter some difficulty addressing the ablaut plurals with a simplex root. This stems from the fact that ablaut plurals alter the [back]ness of the vowel contained in their initial and only syllable, while the proposed Anti-Faithfulness analysis of ablaut plurals stipulates that IDENT- $\sigma_{\text{initial}}$ -[ $\pm$ back]-SP must outrank other Anti-Faithfulness constraints.

In the *Vb* infixed plurals, an alignment constraint, which shows the locus of the *Vb* infix in the plural forms, is dominated by the constraint monitoring the left edge of the plural form. These two constraints are well motivated in Optimality Theory, and along with the constraint restricting the size of the affix to a syllable length, produce the actual *Vb* plurals in Jebbāli. The analysis of the plurals, with the suffixal VC template with the final reduplicated C of the base, is very integrated, and conforms to Ratcliffe's (1998) proposals that this pattern is not a true reduplication but rather a templatic expansion. This dissertation now explains theoretically what templatic expansion is, since the final

analysis of this pattern conforms with the language-specific syllabic, templatic and prosodic well formedness requirements. Finally, the template, resulted from mapping singulars with a geminate onto plurals, is also explained in terms of the interaction of well motivated constraints in Optimality Theory.

In short, noun plurals in Jebbāli have not been theoretically approached before this dissertation. Only a very little description on plurality (though inspiring and organized) was given in Ratcliffe (1996, 1998a &b). This dissertation hopefully contributes to existing knowledge in phonology and Optimality Theory, by adding yet another set of Semitic language phenomena that Optimality Theory can cogently and elegantly explain.

### **Remaining Issues**

In forming plurality, Jebbāli has *Vb* infixation, a pattern of plural that has not been attested in Semitic. It will be very illuminating to trace the history of this infix and study diachronically how this infix evolves to be a plural marker in the language. It will also be revealing to explain why the *b* of the *Vb* plural infix never gets elided while the language extensively deletes *b* elsewhere. I suggest an exhaustive list of all the forms that have elided *b* should be compiled and studied thoroughly.

Triple exponence in Jebbāli is also a potentially fascinating avenue for future research. First, the language seems to admit triple plural markers, a tendency rendered to be impossible cross-linguistically. Although I observe it is very rare in light of the fact that my Jebbāli informants were not able to generate more than a single form that has triple plural marking, more work needs to focus on this pattern and trace back the form that has triple exponents. Secondly, there is now an ongoing research on double exponence, as linguists are baffled by the huge number of languages employing



this linguistic tendency in the grammar. There was an old belief that there is a bi-directional relation between a form and meaning. In other words, only a single form may express a particular meaning. But, this wave is now changing and many theoretical frameworks are now devised to explain this phenomenon (Kurisu 2001; Xu and Aronoff 2011). Jebbāli has twenty six plurals with double exponence and this number is good enough to contribute to this debate.

It will also be a contribution to analyze theoretically the other templatic shapes that result from mapping singulars onto plurals. Previous work on Jebbāli plurals (Ratcliffe 1992; Ratcliffe 1996; Simeone-Senelle 1997; Ratcliffe 1998a and b) was too obsessed with the plural templates. Ratcliffe (1998b), in particular, took this obsession to a level where an exact count of templates was listed from a Jebbāli lexicon (Johnstone 1981). Although such an obsession was justified, bearing in mind the goals of the researchers and the paucity of research done on plurality at that time, my biased view envisions more fruitful results from theoretical and analytical linguistic work than from further generalization of descriptive facts.

Finally, all the exceptional patterns of plurals that were described in chapter six should be taken seriously in future research. I believe the Optimality Theory models for dealing with exceptionality and lexical marking will need to go one step higher, so that an integrated analysis for these shapes may be built.

APPENDIX A  
PLURALS OF JEBBĀLI

**External Plural**

Table A-1. Plurals with the plural suffix /-t(V)/ V→ /i/ or /ə/

Sing.	Pl.	Gloss	Class <sup>39</sup>
s <sup>ʕ</sup> aħan	əs <sup>ʕ</sup> ħenti	plates	m
meh	mhot̪	waters (a lot of water)	m
faɣam	fəɣomtə	men	m
rem	re)ti	tall persons	m
ʃ <sup>ʕ</sup> fef	ʃ <sup>ʕ</sup> ifitə	elbows	m
bat <sup>ʕ</sup> aħ	bat <sup>ʕ</sup> ħiti	beaches	m
ʔɔb	ʔabt̪i	doors	m
ʈħer	ʈħaretə	mountains	m
ʔart̪	ərt̪i	grounds/ floors	f
lɛh	lhot̪i	cows	m
fek'oʔ	fek'atə	blankets	m
gijil	geliti	mountains	m
χatf-et	χtɔftə/ χtɔf	holes bored in the ear	f
ħaʃi	iħʃiti/ iħʃot̪	soil	m
dikun	əd̪kintə	shops	m
fɪnʒ <sup>w</sup> on	fangti	small coffee cups	m
ʈəfəl-et	ʈəfəlɔtə	people from Dhofari	f
ʒifr-et	ʒofortə	plaits, tresses of hair	f
ħær	ħirit̪i	plateaus	m
ʒifar	ʒifirit̪i	nails	m
kəlin-ut	kəlɪnit̪i	moles	f
zəgen-ut	zəgnit̪i	butterflies	f
k'eraħ	k'erħit̪i	donkeys	m
iðon	əd̪ontə	ears	m
herum	hərm̪it̪i	plants	m
fɛnus	fɛnsit̪i	lamps	m
ʔəgor	ʔɛgəret̪	slaves	m
təmbəko	təbakutə	tobacco	f
stəret	stɔrtə	traditional house	m
ɒɔʒ	ɒɔʒiti/ k'ɪʒot̪i	friends	m
e:d	aditə	hands	m
ʃum	ʃimtə	names	m
ɣafr-et	ɣafartə	demons	f
ʔorom/ a:rm	ʔeromtə	roads	m
ɣen	ɣantə	eyes	m
ʈaxr-it	ʈxortə	old women	f
mɣur-at	maɣart̪	guests	m, f
χah	χitə	mouths	m

<sup>39</sup> Class refers to the class of the singular form.

Table A-1 Continued

Sing.	Pl.	Gloss	Class
ʔəgər	ʔəgreṭ	slaves	m
motər	əmtər <u>ot</u>	cars	m
ryad	rəydeṭ/ɔryad	green grass	m
gɪbl-at	gɪbloti	Jebbalis (f.)	f
fɪgr-at	fɪgroti	Bedouin women	f
kub	əkbeṭ	cups	m

Table A-2 Plurals with the plural suffix –Vn whereby V is often /u/

Sing.	Pl.	Gloss	Class
fudun	fidn <u>in</u>	stones	f
nɪʒɪn	nɪʒ <u>u</u> )	aunts	m
lɪftɪn	lɪft <u>u</u> n	aunts	m
gəfnin	gɪf <u>u</u> n	tulchans <sup>40</sup>	m
k'əla	k'əl <u>u</u> n	children	m
ðunub	ðən <u>b</u> in	tails	m
dɪxṭər	dɪxṭɪr <u>u</u> n	doctors	m
losi	losun	large traditional scarfs	m
ʔen-ut	ʔaj <u>u</u> n	years	f
gafan	gɪf <u>u</u> n	eyelids	m

Table A-3 Plurals with the plural suffix –i

Sing.	Pl.	Gloss	Class
s'əfr-it	s'ofor <u>i</u>	cooking pans	f
ɛrt-ot	ɛrt <u>i</u>	boys	m
həʒ-at	həʒ <u>i</u>	black flies	f
k'sɛ-ɛt	k'esɛ <u>i</u>	cliffs/ mountain edges	f
ɪlik	ilke	angels	m

Table A-4 Plurals ending with [oɪ]<sup>41</sup>

Sing.	Pl.	Gloss	Class
mɛlb-ɛt	moloɪ	corners	f
k'ət'ɪb-ɛt	k't'oɪ	carved wooden dolls	f
mar-it	morɪ	mirrors	f
mɪnk'-at	mɪnk'oɪ	monitor lizards	f
lɪh-et	lɪhoɪ	beards	f

40 Tulchan was a man appointed as bishop in Scotland.

41 I also listed those under 'truncation'.

### Doubly and Triply Marked Plurals

Table A-5 Plurals with double and triple plural markers

Sing.	Pl.	Gloss	Class
miṯḥəl	miṯḥ <u>abluntə</u>	chameleons	m
k'ar	k'abr <u>in</u>	graves	m
dɪdɛf-t	dɪdɛf <u>ontə</u> / dɪdɛf	traditional males' outfits	f
səḥar-ah	səḥar <u>untɪ</u>	traditional wooden boxes	f
ɟɪflat	ɟɪf <u>lontɪ</u>	Dhofari women	f
siɟe:r-əh	siɟe:r <u>untə</u>	cars	f
kɪrfe:j-əh	kɪrfe:j <u>untə</u>	beds	f
zəl-it	zəl <u>untə</u>	carpets	f
kɔf-et	kɔf <u>ontə</u>	caps	f
k'et	ək' <u>bətot</u>	food	m
ɤar	ɤabr <u>in</u>	wells	m
θar	θabr <u>in</u>	fractures	m
ɟjɔs	ɟabs <u>in</u>	flue	m
ɟōr	ɟamor <u>untə</u>	sayings	m
saɟ-əh	saɟ <u>untə</u>	clocks	m
təkj-əh	təkj <u>untə</u>	pillows	m
jan	əj <u>untə</u>	shares/ rights	m
ɪlʃan	ɪlʃ <u>intə</u>	tongues	m
ɸar	ɸafr <u>untə</u>	eye lashes	f
ðal	ðabl <u>in</u>	tails	m
segod-ət	sigad <u>untə</u>	carpets	f
ɤɪ'bg-it/ ɤabg-ot	ɤagnɪ <u>ti</u>	girls	f
k'elɛm	ak'ɪlɪ <u>ntɪ</u>	pens	m
fəɟam	fɟo) <u>ntə</u>	legs	f
tɸ'et	tɸ'ɔb <u>tə</u>	monitor lizards	f
ɪɟɔt	ɪɟɔb <u>tə</u>	nipples	m

## Plurals with Vb Infixation

Table A-6 Quadri-consonantal singulars

Sing.	Pl.	Gloss	Class
mirt'un	mirebt'en	the top parts of legs	m
mignam	migebn'em	mattresses made of leather	m
s <sup>ɕ</sup> indik'	s <sup>ɕ</sup> inebdek'	boxes	m
mært <sup>ɕ</sup> um	mirebt <sup>ɕ</sup> am	pots used to keep ghee	m
munxul	minebxəl	sieves	m
məntef	minebtəf	mattresses	m
fundik'	finebdək'	hotels	m
mergel	mirebgəl	cauldrons	m
mizned	mizebnəd	rifle-bolts	m
maxt <sup>ɕ</sup> er	maxabt <sup>ɕ</sup> ər	caravans, turns, times	m
mixtɕif	maxabləf	deserted places	m
məs <sup>ɕ</sup> ref	mis <sup>ɕ</sup> əbrəf	rations, supplies	m
məs <sup>ɕ</sup> rəb	mis <sup>ɕ</sup> əbrəb	grass-cutting knives	m
mertɕ'af-t	mirebtɕ'əf	caches	m
mərkez	mirebkəz	police stations	m
murkus	mirebkəs	crutches, walking-sticks	m
mərkeb	mirebkəb	boats	m
maxbaz	maxabzəb	bakeries	m
mirtəm	mirebgəm	lids	m
mərd-ət	mirebdəm	great barren plains	m
mənzəl	minebzəl	homesteads	m
kinsid	kinəbsəd	shoulders	m
muns <sup>ɕ</sup> ur	minebs <sup>ɕ</sup> ər	wood or bone hairpins	m
munk'us	minebk'əs	pincers	m
munk'ur	minebk'ər	adzes for digging	m
munk'əf	minebk'əf	tools to take the cover off something; or to remove nails	m
mənħuz	minebħəz	pestles and mortars	m
mənħar-it	minebħar	complaints	m
munɕus	minebɕas	biers	m
məstun	misəbtən	gardens	m
mənder	minebdər	ports	m
mərkw'ɔɕ	mirebk'əɕ	veils	m
məndik'	minebdək'	rifles	m
muk't <sup>ɕ</sup> əb	mik'abt <sup>ɕ</sup> əb	pure white waistcloths	m
muk'ħal	mik'abħəl	feathers for applying kohl	m
maħzəm	maħabzəm	cartridge belts	m
maħzeg	maħabzəg	hobbles	m
maħtel	maħabtəl	choppers	m
maɕzel	maɕabzəl	big flocks of goats or sheep	m
maɕdel	maɕabdəl	big loads	m

Table A-6 Continued

Sing.	Pl.	Gloss	Class
mæððef	mæðabðef	big fishing nets	m
mignəb	migəbnəb	mattresses made of cow leather	m
migʕal	migəbʕal	leather bags, traveling cases	m
mufʕəl	mifəbsʕəl	joints	m
məfrəkʰ	mifəbrəkʰ	hairlines (in women)	m
diftər	difəbtər	notebooks (borrowed from Arabic)	m
finʒ <sup>w</sup> on	finəbgən	coffee cups	m
dərʒən	dərəbzən	dozens	m
mədrum	midəbrəm	hocks	m
dəftər	defəbtər	notebooks	m
mignəb	migəbnəb	mattresses made of cow leather	m
kirsiʔ	karabsi	chairs	m
masʕtʰr-ah	masʕabtʰər	rulers	f borrowed from Arabic

Table A-7 Bi-consonantal and tri-consonantal singulars whose plural takes Vb.

Sing.	Pl.	Gloss	Class
lgəm	milabgəm	muzzles	m
χər	χbər	news	m
tʰad8	tʰbed8	Zizyphus spina Christi <sup>42</sup>	f
tʕəl	ətʕəl	drums	m

Table A-8 Vb Plurals with initial vowels

Sing.	Pl.	Gloss	Class
ʔftəħ/ mʔftəħ	əfəbtəħ/ mʔfəbtəħ	keys	f
ʔktəb/ mʔktəb	mʔkəbtəb/ əkəbtəb	offices	m
ʔtʕam	ə tʕabʕam/ mʔ tʕabʕam	restaurants	m
ʔglis/ mʔglis	əgəblis/ mʔgəblis	rooms for guests	m
ʔsgid	əsebgid/ mʔsebgid	mosques	m
ʔdikʰ	inəbdəkʰ	rifles	m
ʔzil	mʔnəbzəl	houses	f

### Plurals with Suffixal Template –VC

<sup>42</sup> A type of spiny shrubs and small trees in the buckthorn family

Table A-9 Plurals taking a suffixal template

Sing.	Pl.	Gloss	Class
kətb	kɪtbɔb	books	m
dik	dkək	roosters	m
kot	ktɔt	towers	m
ħut	ħtɔt	fish	m
nuf	nfɔf	selves	m
fsəs-t	fɔs	axes	f
χat <sup>ɕ</sup>	χt <sup>ɕ</sup> ɔt <sup>ɕ</sup>	letters	m
χel-ət	χelɛl	lavatories	f
χaf	χfɔf	feet, soles	m
χad	χdɔd	cheeks	m
ref	ɛrfɔf	shelves, racks, bulks	m
mus	ɛmsɔs	razors	m
kɛf	ɛkfɔf	palms of the hand; claws	m
ħag	ɔħgɔg	pilgrims	m
ham	hmum	concerns	m
ħel-ət	ħelɛl	dry leaves	f
ħak'	ħk'ɔk'	rights	m
Ɂa	ɛɁɔɁ	brothers	m
nk'ɔt <sup>ɕ</sup>	nək't <sup>ɕ</sup> ɔt <sup>ɕ</sup>	dots	f
hab-ot/ hib-ot	hbeb/ heb	songs	f

Table A-10 Ablaut or vowel opposition

Sing.	Pl.	Gloss	Class
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ʔɔtim	ʔɪtɔm	orphans (m.)	m
s <sup>ʕ</sup> afɾɪr	s <sup>ʕ</sup> əfrɔr	flowers	f
χadər	χədɔr	isolated homes	m
s <sup>ʕ</sup> elim	s <sup>ʕ</sup> elam	nuts	m
χat <sup>ʕ</sup> ɪk'	χat <sup>ʕ</sup> ok'	dresses	f
fagri	fagru	Bedouins	m
ʔagɪm	ʔegum	cheeks	f
motən	motɔn	flesh of backs	m
χəsmim	χəsmum	small pieces of wood	m
χided	χɔdɔd	narrow passages leading to the base of a mountain	m
bɜut	bɜam	date stones	f
mχided	məχdɔd	partings	m
maxfɛf	maxfɔf	shortened waistcloths (for men)	m
ləbid	albɔd	sandals	m
naxrɛr	naxrɔr	noses	m
ʔit <sup>ʕ</sup> ab	ʔət <sup>ʕ</sup> ɔb	teats	f
χider	χɔdɔr	animal's house	m
maħfɛf	maħfɔf	a waistcloth used to tie men's heads	m
s <sup>ʕ</sup> ad	s <sup>ʕ</sup> ɔd	fish	m
ʔagɪm	ʔegum	cheeks	m
ʃən-at <sup>ʕ</sup>	ʃenot <sup>ʕ</sup>	bags	f
mətrɛʃ	motɔrʃ	molar teeth	m
k'allan	k'ɛʒun	babies, infants	m
ʃnen	ʃnon	teeth	m
kerɒb	kerɔb	dry wounds	m
kɛrfɛf	kɛrfɔf	faces	m
χas <sup>ʕ</sup> ɪm	χas <sup>ʕ</sup> um	enemies	m
ʕed-ɪt	ʕad	sardines	f
kəʕəb	kəʕɛb	gear	m
sɛlsɛl-t	solos-əh	chains	f
es <sup>ʕ</sup> fər-ɔt	es <sup>ʕ</sup> fɔr	birds	f
gilil-t	gɪlɒl	bullets	f
sinor-t	sinar	cats	f
ʕið <sup>ʕ</sup> il	ʕoð <sup>ʕ</sup> ol	worn-out dress	f
səbri	sabro	jins	f/m
klin-t	kilan	weddings	m
ħgal	ħɪɜ <sup>w</sup> ol	eyebrows	m
matrak'	mɪtrɒk'	combs	m

Table A-11 Ablaut plurals of CVC shape

Sing.	Pl.	Gloss	Class
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θi't	θoj	sheep	f
nid8	nud8	water skins	f
k'ud8	k'ad8	ropes	m
ʁeg	ʁag8	men	m
ʔot/ bot	ʔat/ bat	houses	f
hab-ot/ hib-ot	heb/ hbeb	songs	f
lɛbk'-ət	lek'	bottles, water-jars	f
kob-ət	kub8	cups	f
ñit-it	ñit	rice	f
k'il-ət	k'el	tribes	f
fit <sup>ɕ</sup> -ət	fet <sup>ɕ</sup>	towels	f

### Templatic Shapes

Table A-12 Plurals derived from geminated singulars

Sing.	Pl.	Gloss	Class
məll-ət	miləl	pots	f
k'all-ət	k'eləl	hilts (of swords)	f
təll-ət	teləl	hills	f
ñall-ət	ñalel	town; small villages	f
dəll-ət	dələl	coffee-pots	f
dəkk-ət	dəkek	benches outside a house	f
rəzz-ət	ɛrɛz	heavy wooden bolts of a door	f
ləbb-ət	lbeb	kernels	f
χal-ot	χalel	aunts	f
nib-ot	nbeb	bees	f
hab-ot/ hib-ot	hbeb	songs	f
ðəb-ot	ðəbeb	flies	f

Table A-13 Templatically expanded plurals

Sing.	Pl.	Gloss	Class
χof-it	χalif	windows	f
kob	kolob	dogs	m
gɔd	gɔʒɔd	skins	m
it <sup>ɕ</sup> boχ	mot <sup>ɕ</sup> oχ	kitchens	m
fəɟɔr	fəɟjɔr	young bulls	m
ɪkber	məkɔr	sweethearts	m
kɛr	e:kwar	chiefs	m
ʔitu)t	ʔitɔmtən	orphans (f.)	f
ɬɔf	ɬof	rocks	f
ɟasɟər	ɟeɟsɟər	nights	m

### Truncation

Table A-14 Truncated plurals

Sing.	Pl.	Gloss	Class
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es <sup>ʕ</sup> baʕ	es <sup>ʕ</sup> oʕ	fingers	m
k'uʕdɛn	k'ɔʕɔd	camel-calves	m
muxbut <sup>ʕ</sup>	moʕot <sup>ʕ</sup>	cartridges	m
erbɛħ-t	eroħ	fans	f
mk'albet <sup>ʕ</sup>	k'albet <sup>ʕ</sup>	turnings on a path	f
mɛlb-ɛt	molɔɪ	corners	f
k'ət <sup>ʕ</sup> b-ɛt	k't <sup>ʕ</sup> oɪ	carved wooden dolls	f
maʕmɛd-t	mʕod	pillars	f
mɪsmar	masor	nails	m
mot-ɛt	t-ɛt	livestock	f
mɪt <sup>ʕ</sup> ɔt <sup>ʕ</sup>	moʕot <sup>ʕ</sup>	sings marked on the ground	m
ʔarək'-t	ərek'	papers	f
t <sup>ʕ</sup> ənk'ot <sup>ʕ</sup> -ɛt	t <sup>ʕ</sup> ənk'ot <sup>ʕ</sup>	characters	f

### Templatic Plurals

Table A-15 Plurals taking the shape CVCVC

Sing.	Pl.	Gloss	Class
bʕal-ɛt	bəʕɛl	female possessors	f
salʕ	seʔəʕ	cheeks	m
əshib	sahab	waves	m
gɪlɪl-t	gɪlɪl	rifle bolts	m
e:drəs-t	darɪs	schools	f
ħgar-t	ħegar	rocks	m
ʃɛk'f	ʃek'ɔf	roofs	m
k'esm-ɛt	k'esɛm	presents	f
sim-ɛt	sɪjam	mats	f
gəder-et	gədor	grounds	f
k'arb-at	k'ɪrab	special pots made of cow's skin used for milking	f
naɣl-ɛt	naɣal	palm trees	f

Table A-16 Plurals taking the shapes CVCC and CCVC

Sing.	Pl.	Gloss	Class
dɪmʕ-ut	dmaʕ	tears	f
səkən	skun	communities	m
ɣabz-ɛt	ɣɔbz	bread	f
kofoɾ-ɛt	kfar	non-believers	f
kəlθ-ot	kəlθ	stories	f
ɣatf-et	ɣtɔf/ ɣtɔftə	holes bored in the ear	f
tʕɪʔ-ot	tʕɪl	honeycombs	f

### Miscellaneous Shapes

Table A-17 Varying shapes of plurals

Sing.	Pl.	Gloss	Class
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səbrin/ səbr-at	səbro	ghosts	m/f
reʃ	ereʃ	heads	m
ħinʔatʃ	ħinʔab	beads	f
ɔɾχ	erɔχ	months	m
ʔaxar	a:ʔaxar	old men	m
lħ-et	lħoɪ	beards	f
bəʒ-ot	bəʒam	date stones	f
eʕlk'-ut/	o:ʕolk'/	spoons	f
maʕlk'-ot	moʕolk'		

### Suppletive/Lexical Plurals

Table A-18 Lexicalized plurals

Sing.	Pl.	Gloss	Class
təθ	ʔiʔnɛθ	women	f
a:k't	mχabt'ər	times	f
ejat	gol	camels	m
gɔdəm	ʔɪk'ɔf	pieces	m
ɪmbera/ m b̄era	ərʔi/ ərʔot	boys	m
bri	ʔiʔni	sons	m
brʔti	ʔontɪ	daughters	f
ʔo <sup>w</sup> z	ʔeru)	goats	m
bɪsr-et	tu)r	dates	f
ʃɪnit	k'onum	flies	f
χoj-et	χam	tents	f
ʕans	ʃeʔɪf	elbows	m
ʔaʕa	ʕak'aha	brothers	m
jum	a:m	days	m
ʔɪjaθ	ɪnθɪnɪti	women	f
berdam	jo	people	f/m
te	etbaʔ	kinds of meat	m
k'allan	k'eʒun	babies, infants	m, f
ʕibgot	ʕagnɪti	girls	f
ʃɪnit	k'onum	fleas	f

## LIST OF REFERENCES

- Abd-Rabbo, Mohammed. 1990. 'Sound Plural and Broken Plural Assignment in Classical Arabic', in M. Eid, and J. McCarthy (eds.), *Perspectives on Arabic Linguistics: Papers from the First Annual Symposium on Arabic Linguistics*, Amsterdam: Benjamins, pp.55-93.
- Abu-Mansour, Anas. 1995. 'The Interface between Morphology and Phonology: The Case of the Broken Plurals in Arabic', *Linguistic Association of Canada and the United States Forum* **22**, 320-339.
- Alderete, John. 1999. *Morphologically Governed Accent in Optimality Theory*, Ph.D. dissertation, University of Massachusetts.
- Alderete, John. 2001. 'Dominance Effects as Trans-Derivational Antifaithfulness', *Phonology* **18**, 201-253.
- Alderete, John, Jill Beckman, Laura Benua, Amalia Gnanadesikan, John McCarthy, and Suzanne Urbanczyk. 1999. 'Reduplication with Fixed Segmentism', *Linguistic Inquiry* **30**, 327-364.
- Al Mashani, Mohammed. 1999. *The Lexical relationship between Classical Arabic and Shehri: A comparative analytical study*, Ph. D. dissertation, University of Manchester.
- Al Mashani, Mohammed . 2003. *Lisan Dhofar al- hemyari al- m'asir: Dirasah mu'jamiyya muqaranah*, Center for Omani Studies, Sultan Qaboos University.
- Al Shehri, Salem. 2007. *Al-lugha al-shehriya wa 'laqatuha bi al-lugha al-'arabiya: Dirasah muqaranah*, Master's thesis, University of Yarmouk.
- Al Hafeedh, Ali Mohsin. 1989. *Min lahja:t Mahrah wa a:dabiha*, Mata:bi' al-Nahdha.
- Al Tabuki, Salem. 1982. 'Tribal Structures in South Oman', *Arabian Studies* **6**, 51-56.
- Arabneh, Jafar. 1978. *The Morphophonemics of Pluralization in Biblical Hebrew and Classical Arabic*, PhD dissertation, University of Utah.
- Archangeli, Diana and Douglas Pulleyblank. 1994. *Grounded Phonology*. Cambridge, Mass: MIT Press.
- Baković, Eric. 2005. 'Anti-gemination, Assimilation and the Determination of Identity', *Phonology* **22**, 279-315.
- Bat-El, Outi. 1994a. 'Stem Modification and Cluster Transfer in Modern Hebrew', *Natural Language and Linguistic Theory* **12**, 571-596.

- Beckman, Jill. 1998. *Positional Faithfulness*, Ph.D. dissertation: University of Massachusetts.
- Belova, Anna. 2009. 'South Semitic Languages', in K. Versteegh et al (eds.), *Encyclopedia of Arabic Language and Linguistics, volume IV*, Leiden: Brill, pp. 301-315.
- Benhallam, Abderrafi. 1980. *Syllable Structure and Rule Type in Arabic*, Ph.D. dissertation, University of Florida.
- Benua, Laura. 1995. 'Identity Effects in Morphological Truncation', in J. Beckman, L. Walsh Dickey, and S. Urbanczyk (eds.), *University of Massachusetts Occasional Papers in Linguistics 18*, GLSA, Amherst, MA, pp. 77-136.
- Benua, Laura. 1997. *Transderivational Identity: Phonological Relations between Words*, Ph.D. dissertation, University of Massachusetts.
- Bittner, Maximilian. 1909. *Studien zur Laut-und Formenlehre der Mehri-Sprache in Südarabien I. Zum Nomen im engeren Sinn*. Alfred Hölder: Wien.
- Bravmann, Meir. 1953. 'A Case of Quantitative Ablaut in Semitic', *Orientalia* **22**, 1-24.
- Buckley, Eugene. 1990. 'Edge-in Associations and OCP 'Violations' in Tigrinya', *Proceedings of the West Coast Conference on Formal Linguistics* **9**, 75-90.
- Burzio, Luigi. 1996. 'Surface Constraints versus Underlying Representation', in J. Durand and B. Laks (eds.), *Current Trends in Phonology: Models and Methods*, CNRS, Paris X and University of Salford, University of Salford Publications, pp. 97-122.
- Burzio, Luigi. 1998. 'Multiple Correspondence', *Lingua* **104**, 79-109.
- Clements, George. 1986. 'Compensatory Lengthening and Consonant Gemination in LuGanda', in L. Wetzels, and E. Sezer (eds.), *Studies in Compensatory Lengthening: Publications in Language Sciences 23*, Dordrecht: Foris, pp. 37-76.
- Crowhurst, Megan. 2004. 'Mora Alignment', *Natural Language and Linguistic Theory* **22**, 127-177.
- Dell, Francois and Mohamed Elmedlaoui. 1992. 'Quantitative Transfer in the Non-concatnative Morphology of Imdlawn Tashlhiyt Berber', *Journal of Afroasiatic Languages* **3**, 89-125.
- Faber, Alice. 1997. 'Genetic Sub-Grouping of the Semitic Languages', in R. Hetzron (ed.), *The Semitic Languages*, London, Rutledge, pp. 3-15.

- Frisch, Stefan and Bushra Zawaydeh. 2001. 'The Psychological Reality of OCP-Place in Arabic', *Language* **77**, 91-106.
- Frajzyngier, Zygmunt. 1977. 'The Plural in Chadic', in P. Newman and R. M. Newman (eds.), *Papers in Chadic Linguistics*, Leiden, Afrika-Studiecentrum, pp. 37-56.
- Frolova, Tatiana. 2005. 'Glottalized Sibilant š in Modern South Arabian Languages and its Etymological Perspectives', in L. Kogan (ed.), *Babel und Bibel 2: Memoriae Igor M. Diakonoff*, Winona Lake, Ind, pp. 429-455.
- Gafos, Adamantios. 1995. 'On the Proper Characterization of 'Nonconcatenative' Languages', ms., Johns Hopkins University.
- Gafos, Adamantios. 2003. 'Greenberg's Asymmetry in Arabic: A Consequence of Stems in Paradigm', *Language* **79**, 317-355.
- Glover, Bonnie. 1988. *The Morpho-phonology of Muscat Arabic*, Ph.D. dissertation, University of California.
- Goldenberg, Gideon. 1977. 'The Semitic Languages of Ethiopia and their Classification', *Bulletin of the School of Oriental and African Studies* **40**, 461-507.
- Greenberg, Gideon. 1955b. 'Internal a-Plurals in Afroasiatic', in J. Lukas (ed.), *Afrikanistische Studien Diedrich Westermann zum 80. Geburtstag gewidmet*. Berlin: Akademie Verlag.
- Hammond, Micheal. 1988. 'Templatic Transfer in Arabic Broken Plural', *Natural Language and Linguistics Theory* **6**, 247-70.
- Harris, James. 1980. 'Nonconcatenative Morphology and Spanish Plurals', *Journal of Linguistic Research* **1**, 15-31.
- Hayes, Bruce. 1989. 'Compensatory Lengthening in Moraic Phonology', *Linguistic Inquiry* **20**, 253-306.
- Hayward, Kathrine, Richard Hayward and Salem Al Tabuki. 1988. 'Vowels in Jibbali verbs', *Bulletin of the School of Oriental and African Studies* **51**, 240- 250.
- Hetzron, Robert. 1972. 'Ethiopian Semitic: Studies in Classification', *Journal of Semitic Studies*, Monograph 2, Manchester, Manchester University Press, pp. xii -145.
- Hetzron, Robert. 1997. *The Semitic Languages*. London: Rutledge.
- Hofstede, Anje. 1998. *Syntax of Jibbali*, Ph. D. dissertation, University of Manchester.
- Horwood, Graham. 2001. 'Anti-faithfulness and Subtractive Morphology', Rutgers Optimality Archive 466-0901.

- Huehnergard, John. 2000. *A Grammar of Akkadian*, Harvard Semitic Museum Studies 45, Eisenbrauns, Winona Lake, Indiana.
- Idsardi, William. 1997. 'Phonological Derivations and Historical Changes in Hebrew Spirantization', in I. Rocca (ed.), *Derivations and constraints in phonology*, Clarendon Press, pp.367-392
- Ito, Junko and Armin Mester. 1999. 'Realignment', in R. Kager, H. van der Hulst and Zonnevald (eds.), *The prosody morphology interface*, Cambridge University Press, pp. 189-217.
- Jahn, Alfred. 1902. *Mehri-sprache in Südarabien. Texte und Wörterbuch*. Wien:Hölder.
- Jayakar, Atmaran. 1889. 'The O'manee Dialect of Arabic', *Journal of Royal Asiatic Society of Great Britain and Ireland*, 649-87 and 811-89.
- Johnstone, Thomas. 1970a. 'A Definite Article in the Modern South Arabian Languages', *Bulletin of the School of Oriental and African Studies* **33**, 295-307.
- Johnstone, Thomas. 1973. 'Diminutive Patterns in the Modern South Arabian Languages', *Journal of Semitic Studies* **18**, 98-107.
- Johnstone, Thomas. 1975. 'Contrasting Articulations in the Modern South Arabian Languages', in James and T. Bynon (eds.), *Hamito-Semitic*, The Hague and Paris, Mouton, pp. 155-159.
- Johnstone, Thomas. 1980a. 'Gemination in the Jibbali Language of Dhofar', *Journal of Arabic Linguistics* **4**, 61-71.
- Johnstone, Thomas. 1980b. 'The Non-occurrence of a t-Prefix in Certain Jibbali Verbal Forms', *Bulletin of the School of Oriental and African Studies* XLIII **3**, 466-470.
- Johnstone, Thomas. 1981. *Jibbāli lexicon*. London: Oxford University Press.
- Johnstone, Thomas. 1983. 'The System of Enumeration in the South Arabian Language', in R. L. Bidwell and G. R. Smith (eds.), *Arabian and Islamic Studies: Articles presented to R. B. Serjeant on the occasion of his retirement from the Sir Thomas Adams's Chair of Arabic at the University of Cambridge*, London and New York, Longman, pp. 225-228.
- Johnstone, Thomas. 1984. 'New Sibilant Phonemes in the Modern South Arabian Languages of Dhofar', in J. Bynon (ed.), *Current Progress in Afro-Asiatic Linguistics: Papers of the Third International Hamito-Semitic Congress*, Amsterdam and Philadelphia, John Benjamins, pp. 389-390.
- Kager, Rene. 1999. *Optimality theory*. Cambridge University Press.

- Kager, Rene and William Zonneveld. 1999. 'Introduction', in R. Kager and H. van der Hulst (eds.), *The Prosody-Morphology Interface*, Cambridge University Press, pp. 1-38.
- Kiparsky, Paul. 2005. 'Blocking and Periphrasis in Inflectional Paradigms', *Yearbook of Morphology* **2004**, 113-135
- Kirisu, Kazutaka. 2001. *The Phonology of Morpheme Realization*, Ph.D. dissertation, University of California at Santa Cruz.
- Kiyota, Masaru. 2003. 'Plural Allomorphs and Stress in Saanich', A paper presented in the 38<sup>th</sup> International Conference on Salish and Neighboring Languages, University of Victoria, British Columbia.
- Kramer, Ruth. 2009. *Definite Markers, Phi-features and Agreement: A Morpho-syntactic Investigation of the Amharic DP*, Ph. D. dissertation, University of California at Santa Cruz.
- Leben, William. 1977a. 'Doubling and Reduplication in Hausa Plurals', in A. Juilland (ed.), *Linguistic Studies Offered to Joseph Greenberg on the Occasion of His Sixtieth Birthday*, Saratoga, California, pp. 419-39.
- Leben, William. 1977b. 'Parsing Hausa Plurals', in P. Newman and R. M. Newman (eds.), *Papers in Chadic Linguistics*, Leiden, Afrika-Studiecentrum, pp. 89-105.
- Leslau, William. 1945. 'The Parts of the Body in the Modern South Arabic', *Language* **21**, 230 – 249.
- Leslau, William. 1946. 'Bibliography of the Modern South Arabic Languages', *Bulletin of the New York Public Library* **50**, 607-33.
- Leslau, William. 1947a. 'Four Modern South Arabian Languages', *Word* **3**, 180-203.
- Leslau, William. 1947b. 'The Position of the Dialect of Curia Muria in Modern South Arabic', *Bulletin of the New York Public Library* **XII**, 5-19.
- Leslau, William. 1970. 'Ethiopic and South Arabian', in T. A. Sebeok (ed.), *Linguistics in South West Asia and North Africa: Current Trends of Linguistics* 6, pp. 467-527.
- Levy, Mary and James Fidelholtz. 1970. 'Arabic Plurals, Rule Features and Lexical Features', *Glossa* **5**, 57-70.
- Levy, Mary. 1971. *The Plural of the Noun in Modern Standard Arabic*, Ph.D. dissertation, University of Michigan at Ann Arbor.



- Lonnet, Antoine. 1985. 'The Modern South Arabian Languages in the P.D.R. of Yemen', *Proceedings of the Seminar for Arabian Studies* **15**, 49-55.
- Lonnet, Antoine. 2009. 'South Arabian, Modern', in K. Versteegh et al (eds.), *Encyclopedia of Arabic Language and Linguistics, volume IV*, Leiden, Brill, pp. 297-300.
- Matthews, Charles. 1960. 'Noun Determination in South Arabian', *University of South Florida Language Quarterly* **VII**, 41-48.
- Matthews, Charles. 1969. 'Modern South Arabian Determination- a Clue Thereto from Shahri', *Journal of the American Oriental Society* **89**, 22-27.
- McCarthy, John. 1979. *Formal Problems in Semitic Phonology and Morphology*. Ph.D. dissertation, MIT, Cambridge, Mass.
- McCarthy, John. 1981. 'A Prosodic Theory of Non-concatenative Morphology', *Linguistic Inquiry* **12**, 373-418.
- McCarthy, John. 1982. 'Prosodic Structure and Expletive Infixation', *Language* **58**, 574-590.
- McCarthy, John. 1985. 'The Phonetics and Phonology of Semitic Pharyngeals', in Keating (ed.), *Papers in Laboratory Phonology 3*, Cambridge, CUP, pp. 191-233.
- McCarthy, John. 1986. 'OCP effects: Gemination and Anti-gemination', *Linguistic Inquiry* **17**, 207-263.
- McCarthy, John. 1998. 'Morpheme Structure Constraints and Paradigm Occultation', *Papers from the Regional Meetings 34*, Chicago Linguistic Society, pp. 125-150.
- McCarthy, John. 1998. 'Sympathy and Phonological Opacity', Rutgers Optimality Archive 252- 03981.
- McCarthy, John. 2000. 'Faithfulness and Prosodic Circumscription', in J. Dekkers, F. van der Leeuw, and J. van de Weijer (eds.), *Optimality Theory: Phonology, Syntax and acquisition*, Amsterdam, HIL, pp. 151-189.
- McCarthy, John and Alan Prince. 1986. 'Prosodic Morphology', ms., University of Massachusetts and Brandies University.
- McCarthy, John and Alan Prince. 1990a. 'Foot and Word in Prosodic Morphology: The Arabic Broken Plural', *Natural Language and Linguistic Theory* **8**, 209-283.
- McCarthy, John and Alan Prince. 1990b. 'Prosodic Morphology and Templatic Morphology', in M. Eid and J. McCarthy (eds.), *Perspectives on Arabic linguistics: Papers from the second symposium*, Amsterdam, Benjamins, pp. 1-54.

- McCarthy, John and Alan Prince. 1993a. *Prosodic Morphology I*, RUCCS TR-3, Technical Reports of the Rutgers Center for Cognitive Science, New Brunswick, NJ.
- McCarthy, John and Alan Prince. 1993b. 'Generalized Alignment', in G.E. Booij and J. van Marle (eds.), *Yearbook of Morphology*, Dordrecht, Kluwer, pp. 79-153.
- McCarthy, John and Alan Prince. 1995a. 'Faithfulness and Reduplicative Identity', in J. Beckman, S. Urbanczyk, and L. Walsh (eds.), *University of Massachusetts Occasional Papers in Linguistics 18*, GLSA, Amherst, MA, pp. 249-384.
- Muller, Jennifer. 2001. *The Phonology and Phonetics of Word-initial Geminates*. Ph.D. dissertation, Ohio State University.
- Morris, Miranda. 2007. 'The Pre-literate, Non Arabic Languages of Oman and Yemen: Their Current Situation and Uncertain Future', *The British- Yemeni Society Journal*, 39-53.
- Nakano, Aki'o. 1986. *Comparative Vocabulary of Southern Arabic: Mahri, Gibbali, and Soqotri*, Tokyo, Institute for the Study of Languages and Cultures of Asia and Africa.
- Newman, Paul. 1990. *Nominal and verbal plurality in Chadic*. Dordrecht: Foris.
- Palmer, Frank Robert. 1955. 'The Broken Plurals of Tigrinya', *Bulletin of School of Oriental and Arabic Studies* **17**, 548-565.
- Pater, Joe. 2000. 'Nonuniformity in English Stress: The Role of Ranked and Lexically Specific Constraints', *Phonology* **17**, 237-274
- Pater, Joe. 2004. 'Exceptions in Optimality Theory: Typology and Learnability', Handout from the Conference on Redefining Elicitation: Novel Data in Phonological Theory, New York University. (Available at <http://people.umass.edu/pater/exceptions.pdf>)
- Porkhomovsky, Victor. 1997. 'Modern South Arabian Languages from a Semitic and Hamito-Semitic Perspective', *Proceedings of the Seminar for Arabian Studies* **27**, 219-223.
- Prince, Alan and Paul Smolensky. 1993. *Optimality Theory*, RUCCS TR-2. Technical Reports of the Rutgers Center for Cognitive Science, New Brunswick, NJ.
- Prince, Alan and Prince Smolensky. 2004. 'Optimality Theory: Constraint Interaction in Generative Grammar', Malden, MA, and Oxford, UK: Blackwell. [Revision of 1993 technical report, Rutgers University Center for Cognitive Science. Available on Rutgers Optimality Archive 537].

- Ratcliffe, Robert. 1990. 'Arabic Broken Plurals: Arguments for a Two-fold Classification of Morphology', in M. Eid and J. McCarthy (eds.), *Perspectives on Arabic Linguistics II: Papers from the second Symposium*, Amsterdam, Benjamins, pp. 94-119.
- Ratcliffe, Robert. 1992. *The Broken Plural Problem in Arabic, Semitic and Afro-asiatic: A Solution Based on the Diachronic Application of Prosodic Analysis*, Ph.D. dissertation, Yale University.
- Ratcliffe, Robert. 1996. 'Drift and Noun Plural Reduplication in Afro-Asiatic', *Bulletin of the School of Oriental and African Studies* **59**, 296-311.
- Ratcliffe, Robert. 1998a. 'Defining Morphological Isoglosses: The Broken Plural and Semitic Sub-classification', *Journal of Near Eastern Studies* **57**, 81-123.
- Ratcliffe, Robert. 1998b. *The Broken Plural problem in Arabic and Comparative Semitic: Allomorphy and Analogy Non-concatenative Morphology*. Amsterdam/ Philadelphia: John Benjamins.
- Ratcliffe, Robert. 2002. 'The Broken Plural System of Moroccan Arabic: Diachronic and Cognitive Perspectives', in D. B. Parkinson and E. Benmamoun (eds.), *Perspectives on Arabic Linguistics XIII-XIV*, Amsterdam, Benjamins, pp. 87-109.
- Ravid, Dorit and Rachel Schiff. 2009. 'Morpho-Phonological Categories of Noun Plurals in Hebrew: a Developmental Study', *Linguistics* **47**, 45-63.
- Rodgers, Jonathan. 1991. 'The Sub-grouping of the South Semitic Languages', in Alan S. Kaye (ed.), *Semitic Studies in Honor of Wolf Leslau on the occasion of his eighty-fifth birthday*, Wiesbaden, Otto Harrosowitz, pp. 1323-1335.
- Rose, Sharon. 1997. *Theoretical Issues in Comparative Ethio-Semitic Phonology and Morphology*, Ph. D. dissertation, McGill University.
- Rosenthal, Samuel. 1999. 'The Prosodic Base of Hausa Plural', in R. Kager and H. van der Hulst (eds.), *The Prosody-Morphology Interface*, Cambridge University Press, pp. 344-366.
- Rubin, Aaron. D. 2008a. 'The Sub-grouping of the Semitic Languages', *Language and Linguistics Compass* **2**, 61-84.
- Samek-Lodovici, Vieri. 1994. 'A Unified Analysis of Crosslinguistic Morphological Gemination', in P. Ackema and M. Schoorlemmer (eds.), *CoSole I Proceedings*, The Hague, Holland Academic Graphics, pp. 265-283.
- Schuh, Russel. 1992. 'The Non-existence of "Internal-a" Plurals in Hausa', *23rd Annual Conference on African Linguistics*, 1-7.

- Shaaban, Kassim Ali.1977. *The Phonology and Morphology of Omani Arabic*, Ph.D. dissertation, University of Texas at Austin.
- Simeone-Senelle, Marie-Claude.1997. 'The Modern South Arabian Languages', in R. Hetzron (ed.), *The Semitic Languages*, London, Rutledge, pp. 378-423.
- Testen, David.1998. 'Modern South Arabian 'Nine'', *Bulletin of the School of Oriental and African Studies* **61**, 314-17.
- Testen, David.1992. 'The Loss of the Person-Marker in Jibbali and Socotri', *Bulletin of the School of Oriental and African Studies* **55**, 445 – 450.
- Thomas, Bertram.1937. 'Four Strange Tongues from Central South Arabia', *Proceedings of the British Academy* **23**, 231-331.
- Ussishkin, Adam.1999. 'The Inadequacy of the Consonantal Root: Modern Hebrew Denominal Verbs and Output-Output Correspondence', *Phonology* **16**, 401-442.
- Urbanczyk, Suzanne. 1996. 'Morphological Templates in Reduplication', in J. Beckman et al. (eds.), *NELS 26*, GLSA, Amherst, MA, pp. 425-440.
- Vergote, Louvain. 1969. 'The Plural of Nouns in Egyptian and Coptic', *Orientalia* **38**, 77-96.
- Watson, Janet. 2002. *The Phonology and Morphology of Arabic*. Oxford University Press.
- Worrell, William H. 1925. 'The Formation of Arabic Broken Plurals', *American Journal of Semitic Languages and Literature* **41**, 179-182.
- Worrell, William H. 1920. 'Noun Classes and Polarity in Hamitic and Their Bearing upon the Origin of the Semites', *Journal of the Palestine Oriental Society* **1**, 15-20.
- Xu, Zheng and Mark Aronoff. 2011. 'A Realization Optimality Theoretic Approach to Blocking and Extended Morphological Expenence', *Journal of Linguistics* **47**,673-707.
- Yip, Moris.1988. 'Template Morphology and the Direction of Association', *Natural Language and Linguistic Theory* **6**, 551-577.
- Yimam, Baye.1996. 'Definiteness in Amharic Discourse', *Journal of African Languages and Linguistics* **17**, 47-83.
- Zaborski, Andrzej and Poland Cracow.1976a. 'The Semitic External Plurals in an Afroasiatic Perspective', *Monographic Journals of the Near East: Afroasiatic Linguistics* **9**, 1-9.

Zaborski, Andrzej. 1986. *The Morphology of the Nominal Plural in the Cushitic Languages*. Vienna: Afro-Pub.

## BIOGRAPHICAL SKETCH

Khalsa Al Aghbari was born in Muscat, the capital of Oman. She did a Bachelor's in Education at Sultan Qaboos University and was appointed as a teacher assistant in the Department of English, College of Arts and Social Sciences. In 2002, she was granted a full scholarship to pursue a Master's in Linguistics. She decided to join the Department of Linguistics at University of Victoria, British Columbia, Canada. She developed immense interest in Theoretical Linguistics there and wrote her thesis on "Broken Plurals in the Muscat Dialect of Omani Arabic", a morpho-phonological analysis to a linguistic phenomenon observed in Omani Arabic and other dialects of Arabic too. After obtaining an MA in Theoretical Linguistics, she went back to Oman and taught English, a phonology class and two translation courses to prospective English teachers and Arts students in a span of approximately four years. Through close interaction with students, she developed teaching and learning skills. During the same period, she became interested in Translation and published translations to three religious books and managed to voice some concerns about translation and its difficulties through writing and publishing a few articles in the Omani newspapers and electronically. In 2007, she was granted a scholarship to do a PhD in linguistics too. She was lucky enough to be accepted at University of Florida where she has spent four years, expanding and sharpening both her linguistics and research skills. After graduation, she will be appointed as an assistant professor in the English department at Sultan Qaboos University where she will be under the happy obligation of teaching English and various linguistics courses to Arts and Education students.