

The Broken Plurals in the Muscat Dialect of Omani Arabic

by

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ABSTRACT

This thesis examines one of the most intriguing and much studied phenomena in Semitic known as the broken plural formation. It has a twofold goal. It documents the diverse shapes of broken plurals in the Muscat dialect of Omani Arabic. Furthermore, it provides a formal analysis to the shapes and vocalism contained in these word forms within Optimality Theory framework (Prince and Smolensky 1993; McCarthy and Prince 1993a & 1993b).

Following proposals by McCarthy (2000), this thesis assumes that the distinction between the singulars and broken plural *shapes* is better represented as ‘**affixed mora** (μ)’ attached at a certain locus in broken plural forms. The analysis of the vocalism characterizing broken plural forms addresses two distinct types of fixed vocalism: phonological and specified. Fixed vocalism is demonstrated to result from an interaction between conflicting alignment and CrispEdge constraints (Itô and Mester 1999) together with *Place markedness constraints.

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CHAPTER ONE

Introduction

1.0 Statement of Intent

In Semitic languages, ‘plural’ meaning is expressed most often by the broken ‘internal’ plural. This phenomenon, where an internal change rather than a fixed affix is imposed on the singular forms, can be seen in the data below which represent broken plurals in the Muscat dialect of Omani Arabic. The stem of the singular forms in (1) particularly the $C_1VC_2^1$ shape at the left edge of these forms as in [daf] in (1.a) is altered into a different shape C_1aC_2a : in the broken plurals.

(1) Broken plurals² in the Muscat dialect of Omani Arabic

<i>Sing.</i>	<i>Pl.</i>	<i>Gloss</i>
a. daftar	dafa:tar	‘notebooks’
b. kursi	kara:si	‘chairs’
c. misgid	masa:gid	‘mosques’
d. tannu:r-ah	tana:ni:r	‘skirts’

The intricacies involved in the broken plural formation of Semitic languages have long intrigued linguists who expressed vigorous interest in proposing different models to explain this phenomenon. In forming broken plurals, the stem of the singulars modifies in a different shape and the vowel changes into a fixed [a] to indicate meaning. This morphological change attracts broad interest and leads to understanding the principles of word-formation. Although broken plural formation is a highly complicated word formation, it constitutes the most common type of plural formation in Semitic languages

¹ C and V stand for consonants and vowels contained in a word respectively.

² The broken plural forms are phonemically transcribed following previous scholars on this phenomenon and Arabic in general (McCarthy and Prince 1990a and McCarthy 2000).

(Levy 1971, McCarthy and Prince 1990a, Abd-Rabbo 1990, Abu-Mansour 1995, among others).

This study is a linguistic attempt to document the shapes of broken plural *nouns* in the Arabic dialect of Oman. More specifically, it explores the diverse shapes observed in the formation of this morphological phenomenon in the spoken language of educated Omanis who specifically relate to Muscat, the capital of Oman.

It is the aim of this thesis to also offer a formal analysis of the shapes and vocalism, (vowel quality) of broken plurals within the Optimality Theory framework (OT) (Prince and Smolensky 1993; McCarthy and Prince 1993a & b). This thesis basically builds on proposals made by McCarthy (2000) to account for the shapes of broken plurals in the Muscat dialect. On the other hand, the analysis of the fixed vocalism exhibited in broken plurals is inspired by proposals and arguments made in Alderete *et al* (1999) and Urbanczyk (1999). This thesis is not limited to investigating the typical, most productive broken plurals' shapes and vocalism but also presents the exceptional patterns which diverge from the general mode of broken plural formalism.

1.1 The patterns

In the Muscat dialect of Omani Arabic, there is immense diversity in the shapes which result from mapping singulars onto broken plurals. The diversity in shapes often stems from the distinct shape of the singular forms from which broken plurals are derived. Discussion of broken plural shapes first outlines the typical and most common broken plural patterns and then moves to describe the peculiarity of the exceptional shapes.

Before describing the shapes of broken plurals, it is worth mentioning that adjectives in the Muscat dialect of Omani Arabic also take broken plurals, for example [ko:f **kbi:r**] ‘big elbow, *sing.*’ is pluralized as [kiʕa:n **kba:r**] ‘big elbows, *pl.*’. Just like the noun preceding it, the adjective [kbi:r] takes the broken plural [kba:r]. However, the focus of this study is limited to broken plurals of *nouns* and leaves the discussion of ‘adjective broken plurals’ for future research.

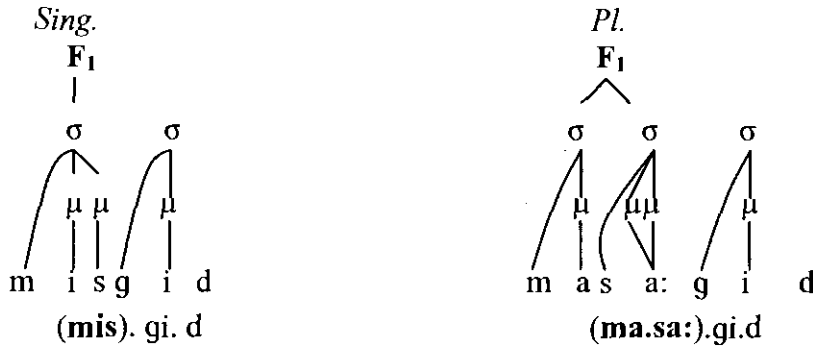
The generalization that governs the formation of the typical broken plurals (McCarthy and Prince 1990a) is that the left foot $C_1V_1C_2$ ([daf] as in form 1.b below) or CVV ([ʕa:] as in form 6.a below) of the singular forms is extracted and mapped onto a typical iamb³ C_1VC_2VV ([dafa:], [ʕawa:] respectively. In forms (5), the C_1VC_2V (e.g. [maki] in form 5.a below) which belongs to the first iamb (ma.ki:) of the singular form [(ma.ki:).n-ah] is extracted and expanded into a typical iamb [ma.ka:] when forming broken plurals. In a nutshell, the formation of broken plurals targets the first two morae of the singulars and maps them onto an iamb with three morae. The iamb constructed involves a sequence of two syllables; heavy H preceded by a light syllable L and resides at the left edge of the broken plural. This iamb is, then, concatenated to the rest of the singular form, maintaining the weight of the final syllable (McCarthy and Prince 1990a; Glover 1988: 159⁴). McCarthy and Prince (1990a) conclude that, as a basic requirement for the formation of broken plurals in classical Arabic, a typical iamb L H has to be

³ Iamb is a type of foot structure which is a right-headed foot. It can be either disyllabic or monosyllabic. If disyllabic, then it has a light-heavy syllable or light-light syllable with the second syllable more prominent. If monosyllabic, then it is always heavy.

⁴ Glover’s research reports that one of the characteristics of plurals in Muscat Arabic is that the final syllable maintains the same length of the final syllable in the singular forms.

realized in broken plural shapes. I provide the following prosodic representation to illustrate the mapping of singulars onto broken plurals. This representation shows that the first *trochaic* foot [mis] of the singular form [mis.gi.d] ‘mosque’ is expanded into an *iamb* [ma.sa:] in the broken plural.

(2) Prosodic representation of misgid → masa:gid ‘mosques’



Broken plurals listed below are considered to be the typical shapes. There are many details to be explored in a full account regarding the extra morphology taking place in some forms in addition to the general mechanism applied to formalize broken plurals.

(3) The typical shapes of the broken plurals

<i>Sing.</i>	<i>Pl.</i>	<i>Gloss</i>
1. (CVC).CV.C Singular forms	(CV.CV:).CV.C	
a. (mis).gi.d	(ma.sa:).gi.d	‘mosques’
b. (daf).ta.r	(da.fa:).ta.r	‘notebooks’
2. (CVC).CV.C- ah Singular forms	(CV.CV:).CV.C	
a. (mas).ṭa.r- ah	(ma.sa:).ṭa.r	‘rulers’
b. (mal).ṣa.q- ah	(ma.la:).ṣa.q	‘spoons’
3. (CVC).(CV:).C Singular forms	(CV.CV:). (CV:).C	
a. (qan).(di:).l	(qa.na:).(di:).l	‘lanterns’
b. (mis).(ma:).r	(ma.sa:).(mi:).r	‘nails’
c. (kar).(fu:).n	(ka.ra:).(fi:).n	‘knuckles’

The singular forms are shaped into CVC.CV(V).C. The suffix-**ah** attached to the singular forms in (2) and other singular forms below indicates that these nouns belong to

the feminine gender. It is not considered as part of the basic consonants which are assumed to indicate the meaning of the stem of the singular forms (McCarthy and Prince 1990a; Abd-Rabbo 1990, among many traditional Arab grammarians). The first foot of the singulars C_1VC_2 as in form (1.b) [daf]tar is changed into [dafa:]tar to indicate plurality. The final syllable of both the singulars and plurals is preserved and surfaces in broken plurals without a change. This is mostly manifested in forms (3) where the length of the final syllable in the singular forms is carried over to broken plurals with no shortening.

Broken plurals in (4) below contain only three consonants coming from the base singular with the shape CVC.CV. Again, the shape of the first foot [C_1VC_2] is expanded into a different shape [C_1VC_2V]; [mak] becomes [maka:] (form 4.a). The final syllable CV in these broken plurals corresponds to the final syllable in the singular form where both the length and quality of the vowel are kept unaltered.

4. (CVC).CV Singular forms	(CV.CV:).CV	
a. (mak).si	(ma.ka:).si	‘dresses’
b. (kur).si	(ka.ra:).si	‘chairs’

The singular forms in (5) and (6) have fewer than four base consonants and their broken plurals expand by inserting a default glide to conform to the mapped shape. For example, in forms (6), the first foot of the singular [ša:]ðar contains only one consonant and a long vowel. [ša:] requires another consonant for shaping this foot into (C_1VC_2VV); [šawa:]ðar results. The singulars in (5) have a long high vowel in their second syllable [Ci:] like in [maki:n-ah]. To form broken plurals, C_1VC_2V [maki] in the first iamb of the singular form (5.b) maps onto C_1VC_2V : [maka:]. The residue of the singular [in] which is

left after the mapping happens requires a glide to form the onset of the third syllable in the broken plural [maka:jin].

5. (CV.CV:).C- ah Singular forms	(CV.CV:).jV.C	
a. (ma.ki:).n- ah	(ma.ka:).ji.n	‘machines’
b. (ħa.di:).q- ah	(ħa.da:).ja.q	‘parks’
6. (CVV).CV(V).C Singular forms	(CV.wV:).CV.C	
a. (ša:).ða.r	(ša.wa:).ða.r	‘bed blankets’
b. (ša:).ra.ʕ	(ša.wa:).ra.ʕ	‘roads’
c. (ta:).(bu:).r	(ta.wa:).(bi:).r	‘line-ups’
d. (ta:).(bu:).q	(ta.wa:).(bi:).q	‘cement blocks’

Forms (7) below have medial geminates [sakki:n] with the first half of the geminates closing the first foot of the singular and the second half filling the onset position of the second syllable (sak)₁(ki:)₂.n. The geminates being adjacent to each other in the singular split into two feet in broken plurals [(saka:)₁(ki:)₂n] as a result of the expansion of the left foot of the singulars (sak) into a different shape (saka:), maintaining the length of the final syllable of the singular forms. McCarthy (2000: 178) notes that the original geminates in the singulars become ‘long-distance’ in broken plurals. The adjacent geminate of the singulars is separated by a vowel in the broken plurals.

7. (CVC₂).C₂V:C Singular forms	(CV.C₂V:).(C₂V:).C	
a. (sak).(ki:).n	(sa.ka:).(ki:).n	‘knives’
b. (θal).(la:).g- ah	(θa.la:).(li:).g	‘refrigerators’

There are singular forms which have four consonants in their underlying forms but map onto a broken plural shape with only three consonants.

8.(CVC)CVj-ah Singular forms	(CV.CV:).CV	
a. (ʃuf).ri.j- ah	(ša.fa:).ri	‘cook pots’
b. (kur)fa.j- ah	(ka.ra:).fi	‘beds’

The final consonant in the singular forms in (8) is consistently the glide /j/ preceded by an open syllable with a short vowel [i] or [a]. The trochaic foot of the singular form like in (8.b) [kur] expands into [kara:] in the broken plural. The length of the final syllable is the same in both the singular and plural forms. Glover (1988: 63) discusses an active phonological process in Muscat Arabic which coalesces a tautosyllabic sequence of a short vowel and glide into a long vowel, mostly /e:/. In these broken plurals, there is a tendency of merging the glide /j/ and short vowels of the final syllable of the singular forms into the high front vowel /i/.

Some singular forms in the Muscat dialect of Omani Arabic have free variations of shaping into different broken plurals (Shaaban 1977). The singular forms whose shape is exactly similar to those in forms (1), (2) and (3) above map onto a different shape of broken plurals (CCV:).CV(V).C. They thus differ from the canonical broken plurals (CV.CV:).(CV(V)).C in that they collapse the first two syllables of the first foot at the left-edge into one heavy foot by deleting the first vowel. Shaaban (1977) formalizes the following rule to capture the deletion of the vowel between C₁C₂ in broken plurals.

(9) V₁ [short] → Ø / # C₁V₁.C₂VV resulting in a cluster and heavy syllable CCVV.

Glover (1988) observes a general rule of short vowel deletion from the first syllable in Muscat Arabic which results in a consonant cluster at the left-edge of words. She states that the left edge of words is the only environment where a cluster of consonants is observed in Muscat Arabic. If short vowels are located in the middle or end of words, then they are likely to be maintained. Thus, syllables in Omani Arabic don't have clusters at their margins as in most environments consonants are followed by vowels.

10. (CVC).CV(V).C Singular forms (C.CV:). CV(V). C

a. (maq).fa.t	m.(qa:).fa.t	'matches'
b. (maq).ša.f	m.(qa:).šu.f	'small vendors'
c. (maš).xa.l	m.(ša:).xi.l	'sieves'
d. (muṣ). (ba:).r	m.(ya:). (bi:).r	'curing spells'
e. (muṣ). (la:).q	m.(ʕa:). (li:).q	'hooks'
f. (muṣ). (ta:).ḥ	m.(fa:). (ti:).ḥ	'keys'

The first foot of the singular in (10.b) [maq] maps onto [mqa:] and not the usual expected pattern [maqa:]. The final syllable in these forms maintains its length when the mapping to broken plural takes place just like the typical broken plurals. Although broken plurals patterning like this all begin with a sonorant /m/, this observation is later countered by broken plurals clustering various types of consonants at their left edge.

There is a wide range of broken plurals with highly different shapes from the typical broken plurals described above. They are distinguished by the distinct shapes of their singular forms which are characterized by a long vowel in the only syllable they have and fewer consonants than in the typical broken plurals.

11. C.(CV:).C Singular forms	(CVC).(CV:).C	
a. n(ʕa:).l	(nuṣ). (la:).n	'sandals'
b. t(r a:).b	(tur). (ba:).n	'sands'
c. g(da:).r	(gid). (ra:).n	'walls'
12. CVV.C Singular forms	CVC.CV:.C	
a. ko:b	kiba:n	'cups'
b. na:r	nira:n	'fires'
c. ko:ʕ	kiʕa:n	'elbows'

The singular forms in (11) have only one heavy syllable and three consonants. They are shaped into C.CVV.C. This thesis proposes that when these singulars are pluralized, the consonant clusters CC word-initially are broken up by an epenthetic vowel. The inserted vowel can either be [i] or [u] depending on the place features of the cluster

consonants in the singular forms; if one of the two consonants is labial, then the epenthetic vowel is [u]. When one of these consonants is coronal, [i] surfaces as the epenthetic vowel. This is a second piece of evidence which reflects the fact that syllable structure in Omani Arabic is simplex and clusters at the margins of syllables are disfavored and broken up by epenthetic vowels. Because the broken plural shape requires four consonants to fill the shape CVC.CVV.C, I propose that an epenthetic /n/ is inserted to fill the final consonant position. Despite the fact that an extra consonant is added in the broken plurals' shape, the inserted consonant always fills the final C position, allowing other C positions in the broken plural shape to be filled contiguously by the consonants from the singular forms. The inserted /n/ can be understood as a remnant from the 'dual' in the classical Arabic's dual marker [un, *genitive*] or [an, *accusative*] (Andrew Rippin, personal communication; Jayakar, 1889: 659). Glover (1988) lists the insertion of /n/ in front of pronominal clitics in the participles of Omani Arabic like in [ka:tb-in-ha] 'written it' as one of the unique characteristics of Omani Arabic. Shaaban (1977) considers this /n/ as a remnant of nunation⁵ from classical Arabic.

In forms (12), the singular forms only have two consonants and a long vowel in between them, shaping into CVV.C. When these shapes form broken plurals, they map onto the shape CV.CVV.n. The first vowel position is filled by a fixed vowel /i/ while the long vowel is always realized as [a:]. As is the case in forms (11), the final C position is supplied by an epenthetic /n/. These two shapes of broken plurals, specifically the second

⁵ Nunation is the marker of indefiniteness- accomplished by adding /n/ following the last vowel (Guda 1988: 186)

type, are unique to Omani Arabic and there are no similar shapes attested in the literature of classical Arabic broken plurals. To illustrate, [ko:b] ‘cup’ is pluralized as [ʔakwa:b] and not *kiba:n in classical Arabic.

What is inconsistent about the shapes of these broken plurals is that they conflict with the general mechanism applied to form broken plurals. They more specifically contradict McCarthy and Prince’s (1990a) proposal that a C_1VC_2 or C_1VC_2V or C_1V : of the singulars is mapped onto C_1VC_2V : (typical iamb)⁶ as in fact these forms map C_1C_2V : in (11) and CV : in (12) plus an extrametrical⁷ consonant onto $C_1VC_2.C_3V$:.n (two even iambs Hs) in (11) and $Ci.CV$:.n in (12) and epenthesize /n/ as a final consonant.

A wide range of broken plurals exhibits patterns that are notoriously inconsistent with their singular forms. The shape of the singular forms can’t be regarded as a sole determinant for which shape of broken plural the singular is mapped onto. The following singulars map their $C.CVC$ or $CVC.C$ onto $C.CV$:.C with consonant clusters word-initially and a long vowel in the only syllable of these broken plurals.

13. C.CV.C- (ah) Singular forms

- a. m.la.f
- b. m.xa.m- ah
- c. m.šu.ʔ
- d. m.ka.b- ah

C.(CVV).C

- m.(la:).f ‘folders /binders’
- m.(xa:).m ‘brooms’
- m.(šu:).ʔ ‘combs’
- m.(ka:).b ‘bowls’

14. CVC.C- (ah) Singular forms

- a. xur.q
- b. ʔur.q
- c. ʔar.f

CCVV.C

- x.(ru:).q ‘holes’
- ʔ.(ru:).q ‘burns’
- ʔ.(ru:).f ‘letters’

⁶ Footnote (c.f #4)

⁷ Extrametricality as a notion of the metrical theory was first brought up by Liberman and Prince (1977). It “designates a particular prosodic constituent such as a Foot or syllable as invisible for the purpose of rule application” (Hayes 1995).

d. nax.l- ah	n.(xi:).l	‘palm trees’
e. šum.ʔ- ah	š.(mu:).ʔ	‘candles’

Although the singular shapes vary in that forms (13) have consonant clusters word-initially and forms (14) have the clusters word-finally, both these diverse shapes map onto the shape C.CV:.C where the singular forms in (13) maintain the clusters and lengthen the vowel following them and the singular forms in (14) delete the short vowels in between C₁C₂ and collapse the consonants into one heavy syllable.

Singular forms with the shape CV.CV.C also take the same shape of broken plurals in (13) and (14) above. Observe the following shapes of broken plurals.

15.CVCVC Singular forms	C.(CV:).C	
a. šaḥan	s.(ḥu:).n	‘plates’
b. ṭabal	t.(bu:).l	‘drums’
c. gabal	g.(ba:).l	‘mountains’

The vowel contained in the only heavy syllable of the broken plurals (13-15) varies among /a:/, /i:/ and /u:/. The quality of the vowel here is *ad hoc* and can’t be determined from the place features of any of the surrounding consonants. Both (15.b) and (15.c) have a labial /b/ preceding the long vowel but each gets different vocalic qualities, /u:/ and /a:/ respectively.

These forms have also lumped together the first two syllables contained in the first foot at the left edge of the broken plurals into a single heavy syllable. Instead of shaping into CV.CV:.C as expected, they map onto C.CV:.C. This conclusion is drawn through observation of similar broken plurals in classical Arabic. Broken plurals of the Muscat dialect surface with a consonant cluster at the left edge of these forms. For example,

Omanis pluralize [nafs] as [nfuus] and not *[nufuus] as attested in classical Arabic in the forms in (16).

16. CVCC Singular forms CV.CVV.C

a. nafs	nufuus	‘souls’
b. qidh	qidaah	‘arrows’
c. ʔasad	ʔusuud	‘lions’

(McCarthy and Prince 1990: 217)

There are also singulars of the shape Ce:C which map onto C.jV:.C when forming broken plurals in the Muscat dialect of Omani Arabic. Observe the following singular and broken plural nouns.

17. CV:C Singular forms C.(jV:).C

a. ʔe:n	ʔ.(ju:).n	‘eyes’
b. se:h	s.(ju:).h	‘barren lands’
c. se:f	s.(ju:).f	‘swords’

The long mid vowel /e:/ is the only vowel in the singular forms. The singulars have only two base consonants. The broken plural’s shape is C.C₂V:.C with three consonant positions. These broken plurals surface with a glide /j/ filling the second C position and preceding the long vowel /u:/. They show up with a consonant cluster and long vowel.

More striking are broken plurals which shape into C.CV.C, a light syllable with a consonant cluster word-initially. The singular shape, while often CVCC-ah resists mapping its C₁VC₂ at the left-edge onto a C₁VC₂V: as expected and the broken plural thus surfaces with a light syllable.

18. CVCC-ah Singular forms C.CV.C

a. xan.š- ah	x.na.š	‘trolleys’
b. hil.q- ah	h.la.q	‘earrings’
c. ʔad.f-ah	ʔ.da.f	‘scarves’

d. ɣar.š- ah ɣ.ra.š ‘bottles’

McCarthy and Prince (1990a) propose as part of the broken plural shape requirement that they surface with a typical iamb. This follows from the principle of ‘Template Satisfaction Condition’ which requires that forms satisfy the minimal requirement of the target shape. Broken plurals in the Muscat dialect of Omani Arabic seem to surface with any expansion of iambs. They either surface with L H or only H to meet the ‘Template Satisfaction Condition’. The exception to this requirement is shown by the idiosyncratic behavior of broken plurals in (18) which surface with a short syllable instead.

The final interesting shape of broken plurals involves partial reduplication of the last consonant in the singular forms which have the C_1VC_2 shape. These singular forms have only two consonants in their underlying structure. When they form broken plurals, the second consonant spreads to fill the third consonant position in the shape $C.C_2V:C_2$ where C_2 is the same consonant.

19. CVC-(ah) Singular forms	$CC_2V:C_2$	
a. xaṭ	xṭu:ṭ	‘lines’
b. šat	štu:t	‘covers’
c. kum- ah	kmi:m	‘Omani traditional caps’
d. ɣub-ah	ɣbi:b	‘swamps’

The vowel between the first and second consonant of the singular form drops and the first two consonants form a cluster in broken plurals. The vowel in these broken plurals varies between /i:/ and /u:/.

To sum up, broken plurals in the Muscat dialect of Omani Arabic are highly diverse in their shapes. Partially, the diversity is attributed to the distinct shapes of the singulars from which broken plurals are derived. However, quite a large number of broken plurals

don't relate to their singular forms, either because the same singular shape is licensed to map onto the canonical broken plural shape or else broken plurals exhibit idiosyncrasies that can't be explained by attributing their shapes to their singular form.

The typical shapes of broken plurals have [a] filling the vowel positions in the first foot at the left edge and [a], [i] or [u] in the final short syllable. When the final syllable of these broken plurals is long due to the length of the final syllable of their singulars, /i:/ always surfaces in the final syllable of broken plurals. Exceptional broken plurals have a variety of vowels which randomly fill the vowel positions of broken plurals.

1.2 Overview of thesis

This thesis is structured as follows: chapter two deals briefly with the socio-linguistic aspects of Omani Arabic, highlighting the major languages and dialects in Oman. More relevant for the sake of this thesis, it situates the Muscat dialect and describes how data are obtained for this study. Research done on Omani Arabic is also reviewed to cast light on previous studies on this variety of Arabic. Finally, this chapter presents the necessary background information on the segmental and syllabic inventories of the Muscat dialect of Omani Arabic.

Chapter three reviews past scholarship on the broken plural formation. Four morphophonological models and a historical approach are investigated to report their basic analyses and assumptions on the broken plural formation. These are the linear generative approach, the historical and comparative model, melodic transfer, prosodic circumscription and Optimality Theory. The presentation of these models equips the readers with the necessary background on previous analyses so that a just evaluation among them and the model presented here can later be made. Moreover, the chapter

shows how broken plurals in the Muscat dialect relate to broken plurals of classical Arabic.

The fourth chapter presents the basic theoretical assumptions the research hinges on for its crucial arguments and analyses. It offers a description of the main principles of Optimality Theory, a constraint-based theory of Grammar, and introduces the major constraints used in the analysis of the diverse shapes and invariant vocalism of broken plurals. This thesis adopts two families of faithfulness constraints couched in Correspondence Theory (McCarthy and Prince 1995). These are Output-Output Correspondence (Benua 1995; 1997) which demands identity between related independent words and Positional Faithfulness Constraints (Beckman 1998) which target special positions in a word as having unique identity requirements. It also relies for its pivotal assumptions on Generalized Template Theory (GTT) in which there are no templates *per se* (McCarthy & Prince 1994a, 1995, 1999; Urbanczyk 1995, 1996a & b; Ito, Kitagawa, & Mester 1996; Gafos 1996 & 1997a; Spaelti 1997 among others). This theory does not entail reference either to the resultant CV-shape or to the type of foot structure of broken plurals. Despite the fact that an iamb is realized in broken plurals, this thesis assumes that interaction of constraints of Universal Grammar yield the outcome shapes. Therefore, no template is needed.

Chapter five includes a formal analysis of the shapes of broken plurals using the framework of Optimality Theory (Prince and Smolensky 1993; McCarthy and Prince 1993a & b). The analysis adopted in this chapter builds on proposals made by McCarthy (2000). The analysis first presents the basic arguments by elaborating on the technical details of McCarthy's (2000) analysis and analyzes the typical shapes. It then extends the

same analysis to capture forms with default glides, medial geminates and even iambs. Finally, it explores the exceptional shapes of broken plurals.

Chapter six introduces two distinct types of fixed vocalism characterizing the formation of broken plurals in the Muscat dialect of Omani Arabic. It reviews past approaches to vocalism in broken plurals of classical Arabic (McCarthy and Prince 1990a). It also discusses how Optimality Theory has recently offered an adequate analysis to capture fixed segmentism (Alderete *et al* 1999). Finally, it analyzes the phonological fixed vocalism in relation to the basic tenets of Optimality Theory and *Place Markedness constraints.

Chapter seven addresses how this research ties in with previous work done on Optimality Theory and research on Arabic in general. It also demonstrates the basic findings and conclusions made from the study of broken plurals in the Muscat dialect of Omani Arabic.

CHAPTER TWO

Overview of Omani Arabic

This chapter presents background information on Omani Arabic, which is basically a descriptive sketch of both the segmental and syllabic inventories of the dialect of Arabic spoken in Oman. More preliminarily, the discussion here acquaints readers with some of the socio-linguistic aspects of Omani Arabic, highlighting the main languages and dialects existing in Oman up to this point in time and situating the data used in this study. This chapter also reviews key work done on Omani Arabic, enumerating the basic aspects of these studies and their findings.

2.1 Genetic Affiliation

As is widely known, Omani Arabic (OA, henceforth) is a daughter dialect of the mother language ‘Arabic’, a Semitic language which belongs to the Afro-Asiatic family. It specifically relates to the Central South Semitic family (Watson 2002; Rose 1997).

OA is spoken in different areas, including the Sultanate of Oman, Kenya, Tanzania and parts of the United Arab Emirates. There are about two million speakers of Omani Arabic in Oman alone.

One might ponder the existence of Omani Arabic in African areas, but looking at the history of Oman elucidates this puzzlement. During the seventeenth and early eighteenth centuries, Oman largely extended its territories to huge parts of Africa, taking over the coastal city of Zanzibar which had become a second capital of Oman for a period of time. This results in the migration of Omanis attracted to the clove and rice plantations of the Island of Zanzibar in East Africa (Glover 1988). Vestiges of the Omani culture and

language can be traced in Zanzibar to this day. People in Africa still preserve the Omani costume and traditions.

2.2 Socio-linguistic Profile

2.2.1 Dialectal variations and languages in Oman

Oman is a linguistically rich country. There are plenty of languages and dialectal variations of OA spoken across its lands (Holes 1989, Glover 1988, Shaaban 1977). For instance, in the Southern part of Oman, Omanis speak Jabbali, Mehri and Harsusi languages⁸. Rose (1997:3) refers to these languages as ‘South-Arabian’ and points out that they are spoken in Yemen as well; Oman and Yemen share southern borders.

The northern part of Oman is a different story. Due to the closeness of this part to Iran, Omanis there are exposed through trading to Kumzari⁹ (Indo-Iranian, western) which is widely spoken in Musandam and Khasab¹⁰.

Swahili, Lawati and Belushi/ Balushi are minority languages in Oman. There are quite a large number of speakers of these minority languages (about 382,000 according to the 1993 census). The minority groups of these languages are assimilated Omanis of different origins. To illustrate, the Lawati group composes Baharina¹¹ merchants of Persian descent who are Shiite Muslims. The Swahili group migrated from Africa during the time when Oman and Africa had strong ties and merged as one country (Glover 1988). The Belushi group constitutes the largest minority in Oman (Shaaban 1977). They

⁸ An extensive body of research is done to explore these Ethiopian Semitic languages. The most comprehensive of which is Johnstone's dictionary of Harsusi (1977) and Jibbali (1983) containing enormous number of forms used in Omani Arabic.

⁹ Jayakar (1903) publishes a description of the Arabic spoken in Musandam supplemented with notes on Kumzari.

¹⁰ Musandam and Khasab are cities in the northern part of Oman.

¹¹ Prochazka, T. (1981) does an interesting research describing the relation between Shi'i dialects of Bahrain and Bahraini (Sunni) dialects and their relevance to the Arabic spoken in Ristaq, Oman.

were brought to Oman during the reign of Sayyid Saeid bin Sultan¹² and have continued to settle in Oman ever since.

Two major varieties of Arabic are in use in Oman today: the Modern Standard Arabic (MSA)¹³ and the spoken Arabic referred to as Omani Arabic (OA). MSA is the language of mass media, official ceremonies and religious and public speeches (Shaaban 1977). More significantly, it is the medium of instruction in Omani schools, colleges and educational institutions.

OA, on the other hand, is the native spoken language of Omanis. It is diverse in its phonology, morphology, and utilizes different lexical terms (Shaaban 1977). Shaaban makes interesting observations with regard to the Arabic spoken in Oman. He notices that the linguistic interactions with minority groups as well as expatriates have left traces in the speech of Omanis, especially in the vocabulary (Shaaban 1977: 11). He reports some foreign words in the speech of young Omanis of Muscat. Foreign words include [du:bi] ‘washer’-originally a Hindi word and [ko:š] ‘shoes’-originally a Persian word (Shaaban 1977:13)¹⁴. Glover (1988: 17-18, 90-91) also lists some of the technical foreign terms that are in wide use in the spoken Muscat dialect. For example, she reports [ħafi:s] ‘office’ borrowed from English¹⁵.

2.2.2 Situating Muscat dialect

The data in this study only pertain to OA spoken in the Sultanate of Oman with a special emphasis on the dialect spoken in Muscat, the capital of Oman. More specifically,

¹² Sayyid Saeid bin Sultan is a ruler of al-Saeid family, the current royal family in Oman.

¹³ Glover (1988) claims that a better term for this variety of Arabic is ‘Literary Arabic’.

¹⁴ For more examples of foreign words in the speech of Omanis, readers are referred to Shaaban (1977) who provides a comprehensive lists of these words.

¹⁵ Glover (1988: 16, 90-91) lists some of the interesting foreign terms observed in the speech of Muscat people.

the data represent the dialect of Arabic spoken by Omanis who are native to Muscat and do not belong to any of the minority ethnic or religious groups found within Oman. Different Islamic sects exist in Muscat; however, this study focuses on the speech of Ibadhi¹⁶ people who relate to Muscat.

Shaaban (1977) classifies dialects in Oman into two major types: coastal and interior. He considers the Muscat dialect to be coastal due to the strategic location of Muscat, overlooking the Gulf of Oman. The Muscat dialect reflects the speech of educated people. It also demonstrates the impact of modernization and education on the speech of young generations. Muscat is exposed to expatriates from other Arab and Asian countries like India¹⁷ more often than other areas in Oman. The influence of these expatriates on the speech of Muscat people is noticeable since traces of expatriates' speech do not manage to insinuate its way deep into the country.

Aspects of the distinction between the Omani Arabic spoken in Muscat and other varieties of OA encompass differences in phonology and lexical words. As reported by Shaaban (1977) and Glover (1988), the uvular stop /q/ is preserved from classical Arabic in the speech of Muscat people as opposed to the people in the interior who pronounce it as /ɣ/. Moreover, while /g/ and /j/ are alternates in the speech of Muscat people, only /g/ is observed in the interior speech.

2.2.3 Data of study

The data in this study document the shapes of broken plural *nouns* observed in the speech of educated Omanis in the capital of Oman, Muscat. They are generated from the

¹⁶ Ibadhi is one of the Islamic sects. Most Omanis are Ibadhi people.

¹⁷ A very pervasive Hindi word observed in the speech of Muscat Arabic is [bannad] 'close'. This word has been completely assimilated to Omani Arabic that one hardly doubts it is native Omani.

researcher's native knowledge of the language. It is important to note that the researcher was born and brought up in Muscat. Because the researcher has lived in Muscat since birth, the researcher's speech is assumed to be a plausible representation of the speech of contemporary Muscat people.

Anticipating the linguistic change Omani Arabic underwent during and after the time of his study, Shaaban (1977) predicts a variety of OA moving from the interior of Oman more towards Muscat speech, saturated with learned forms. This study discloses how the dialect has changed since Shaaban did his research on the Muscat dialect of Omani Arabic in 1977.

In 1988, Glover already notices that Arabic-speaking Omanis of regions outside the capital are likely to speak a form of Omani Arabic that resembles to a large extent the Muscat dialect especially when these speakers address urbanized people.

2.3 Previous research on Omani Arabic

Despite the paucity of research on the theoretical aspects of Omani Arabic, it has been pinpointed in a number of socio-linguistic studies that Omani Arabic exhibits unique phonological and morphological variations that set it apart from other dialects of Arabic spoken in peninsular Arabia (Webster 1991, Holes 1989; Glover 1988; Broket 1985). In his classification of the dialects of the peninsular Arabia, Johnstone (1967: 1-3) treats Oman as a single dialect area. Given the fact that Oman has varied topography which includes massive deserts, impassable mountain ranges and long coasts (Holes 1989: 447), a considerable degree of dialectal variations can reasonably be expected. These variations demonstrate that OA should be considered a distinct dialect of its own.

Holes (1989) successfully illustrates the diverse nature of Omani Arabic by presenting a number of morphological and phonological variables distributed across Oman. He discusses the social and geographical distinctions of a number of phonological and morphological tendencies characterizing the speech of Omani Arabic. He neatly supplements his classification of the Omani areas and the dominant speech variant with thorough discussions and arguments. He assumes that there are basically four dialectal groups in Oman. The primary division is between Hadhari (modern) dialects and Bedouin dialects. Each of these core divisions is further classified as H1, H2 and B1 and B2, **H** and **B** standing for Hadhri and Bedouin respectively. This classification relates to Shaaban's division of the dialects in Oman since it associates the modern dialects of Oman with the coastal areas and the interior ones with the Bedouin.

Broket's (1985) monograph constitutes a detailed glossary of the technical and agricultural terms used in the Batinah coastal town of Khabura. A meticulous reader of Broket's monograph would notice that Broket's main purpose is to survey and characterize the speech patterns of his informants whom he manages to classify into groups according to place of family origin. It goes without saying that Broket's study reflects the social life of Omanis in Khabura because the coastal, agricultural and 'crafts' terms observed in Khabura are highly reflected in the speech of Khabura people.

Early research on Omani Arabic is mainly attributed to Jayakar (1889)¹⁸ and Reinhardt (1894)¹⁹ who initiated efforts into the exploration of Omani Arabic. Jayakar constructs a concise English/ Omani Arabic dictionary of about 600 words and 320

¹⁸ Jayakar was an officer in the British army who wrote about the language and culture of the Omani people.

¹⁹ Carl Reinhardt came to Oman with an expedition from the Oriental Society of Berlin at the time when Oman is trying to establish bilateral relations with other Arab countries (Shaaban 1977: 21).

proverbs. He notes all the peculiarities of Omani Arabic. Although his work is regarded as valuable and mostly accurate, he dispensed with the agricultural vocabulary and makes no division between inland and coastal dialects (Broket 1985:1). Shaaban (1977) evaluates Jayakar's work as a haphazard description of the phonology and morphology of OA, ignoring the dialectal variations reflected in this variety of Arabic.

Reinhardt (1894), on the other hand, focuses on the inland dialect of Wadi Beni Kharus²⁰ providing a thorough grammar followed by about a hundred pages of transliterated texts and two hundred proverbs. Because this study is more systematic as it describes a single dialect, it proves a good reference for future Omani dialect studies.

Shaaban's (1977) study of the phonology and morphology of Omani Arabic constitutes a hallmark in the systematic study of this variety of Arabic. It extensively elaborates on the morphological and phonological processes that verbs and nouns have undergone due to social and political changes. He introduces the language in historical, social and linguistic terms, outlining the peculiarity of this dialect of Arabic when compared to other dialects in the region.

Shaaban (1985) investigates the phonological and morphological changes that have taken place in the verbs of Omani Arabic in a period of about one hundred years. He basically compares the alternations between the perfective and imperfective forms of the tri-consonantal verbs. He argues that the opening up of Oman, increased contacts with other countries, and the spread of education have conspired to introduce to Omani Arabic the simplification and regularization tendencies observed in the speech of the educated. His study falls into two major parts: the variations in the perfective and imperfective

²⁰ Wadi beni Kharus is part of the Rustaq region in Oman, according to the current regional division of Oman.

forms of the verbs as cited by Reinhardt (1894). The second part deals with the modern Omani Arabic. It also discusses the factors contributing to the regularization process.

Glover (1988) describes the phonology and morphology of the Omani Arabic spoken in Muscat. Based on fieldwork done in the old city of Muscat, her study highlights the basic phonological and morphological characteristics that distinguish this dialect from other varieties of Arabic. For example, she studies the influence of adjacent consonants on short vowels, vowel syncope, stress rules and syllabic alternations, to mention a few. The linguistic frameworks applied in Glover's (1988) work are lexical phonology and the non-linear approach of non-concatenative²¹ theory proposed by McCarthy (1979).

Webster²² (1991) offers a description of the Al-Wahiba²³ Bedouin dialect of Oman, highlighting the linguistic and ethnographic context of South-Arabian Bedouin dialects. His previous familiarity with Al-Murra Bedouin of Saudi Arabia enables him to draw the basic distinctions between the Bedouin of Oman and Saudi Arabia. He recognizes that the dialects of present-day Oman share common features with both eastern Arabia along the Gulf littoral of the United Arab Emirates and Arabs of Hadhramaut, Yemen (Webster 1991: 473). Depending on the classification offered by Holes (1989) of the dialects of Oman, Webster classifies Al-Wahiba Bedouin dialect of Oman as a B2 dialect. He justifies this division on the basis of some dominant phonological features such as the lack of velar fronting or affrication of /q/ exhibited in B1 dialect. He further illustrates

²¹ As proposed by McCarthy (1979), non-concatenative morphology addresses root and pattern languages that express morphological distinctions by imposing a definite shape in which consonants and vowels are interleaved together rather than the typical fixed affix attached to words to signal meanings.

²² Webster participates in a multi-disciplinary study of the Wahiba sands of Oman organized by the Royal Geographical Society, London and the Diwan Royal Court, Muscat between 1985 and 1987.

²³ The Al-Wahibi tribe exists in Oman up to this time and resides in East and North of the main sand desert in Oman. Other tribes co-existent with Al-Wahiba are Al-Amr, Al-Buiesha, Hikman and Hishm (Webster, 1991: 473)

some interesting features which don't exist in B2 dialects, among which is the palatalization of /k/ in front vowel environments in forms such as [rikʲab] 'camels'.

Webster is also able to spot the major features of the social life of Al-Wahiba Bedouin in Oman as illustrated in the scripts he makes with an informant from this tribe.

2.4 Discussion of the sound system

2.4.1 Segmental inventory

The discussion below introduces the consonant and vowel inventories in the Muscat dialect of OA. It also sketches a description of the syllable structure of this variety of Omani Arabic.

2.4.1.1 Consonant inventory

Following mainly the International Phonetic Alphabet (IPA) transcription, the chart below displays the consonant inventory in the Muscat dialect of OA. The total number of consonants is 27 sounds including the glottal stop and emphatic segments. Glides, nasals and liquids comprise two sounds each.

(1) Consonant inventory

	bi-labial	labio-dental	dental	alveolar		palatal	velar		uvular	pharyngeal		glottal
Stops	b			t	d		k	g	q			ʔ
Fricatives		f	θ ð	s z	ʃ ʒ				x ɣ	ʕ	ħ	h
Nasals	m		ṯ	n								
Liquids				l	r							
Glides	w					j						

Segments represented by a dot underneath them /C̣/ are the emphatic sounds (phonetically known as pharyngealized). The consonant /ḍ/ which is present in classical

and other dialects of Arabic is missing from this dialect. Omani Arabic lumps /ð/ and /d/ into one; both are represented by /ð/ (Shaaban 1977; Glover 1988). Hence, Omani Arabic has three coronal emphatic sounds, the dental /ð/, the alveolars /t/ and /s/. According to Shaaban (1977), all the non-emphatic sounds with the exception of /r/ have emphatic allophones governed by the rule of emphatic spread which he allots a whole chapter in his dissertation (1977) to discuss. The emphatic /l/ argued to be present in some dialects of Arabic occurs only in one form: [alˤlaah] ‘God’ (Shaaban 1977; Glover 1988) in OA.

Similar to the dialect of Egyptian Arabic, the voiced velar stop /g/ is more pervasive in Omani Arabic than the affricate /tʃ/ which characterizes most varieties of Arabic like Gulf Arabic, Lebanese, Jordanian and Syrian Arabic. Shaaban (1977) argues that the preference of this consonant is attributed to the speech of an old tribe of Arab called Azed of Yemen which settled in Oman a hundred years ago and to which most Omanis belong. However, the exposure of Omanis to other dialects as well as the extensive interaction with foreigners admit the alveopalatal /tʃ/ to freely co-occur with the velar /g/.

Shaaban (1977) and Glover (1988) note that /x/ and /ɣ/ are uvulars²⁴ in Omani Arabic which correspond with ځ and ڤ occurring in the inventory of classical Arabic and pervasively in other dialects of Arabic. In current Omani Arabic, these back consonants

²⁴ Although Shaaban (1977) and Glover (1988) consider these back consonants as uvulars, their transcription of these sounds is consistent with their transcription as velars in this thesis.

are basically velars with a little tendency towards the uvular in some forms. Little trill is produced while articulating them, but they aren't purely uvulars²⁵.

Although /p/ and /v/ are not phonemes in Arabic dialects, they occur as allophones of /b/ and /f/ which occur before voiceless and voiced obstruents respectively. This observation also accords with Shaaban's discussion of the consonants in Omani Arabic.

(2) Allophonic variations of /f/ and /b/

- a. /wafd/ [wafd] 'delegation'
- b. /jahbt/ [jahbt] 'descend'

(Shaaban 1977: 42)

Moreover, [ŋ] occurs as an allophone of /n/ when followed by /k/ and /g/ as the following examples illustrate.

(3) Allophonic variations of /n/

- a. /nkarax/ [ŋkarax] 'bumped into'
- b. /ngarah/ [ŋgarah] 'injured'

2.4.1.2 Vowel inventory

In addition to the three fundamental vowels assumed to be in the phonemic vowel inventory of Arabic (these are /a/, /u/ and /i/), Omani Arabic has long mid phonemic vowels (Shaaban 1977; Glover 1988). These mid vowels are /e:/ and /o:/. They result from pronouncing words that underlyingly have diphthongs. Shaaban (1977) and Glover (1988) assume the round mid vowel to be /o:/; however, this study proposes that both mid round vowels /o:/ and /ɔ:/ are possible and can occur in free variation (John Esling, personal communication). However, to be consistent with previous research done on

²⁵ This conclusion is primarily made by a phonetician observing how the researcher produces these sounds in her normal speech.

Omani Arabic and particularly the Muscat dialect, /o:/ is used in the transcription of this vowel in the data of this study.

(4) Long mid vowels in Omani Arabic

a. /jawm/	[jo:m]	‘day’
b. /mawt/	[mo:t]	‘death’
c. /ʕajn/	[ʕe:n]	‘eye’
d. /bajt/	[be:t]	‘house’

The phonemic vowel system in Omani Arabic is represented in the following chart.

(5) Phonemic vowels

i/i:	u/u:
e:	o:
a/a:	

Following Shaaban (1977) and Glover (1988), there are thus three short phonemic vowels /a/, /u/ and /i/ and five long ones /a:/, /u:/, /i:/, /e:/ and /o:/. These vowels exhibit allophonic variation as follow. These allophonic variations represent a common pattern of centralization which occurs in closed syllables in Arabic.

1. In closed short syllables, /i/ is lowered to [ɪ] as in /misgid/ → [mis.ɡɪ.d] ‘mosque’.
2. /a/ raises to [ʌ] and [ə] in short, unstressed syllables and basically in the environment of emphatic (pharyngealized) sounds as explored below.
3. /u/ becomes [ʊ] in closed and short syllables as in /kurfaj-ah/ → [kur.faj-ah] ‘beds’.

The following sketch provides a succinct description of the position of the tongue when articulating the fundamental short phonemic vowels in Omani Arabic.

(6) Description of vowels

/a/	low tongue position, open jaw
/u/	raised, back tongue position
/i/	raised, front tongue position

Vowels often tend to retract (lower) especially in languages that have pharyngeal sounds. OA has a lot of pharyngealization which retracts vowels after pharyngeal and emphatic sounds (John Esling, personal communication; Shaaban 1977; Glover 1988). Most of these vowels can retract to schwa or further back to [ə]²⁶ when followed by a pharyngeal or emphatic sound.

(7) Words with vowel retraction

- a. /maṭbax/ [məṭbəx] or [məṭbəx] 'kitchen'
 b. /malʔaq-ah/ [malʔəq-əh] 'spoon'
 c. /ħadi:q-ah/ [ħədi:q-əh] 'park'
 d. /ħilm/ [ħəlm] 'dream'

Phonemic short vowels in OA contrast for length. Observe the forms in (8).

(8) Vowel length contrast

- a. ḡarab 'hit' ḡa:rub 'person who hits'
 b. ḡuṣ 'dirty' ḡu:s 'rewind, verb'
 c. ʔaṣir 'afternoon' ʔaṣi:r 'juice'
 d. mara:sim 'artists' clubs' mara:si:m 'royal decrees'

2.4.2 Syllable structure

Reference to syllable structure is indispensable in explaining the shapes of broken plurals in the Muscat dialect of Omani Arabic. This section sketches a description of the syllable structure, highlighting the basic syllable shapes and making generalization of syllabification. The Muscat dialect of Omani Arabic has three basic syllable types.

(9) Syllable shapes in Muscat Arabic

<i>Syllable shapes</i>	<i>Word-initial</i>		<i>Word-medial</i>		<i>Word-final</i>	
CV	ʔa.zam	'invited'	max.ba.zak	'your bakery'	m.qa:.ba.r	'graves'
CVC	maṭ.ba. x	'kitchen'	ʔa.ḡab.ha	'he tortured her'	baḡ.θ	'research project'
CVV	ma:ki.l	'he ate'	ma.ra:si:m	'royal decrees'	ḡi.ša:. n	'backyards'

²⁶ The symbol beneath the schwa phonetically represents lowering of these vowels.

OA bans onsetless syllables as the three basic syllable shapes all surface with onsets. There is a process of a default glide insertion to resolve onsetless syllables in the broken plural formation.

(10) Default glide insertion

- | | | |
|------------|-----------|-----------|
| a. saʎf-ah | saʎa:lɪf | ‘gossips’ |
| b. ʃa:raʃ | ʃaʎa:raʃ | ‘roads’ |
| c. ʃi:ta:n | ʃaʎa:ti:n | ‘devils’ |

The syllable shape CVC is heavy non-finally but light finally (McCarthy 1979). Thus, the final C is said to be extrametrical and does not have weight in word final position. Thus, the assignment of μ (unit of weight) to the final C is blocked, making the CVC sequence light when occurring word finally; it is syllabified as CV.C.

In the Muscat dialect, what appear to be superheavy syllable shapes such as CVVC and CVCC most often occur word-finally in which the final C is weightless. This exempts the final consonant from participation in weight. Thus, the syllable always has two morae. However, in some rare singular forms, superheavy syllables (syllables with three morae) show up as the first syllable in the singular forms as seen below. This shape, however, shortens in broken plurals to conform to the restricted bimoraic syllable. The long vowel in the first syllable of these forms results from merger of /a/ and /w/ underlyingly to produce the long mid vowel phoneme /o:/, as shown in forms (4) above.

(11) Superheavy syllables of the singular forms

- | <i>Sing.</i> | <i>Pl.</i> | <i>Gloss</i> |
|---------------|------------|--------------|
| a. mo:x.r- ah | mawa:xar | ‘noses’ |
| b. mo:q.ʃ-ah | mawa:qaʃ | ‘grinders’ |

Although consonant clusters occur at the left and right periphery of words in Omani Arabic, the peripheral consonants are considered extrametrical and syllable shapes are assumed to be simplex. Glover (1988: 60) draws a similar conclusion regarding the basic

syllable shapes of Muscat Arabic. She attributes the clusters at the left-edge of words to a phonological rule of short vowel deletion which deletes the short vowel in the first syllable, resulting in a cluster at the left boundary of words. She further illustrates that this rule only applies to short vowels in the first syllables as clusters are never attested at margins of syllables word medially.

(12) Syllabification of clusters word-initially

- a. CCV ktub → [k.tu.b] ‘book-pl.’
 b. CCV: ħru:z → [ħ.ru:.z] ‘curing spell-pl.’

Extrametrical elements are only found at word edges (left and right edges), so this supports the treatment of the initial C in CCV words as extrametrical. Intervocalic single consonants are syllabified with the following vowel while with intervocalic consonant clusters of two, the first belongs to the preceding syllable and the second makes up the onset of the following syllable (Shaaban 1977). Words with a CVCC shape are syllabified as CVC.C, with the final consonant extrametrical.

The absence of CCCV pattern from medial and final positions is attributed to syllabification well-formedness which bans consonant clusters at the syllable margins and restricts the first C in CCV to close the first syllable and the second C to be the onset of the following syllable. Thus, a CVCCVC sequence is syllabified as CVC.CV.C as illustrated below²⁷ and there are no VCCCV sequences as complex syllable margins aren't permitted.

(13) Syllabification of intervocalic clusters

- a. xan.ga.r * xa.nga.r ‘dagger’
 b. mar.ha.m * ma.rha.m ‘lotion’
 c. mar.ga.ʕ * ma.rga.ʕ ‘reference’

²⁷ For more examples of how this shape of words is syllabified, readers are referred to Glover (1988: 59)

Like other dialects of Arabic, the Muscat dialect of Omani Arabic has a broad distribution of geminates in its surface forms. More relevant for the sake of this thesis are broken plurals with geminates. McCarthy (2000) notes that when broken plurals are mapped from singular forms with medial geminates, they preserve the length of the singular consonants and often create long-distance geminates (these are geminates separated by a vowel). This stems from the tendency of maintaining the same quantity of root geminates in surface forms (Gafos 2003). Geminate codas are heavy and bear a mora. The weight of gemination needs to be realized in broken plurals if they are derived from singulars with geminates. McCarthy (2000) claims that although the geminates are preserved from the singular forms, they become ‘long distance linked structure’ p. 178. In the words below, each geminate consonant belongs to a different foot.

(14) Forms with geminates

<i>Sing.</i>	<i>Pl.</i>	<i>Gloss</i>
a. θa:l.la:g- ah	(θa.la:).(li:).g	‘refrigerators’
b. kar.ra:s- ah	(ka.ra:).(ri:).s	‘drawing pads’
c. šub.ba:k	(ša.ba:).(bi:).k	‘windows’
d. duk.ka:n	(da.ka:).(ki:).n	‘shops’

McCarthy (1998) and Gafos (2003) have done elaborate research to prove that geminates can’t occur in the edge of syllables. Thus, geminates at the syllable margins, $o[C_xC_x \text{ or } C_xC_x]_o$ in which geminates (similar consonants) belong to the same syllable and occur at the periphery of this syllable, is hence impossible to surface in Arabic. That is why the parsing of adjacent geminates licenses the first geminate as a coda to the first syllable and the second as an onset to the second syllable.

CHAPTER THREE

Literature review on broken plurals

The complications displayed in the broken plural formation of Semitic languages have captured the interest of linguists who get inspired in proposing different models to account for this interesting word formation. The broken plural formation is definitely a major phenomenon which has received considerable attention in the literature of Semitic. Although it constitutes a highly complicated word formation, it is considered, by and large, to be the most productive type of plural formation in Semitic languages (Levy 1971, McCarthy and Prince 1990a, Abd-Rabbo 1990, Abu-Mansour 1995, among others).

Past work in the broken plural phenomenon includes Levy and Fidelholtz (1970), Levy (1971), Wright (1971), Benhallam (1980), Hammond (1988); McCarthy and Prince (1990a); Abdo-Rabbo (1988), (1990), Ratcliffe (1998); (1988), Kager and Zonneveld (1999), Lombardi and McCarthy (1991), Kager (1993), Abu-Mansour (1995), and more recently McCarthy (2000), among others. The purpose of this chapter is to review these works and highlight their basic premises and findings.

For the sake of this thesis, broken plural formation is reviewed from five basic frameworks. These include the transformational-generative approach, the historical and comparative model, melodic transfer, prosodic circumscription and Optimality Theory. My reason for exploring these frameworks is their wide acceptance as distinguished approaches in addressing a range of phonological and morphological phenomena. Before embarking on the detailed review of these approaches, I show how Omani Arabic broken plurals relate to classical Arabic broken plurals.

3.1 Omani Arabic Vs. classical Arabic broken plurals

Although a large portion of broken plural shapes in the Muscat dialect of Omani Arabic resemble broken plurals in classical Arabic, Glover (1988) recognizes a few irregularities in Muscat plurals. She notices alternations between the glides /j/ and /w/ in the singular → plural mapping. For example, she notices that the second consonant /j/ in singular forms such as [lajsuw] ‘women’s head cloth’ becomes /w/ whereas the final consonant /w/ turns into /j/ after a short vowel /i/ as in the broken plural [lawasi]. This alternation of /j/ and /w/ in the singular → plural mapping is interesting.

In classical Arabic, there are two major types of broken plurals: plurals of paucity and plurals of multiplicity/ multitude. Plurals of paucity denote the number from two to ten while plurals of multitude encompass numbers which are more than ten. In the Muscat dialect of Omani Arabic, such a fine distinction is not made (Jayakar, 1889). Instead singular nouns can either take the ‘sound plural’ expressed by normal suffixation of -aat ‘feminine’ and -uun ‘masculine’ to singular forms, or broken plurals with no reference to the number of items. Abd-Rabbo (1988) notes that many dialects of Arabic don’t distinguish between plurals of paucity and multiplicity. His general observation is that broken plurals are usually formed to express multitude in a wide range of dialects of Arabic.

3.2 Transformational generative framework

Earlier scholarship on broken plurals in Arabic explores this interesting phenomenon within the linear transformational-generative framework. Research on broken plurals within this model dates back to 1970s and includes works by Brame

(1970), Levy and Fidelholtz (1970), Levy (1971), Benhallam (1980), Abd-Rabbo (1990), and finally Abu-Mansour (1995). According to Levy and Fidelholtz (1970), Levy (1971), and Abd-Rabbo (1990), the plural of any particular noun is predicted on the basis of the phonological shape of its singular form, with direct reference to its semantics. These semantic features are encoded in linear rules such as [radical] and [derived] among others (Abd-Rabbo 1990). For example, singular forms which are characterized as being derived from tri-consonantal roots in Arabic are assumed to take a particular plural shape which is different from the broken plural shape of singulars that aren't derived.

Levy (1971) proposes two types of rules to account for the broken plural formation: basic and minor rules. The difference between these rules centres on the applicability of the basic rules to account for a broader range of forms than the minor rules. The structural configurations of these rules are annotated with features such as [-Fem, +Rational] and [+Adjective, colour or defect], restricting the application of these rules to forms having these semantic and morpho-syntactic specifications. The major rules of Levy are ordered linearly.

Abu-Mansour (1995) stipulates, based on the diversity of plural formation in Arabic, that plural assignment is based on "... phonological, morphological and semantic properties of nominals, combined with a certain amount of arbitrary marking" (1995: 326). He chooses a set of morphological rules to represent the generalization that reflects the overall broken plural mechanism in Arabic. His account requires that three morphological rules be applied.

(1) Abu-Mansour's linear rules of broken plural formation

(A) Feminine suffix deletion

$\{-X^{28}\} \rightarrow \emptyset / [\text{plural}]$

(B) Infixation (after either the second or third consonant of the stem)

$\emptyset \rightarrow a: / \# \text{CVC-C...}$
 $[\text{+ plural}]$

(C) Raising

$V \rightarrow [+hi] / \# \text{CVCa:C - C...}\#$
 $[\text{+ plural}]$ (Abu-Mansour 1995:326)

As he extends these three basic rules to account for nominals with biliteral roots and loan words, he incorporates other independently motivated rules in the language such as C? metathesis and vowel deletion rules to complement his rules and to account for further phonological changes in broken plurals.

Ratcliffe (1988) proposes a two-level morphology to account for the Arabic plurals pretty much the same as the two levels²⁹ assumed to derive inflectional and derivational affixes in English. He examines a corpus of about 27 plurals and classifies them into two levels. Broken plurals belong to level one as they involve 'internal' change while 'sound' plurals belong to level two.

Abd-Rabbo (1988) argues that the variations in the vowel combinations observed in the triliteral broken plurals are the result of homophony avoidance. He claims that blocking the productive [a] in some of the broken plurals results from the fact that they would coincide with words with the same shape but with different meaning in Arabic. An

²⁸ Abu-Mansour uses X to stand for the suffix [-at] attached to the singular forms. This suffix is a marker of feminine gender in classical Arabic which gets deleted in the broken plural formation.

²⁹ Level I affixes impose a change to the bases they are attached to. For example, in English, they might cause stress shift or trisyllabic shortening while in Level II affixes are neutral. Level II affixes get attached to the base forms without effecting any change.

example of homophony avoidance is the singular [muʔmin] ‘believer’ whose broken plural, *if it existed*, would be *[maʔaamin] which is identical to the broken plural of [maʔman] ‘place of safety’ (Abd-Rabbo 1990: 72). To avoid homophony with the broken plural of [maʔman], [muʔmin] takes the sound plural [muʔmin-uun]³⁰.

3.3 Historical and Comparative study

Ratcliffe (1998) presents a historical and comparative analysis of the broken plural formation in Arabic and Semitic. He thoroughly examines the nominal morphology of Arabic, comparing it with available root-and-pattern morphological formations prevailing in other Semitic languages. As a diachronic study, Ratcliffe’s study depends on research on other fields such as philology, descriptive and theoretical linguistics, compiling evidence for constructing a proto-language for Semitic languages.

Most relevant for the sake of this thesis is Ratcliffe’s discussions of the Arabic noun plural system in chapter three of his dissertation (1998) where he elaborates on the various patterns obtained through pluralization of nouns in Arabic. Not only does he provide a neat classification of the plural shapes, he also delves into the major problems occurring when attempts are made to derive these plurals from other noun classes. The discrepancies are cited when a specific noun shape maps onto quite a large number of plural shapes that vary considerably from another singular of the same shape mapping onto distinct shapes. He basically deals with the general mechanism of forming broken plurals, pinpointing previous research into this phenomenon.

³⁰ The derivational history of these forms differs and this may contribute to the distinct ways of forming plural forms.

Greenberg (1955) suggests a genetic relationship between the broken ‘internal’ plurals of south Semitic and plurals expressed by internal [a] vowel in the non-Semitic Afroasiatic languages. He establishes three common features of the internal [a] plurals in languages throughout the Afroasiatic group. The first of these is the plural stem, which is generally expressed by a vowel after the second consonant. The second is the continuous appearance of the vowel [a]. The third of these is the existence of dissimilation from [a] in the plural whenever the singulars have this vowel quality.

Ratcliffe (1996) argues that plural forms that exhibit partial reduplication occur as a morpho-phonologically conditioned variant of the prosodically extended stem (or internal-a). He considers this phenomenon of broken plural formation as a sporadic and occasional marker of plurality in a large number of Semitic languages including Cushitic and Chadic groups.

3.4 Melodic transfer (Hammond 1988)

Hammond (1988) advocates “melodic transfer” to account for the broken plural formation. In melodic transfer, segmental materials of the singular forms are copied/transferred to the broken plural shape without change in their positions. Hammond first addresses the major problems relating to broken plurals in Arabic which are the length of the final vowel being identical to the vowel length of the singular, a consonant that is spread in the singular is also spread in the plural, insertion of /w/ which occurs when there is a long vowel in the first syllable of the singular and finally truncation which occurs when the number of consonants are too many to accommodate to the target shape of broken plurals (Hammond 1988: 254). He elaborates on McCarthy’s

(1982) approach which comprises three rules: infixation rule of a VV syllable, vowel melody which spreads the appropriate vowels and the filter rule which ensures that all broken plurals surface with the canonical [CV.CV:].CV(V)C shape. He touches on the problem of joining together two separate mechanisms (truncation and infixation) which McCarthy's rules imply. He also observes a problematic process proposed by McCarthy which basically converts the V slot into C slot in cases where /w/ is inserted.

3.5 Prosodic Circumscription (McCarthy and Prince 1990a)

McCarthy and Prince (1990a) have done an extensive research study to examine broken plural shapes of classical Arabic. They identify the general broken plural formation rule as an extraction of a trochee C_1VC_2 , C_1VV or C_1VC_2V from the singulars and mapping it onto iamb C_1VC_2VV in the broken plurals. This operation is dubbed Prosodic Circumscription. As formalized by McCarthy and Prince, Prosodic Circumscription is based on a factoring function $\Phi(C, E, B)$ which parses out the prosodic constituent C standing at edge E of a base form B (McCarthy and Prince 1990a: 226). This theory restricts the application of a morphological process to a specific prosodic constituent (μ, σ, F , etc...)³¹ in a morphological word and identifies two types of Prosodic Circumscriptional operations: *positive* and *negative*. If the morphological operation targets the parsed portion of a word, notated as $(B: \Phi)$ and known as the kernel, then we have **positive** prosodic circumscription. However, if the morphological operation targets the rest of the word, notated as (B/ Φ) and known as the residue, then we have **negative** prosodic circumscription.

³¹ Prosodic Morphology establishes the need to define templates in terms of the authentic units of prosody which are mora μ , syllable σ , foot F and prosodic word PrWd, hierarchically ordered from the smallest constituent making up a syllable to the prosodic word consisting of all the elements of prosody (McCarthy and Prince 1990a: 209).

McCarthy and Prince (1990a) analyze the broken plural formation using positive Prosodic Circumscription which extracts the trochaic foot from the singular forms and maps it onto an iamb. It retains the weight of the final syllable of the singular which is then concatenated to the rest of the constructed iamb.

The insertion site of the default glide is also addressed. It is assumed to follow from the position of the long vowel in broken plurals. A long vowel in the first syllable of the singular form such as in [xɑ:tam] requires the /w/ to form the onset of the second syllable of the expanded first foot in broken plurals, thus yielding [xawa:tim]. Due to the fact that there is only one consonant in the circumscribed foot, glide insertion serves to provide an onset to the second syllable. When the singular forms have a long vowel in their second syllable like in [saħa:b-at], a default glottal stop /ʔ/ is inserted in the third syllable of broken plurals. The resultant broken plural shape is [saħa:ʔib] (McCarthy and Prince 1990a: 218).

3.6 Optimality Theory (McCarthy 2000)

This thesis builds on proposals made in McCarthy (2000) who shows how a range of Prosodic Circumscription analyses can be recast into non-derivational OT by retaining the prosodic structure of output forms. This section briefly reviews the basic assumptions made by McCarthy (2000) about broken plurals and technical details of his analysis are addressed in the actual analysis in chapter five of this thesis.

Although McCarthy does not provide a full OT analysis, his assumptions based on the moraic faithfulness constraints he proposes pave the way for adopting an OT analysis to account for the diverse shapes of broken plurals in the Muscat dialect of

Omani Arabic. As a start-off point, McCarthy (2000), identifies the major patterns characterizing the broken plural formation such as preserving the weight of the final syllable, the insertion sites of the extra consonants and the tendency to preserve consonantal spreading in geminates.

He argues that high-ranking prosodic faithfulness constraints can obtain preservation of the weight of the final syllable in broken plurals (McCarthy 2000: 174). Moreover, he uses constraints against spreading and delinking of association lines to capture the conservation of consonantal positions in the mapping of the singulars and broken plurals. In his conclusions, McCarthy suggests the possibility of using positional faithfulness constraints to obtain the identity or faithfulness effects of certain privileged positions like ‘stem-final’ syllables (see McCarthy 2000: 180).

This thesis adopts McCarthy’s suggestion to advance this identity by using positional faithfulness constraints (Beckman 1998). It also builds on the assumption that the difference between singulars and broken plurals lies in an extra mora ‘affixed + μ ’ attached at a definite position in the singular forms to yield the final shapes of broken plurals.

CHAPTER FOUR

Theoretical assumptions

This thesis hinges on a number of theoretical assumptions that govern its overall arguments and shape the final analyses. This chapter presents the major theoretical assumptions made to analyze the shapes and vocalism of broken plurals in the Muscat dialect of Omani Arabic.

The foremost theory it adopts is Optimality Theory, the constraint-based approach (Prince and Smolensky 1993; McCarthy and Prince 1993a & b) in which linguistic forms are evaluated by constraints and the optimal form (the one which minimally violates constraints) is the output. In OT, there are two basic sets of competing constraints: Markedness and Faithfulness constraints. In syllable theory, CV is more frequent and less marked than CCV or only V syllable shapes. Markedness constraints, thus, evaluate marked structures in the candidate outputs while faithfulness constraints monitor identity in correspondent forms.

This chapter presents the basic theoretical assumptions the thesis adopts to analyze the shapes and vocalism of broken plurals in the Muscat dialect of Omani Arabic. § 4.1 summarizes the framework of OT. § 4.1.3.1 introduces Correspondence Theory and outlines the premises of two families of constraints: Output-Output Correspondence (Benua 1995, 1997) and Positional Faithfulness Constraints (Beckman 1998). § 4.2 introduces Generalized Template Theory (GTT) and shows how it relates to the analysis of the shapes of broken plurals in the Muscat dialect of Omani Arabic.

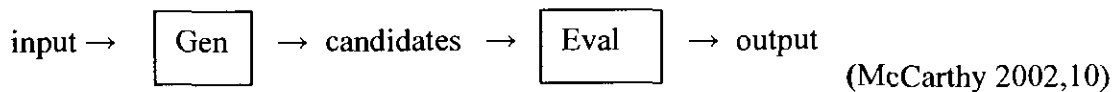
4.1 Optimality Theory Framework

OT is a constraint-based theory which assumes that the actual output surfaces as a result of resolution between a set of conflicting violable constraints through a ranking. Constraints are ranked with respect to one another and the output violates the lowest ranked constraints. This section and the subsequent one explain the basic components of this theory.

Under the tenets of OT, Universal Grammar supplies a set of universal constraints. These constraints are the same in all languages but ranked differently on a language specific basis. They are classified into two broad categories: markedness and faithfulness constraints. While markedness constraints penalize marked structures in the output forms, faithfulness constraints strive to keep each string/form consistent with its correspondent. If the output form exhibits a change from its input, then markedness prevails over faithfulness. This conflict between markedness and faithfulness is resolved through a definite ranking which prioritizes either markedness or faithfulness. Through the function Generator, potential candidates are generated from a particular linguistic input. These potential outputs compete with the actual output (dubbed as optimal) and are doomed because they violate high-ranking constraints by the function Evaluator which checks each candidate against the constraint set. Therefore, the optimal output is the one which is more harmonic and incurs minimal violation. It violates the low ranked constraints and satisfies high-ranking ones.

Below, the general architecture of OT as proposed by McCarthy (2002) is provided:

(1) OT architecture



If markedness constraints (M) outrank faithfulness constraints (F), then any candidate which violates M will receive a fatal violation mark indicated by (!). The optimal candidate is more harmonic and exhibits less serious violations. It obeys M at the expense of violating the low ranked constraints F. Solid lines between the constraints in a tableau of ranking show valid ranking while dotted lines demonstrate that no definite ranking between the constraints can be established. In other words, they are equal in ranking. ♪ is placed in front of the optimal (winning) candidate.

Tableau (1)

<i>Candidates</i>	M	F
♪ a. Candidate A		*
b. Candidate B	*!	

This ranking where **M** prevails over **F** produces an alternation from the input to the output form because the identity of the input is changed. The output violates **F**.

4.1.1 Principles of OT

There are five basic principles that govern OT framework. Universality entails the assumption that Universal Grammar provides a set of universal constraints. Languages of the world have the same set of constraints, but they differ in whether these constraints are active or passive and on whether they are high or low ranked. Violability holds that constraints are violable. The usual scenario is that the competing suboptimal candidates are excluded from further evaluation because they violate high-ranking constraints. Along the same line, the optimal output is not totally obedient. The stipulation stressed here is that the optimal output can violate constraints minimally and still gets selected as an optimal output. If constraint **A** prevails over constraint **B**, then the optimal output can violate **B** as long as it obeys **A**. Ranking ranks constraints with respect to each other; some constraints have more priority over others and thus are highly ranked. It determines

how evaluation of constraints proceeds and what the actual output form is. Inclusiveness entails that any set of candidates are admitted for evaluation since any form is considered a possible output by OT. OT is proposed to solve the cumbersome serial derivations. Parallelism guarantees that all phonological, morphological and prosodic changes encoded in the proposed constraints are applicable simultaneously (Prince and Smolensky 1993; McCarthy and Prince 1993a; Kager 1999).

4.1.2 Markedness Constraints

In Optimality Theory (Prince and Smolensky 1993; McCarthy and Prince 1993a & b), the grammar of any language is reduced to a ranking of a set of universal constraints. The ranking resolves a conflict between two major constraints: markedness and faithfulness. This section is devoted to the discussion of markedness constraints, leaving faithfulness constraints to be explored in the coming section.

Markedness constraints evaluate marked structures in output forms. They are violated when outputs produce marked segments or features. For example, they monitor the syllable structure of output forms. They penalize marked syllable structures such as V (onsetless syllable) and CCV (syllable with complex onset). Among the constraints evaluating syllable structure are:

(3) ONSET

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

(4)* COMPLEX

Clusters are prohibited from the margins of syllables. (Prince and Smolensky 1993)

(5) * $\mu\mu\mu|\sigma$

Syllables are not trimoraic. (McCarthy and Prince 1990a, 1990b)

(6)* σ | C_xC_x

Geminates are banned from the margins of syllables. (McCarthy 1998 and Gafos 2003)

4.1.3 Faithfulness constraints

Faithfulness constraints monitor identity between related strings. These strings shouldn't be thought of as identical because identity is regulated by faithfulness constraints such as DEP and MAX which militate against epenthesis and deletion of segments or features between related strings respectively. IDENT (F) ensures that segments in related strings have the same featural values.

These faithfulness constraints generalize to include larger constituents or units of phonological representation. For instance, units of prosody such as mora are also incorporated. For example DEP- μ bans epenthesis of morae in surface forms. The full picture of the effects of these prosodic faithfulness constraints is illustrated in the actual analysis in chapter five.

4.1.3.1 Correspondence Theory

Correspondence Theory (McCarthy and Prince 1995) posits that strings of words (input-output pairings or output-output pairings) stand in a correspondence relation. The general schema of this theory is shown below.

(7) 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 α (an element of S_1) and β (an element of S_2) are referred to as correspondents of one another when $\alpha R \beta$. (McCarthy and Prince 1995: 262)

Any two strings of words have a correspondence relation. Segments or features of one string relate to segments or features of the other string. The following sections outline the premises of two correspondence families adopted in the analysis of broken plurals. These are output-output correspondence and positional faithfulness.

4.1.3.1.1 Output-output Correspondence (Benua 1997)

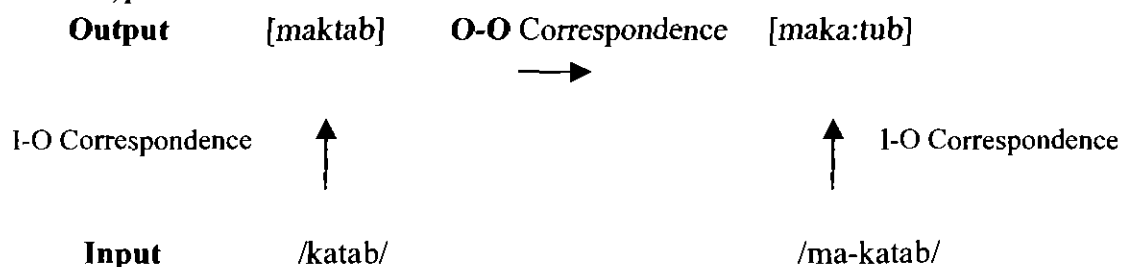
Benua (1997) extends the correspondence relations from Input-Output and Base-Reduplicant (McCarthy and Prince 1995) to correspondence between morphologically related forms in languages.

According to Benua, the identity of words in a paradigm is captured by constraints regulating output-output relations. These constraints interact directly with other constraints including phono-constraints (markedness, in other words) that relate to phonology and whose crucial role is to evaluate marked structures in the output strings.

Quoting Benua, the basic assumption of output-output correspondence is that “...phonology is sensitive to morphology because phonological identity relations hold over paradigmatically-related words...” (Benua 1997: 227)

Morphological derivation (affixation, truncation, etc...) is assumed to be of an output-output correspondence relation between derived output and output forms in Benua’s model. The following diagram represents a simplified version of Benua’s model which is used to illustrate an output-output relation in Omani Arabic.

(8) Output-output (O-O) relations in [maktab] ‘office, *sing.*’ and [maka:tub] ‘offices, *pl.*’



Output forms are linked to Input forms by an I-O correspondence relation and the two words are also related by an output-output correspondence. Benua demonstrates that

any input form, which is fed into a specific grammar of any language, must result in an output that is well formed in that language.

This proposal reflects how broken plurals in the Muscat dialect of Omani Arabic which correspond to singulars (independent words) are regulated by the well formedness constraints in the language. These constraints evaluate output broken plural against accepted structures in the language. The formalism of the broken plural formation applies to any singular forms, but it never takes place in isolation from the well formedness canons of the language as a whole.

Ussishkin (1999) offers cogent arguments for output-output correspondence when analyzing the denominal verbs³² in Hebrew. He shows that denominal verbs are derived from independent forms (output nouns) in Hebrew and there is no need to refer to the consonantal roots³³. His arguments rely on some empirical observations such as the fact that the vowel and second consonant of the output nouns relate directly to their denominal verbs. Moreover, consonant clusters in these nouns are also preserved in their denominal verbs. These crucial observations lead Ussishkin to adopt an output-output correspondence relation between denominal verbs and their output nouns.

McCarthy (2000) proposes that the correspondence relation observed between the singular forms and their broken plurals is of the Output-Output type. McCarthy and Prince (1990a) note some problems of the dependence on the consonantal root as the input for broken plural formation. They illustrate “... [T]he iambic plural systematically reflects aspects of the singular that the consonantal root does not determine”. Empirical evidence lies in the total identity of the weight of the final syllables of both the singulars

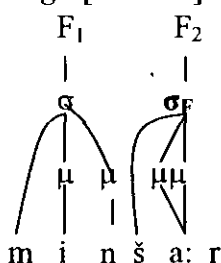
³² Denominal verbs are verbs which are derived from nouns.

³³ The general trend taken by linguists studying Semitic is to refer to the consonantal roots (typically, three consonants) in order to analyze the internal structure of words and how they are derived.

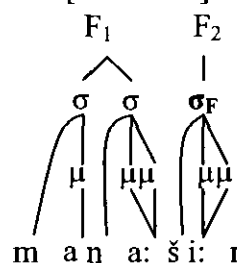
and their broken plurals³⁴. Such identity suggests an Output-Output correspondence relation between these morphological strings. They are both already existing forms in the language. In addition, both the singular forms and broken plurals share the same consonants with the exact order (refer to (9) below). I provide the following representation to show that the weight of the final syllable of the broken plural is only derivable from the output singular (not from the input stem alone). Compare the final syllables of both the singular and broken plural which contains two morae each. This identity supports that the input stem cannot derive the broken plurals. Moreover, prosodic structure such as assignment of weight is only reliably present on the output.

(9) Output-Output relation between the singular and broken plural

Sing. [minša:r]



Pl. [mana:ši:r]



4.1.3.1.2 Positional Faithfulness

In order to capture the identity in weight between the final syllables of both the singulars and broken plurals, reference to Positional Faithfulness constraints is made. Beckman (1998) proposes a set of Positional Faithfulness constraints that capture the fact that certain positions in a word are more privileged in that they maintain phonological distinctions. The fact that these positions keep their identity unaltered suggests that they are more privileged or prominent than other positions. Beckman (1998) outlines a set of privileged positions sketched below:

³⁴ This observation is also made by Glover (1988) who briefly discusses the features of plurals in Muscat Arabic.

(10)**a. Privileged positions**

- Root-initial syllables
- Stressed syllables
- Syllable onsets
- Roots
- Long vowels

b. Non-privileged positions

- Non-initial syllables
- Unstressed syllables
- Syllable codas
- Affixes, clitics, function words
- Short vowels

(Beckman 1998:1)

Beckman (1998:1) also pinpoints the possibility of considering final syllables as a privileged position. She illustrates “Positions of phonetic prominence include stressed syllables, syllable onsets, long vowels and **possibly final syllables**” (emphasis added). McCarthy (2000: 186) also demonstrates that *final-stem* is a *privileged position* and warrants positional faithfulness constraints to capture its special status. Hayes (1995:59) claims “In measuring syllable weight, a word final position is likewise often a special case” when he discusses extrametricality in relation to stress assignment. This leaves us with three pieces of empirical evidence for the special condition of syllable final position and supports adoption of Positional Faithfulness constraints to capture the identity of weight of the final syllables in the singulars and plurals.

(11) Final syllable identity

a. (sak). (ki:)n	(sa.ka:). (ki:). n	‘knives’	H → H	H = Heavy
b. (mux).ba	(ma.xa:). bi	‘pockets’	L → L	L = Light

The weight of the final syllable in singular forms is preserved when they form broken plurals. In forms (11), both the final syllable of the singular and broken plural is equal.

A crucial point to mention: weight concerns the number of morae between elements in correspondence. So, the prosodic feature used to capture the identity in weight is μ . Beckman proposes the following Positional Faithfulness schema:

(12) IDENT-Position (F)

Let β be an output segment in a privileged position P and α the input correspondent of β . If β is $[\gamma F]$, then α must be $[\gamma F]$.

“Correspondent segments in a privileged position must have identical specifications for [F]” (Beckman 1998:8)

Another vital point which needs to be addressed is the mapping of the first trochaic foot of the singular onto an iamb in broken plurals. McCarthy (2000) addresses this mapping by proposing that broken plurals differ from the singular form by an extra mora (‘affixed + μ ’, using McCarthy’s term) added to the second syllable of the singular forms. This mapping can be captured by employing a positional faithfulness constraint.

The merit of adopting positional faithfulness constraints is that they check identity in a certain position in a prosodic word. For example, the weight of the first foot in broken plurals does not match up with the weight of the first foot of the singular form. Positional Faithfulness constraints also address the mapping from the singular onto broken plural straightforwardly as they show that an extra mora distinguishes the first foot of the broken plural from that of the singular.

4.1.4 Alignment constraints

Alignment constraints demand certain edges of categories/constituents to align with some edges of other categories/constituents. For example, in the formation of broken plurals, they require that the right edge of syllables in the broken plural (prosodic constituent) coincide with a morphological constituent. The general formalism of the alignment constraints is couched in Generalized Alignment Theory (McCarthy and Prince 1993b).

(13) Generalized Alignment

$$\text{Align}(\text{Cat}_1, \text{Edge}_1, \text{Cat}_2, \text{Edge}_2) =_{\text{def}}$$

$$\forall \text{Cat}_1 \exists \text{Cat}_2 \text{ such that } \text{Edge}_1 \text{ of } \text{Cat}_1 \text{ and } \text{Edge}_2 \text{ of } \text{Cat}_2 \text{ coincide.}$$

$$\text{Cat}_1, \text{Cat}_2 \in \text{Pcat} \cup \text{Gcat}$$

$$\text{Edge}_1, \text{Edge}_2 \in \{\text{Right}, \text{Left}\}$$

(McCarthy and Prince 1993b)

This definition stipulates that Generalized Alignment demands that a particular edge of every prosodic or morphological constituent of Cat_1 coincide with a particular edge of some other prosodic or morphological constituent of Cat_2 .

The fact that the specified vowel [a] occurs at the right edge of syllables contained in the first foot of broken plurals as in [maka:tub] ‘offices’ and [mga:mar] ‘incense burners’ is translated into the constraint ALIGN-R (σ , [a]) which demands the right edge of every syllable to coincide with [a].

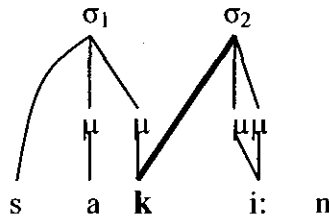
(14) ALIGN-R (σ , [a]) The right edge of every syllable coincide with the right edge of [a].

This constraint relates to the output broken plurals as it evaluates whether [a] is aligned to the right edge of syllables contained in broken plurals and not in the singular forms. It is violated when the right edge of any syllable of the output broken plural form isn’t aligned to [a].

Itô and Mester (1999) refine the notion of alignment to account for strings with shared features. In words with geminates of which the first half of the geminate belongs to the first syllable and the second half belongs to the second syllable, the geminates are contained in two syllables. Thus, these syllables do not have a CrispEdge because of the shared elements between the two syllables. For example, the form [(sak)_{σ1}. (ki:)_{σ2}. n] has the geminate /k/ shared by two adjacent syllables (refer to the representation in (15)).

Such cases warrant refinement of alignment constraints. Therefore, Itô and Mester propose CrispEdge constraints that successfully capture the fact that shared elements should be contained within a prosodic constituent. In (15), the geminate consonant /k/ is shared by σ_1 and σ_2 in the word [sakkin]. It functions as the onset of the second syllable and coda of the first syllable. This violates CrispEdge (σ) which requires the shared segment (geminate) to be included in one syllable.

(15) Geminates violate CrispEdge



The general formalism of this constraint looks as follow.

(16) CrispEdge [Pcat]

Let /A/ be a terminal substring in a phonological representation, \mathfrak{I} a category of type Pcat and /A/ = $|\mathfrak{I}|$ (the content of \mathfrak{I}). Then \mathfrak{I} is crisp (has crisp edges) if and only if A is-a $\mathfrak{I} : \forall A (/A/ = |\mathfrak{I}| \supset /A/ \equiv \mathfrak{I})$ (Itô and Mester 1999:208)

In broken plurals of the Muscat dialect of Omani Arabic, there is a strict restriction of [a] linking only to the vowel positions contained in the first foot and not extending to any vowel position outside the designated foot. The constraint adopted to account for [a]'s adherence to the vowel positions within a foot is CrispEdge [Ft] (following proposals by Urbanczyk 1999). This constraint is violated by any candidate which extends the shared elements to a position outside the foot domain.

4.2 Generalized Template Theory (GTT)

One of the most pivotal theoretical assumptions made in this thesis is Generalized Template Theory (McCarthy & Prince 1994a; Urbanczyk 1995, 1996a & b; Ito, Kitagawa, & Mester 1996; Gafos 1996 & 1997a; Spaelti 1997) among others. GTT assumes that templatic effects such as CV-shapes and type of foot structure are derived from interactions of other constraints in the Universal Grammar. There is thus no need to formulate a constraint that checks a specific foot type or CV-shape in the output forms.

In reference to the shapes of broken plurals, GTT basically stipulates that rankings of related constraints can best generate the optimal outputs without reference to the CV shapes of broken plurals. Furthermore, despite the persistent tendency of iambs to be realized in broken plurals, this thesis does not formulate a constraint that monitors the foot structure of broken plurals. Instead, ranking of well-formedness constraints along with the general plural formalism (affix + μ) derives the output forms without having to propose a constraint like PLURAL= IAMB. Such nicety in accounting for the diverse shapes of broken plurals precludes stipulating an *ad hoc* set of constraints like TEMPL to refer to a variety of resultant CV shapes. It also dispenses with constraints articulating a particular shape of foot structure.

In conclusion, this chapter has presented the basic theoretical assumptions this thesis hinges on to offer an integrated analysis to both the shapes of broken plurals and vowels contained in these word forms.

CHAPTER FIVE

Shapes

5.1 Introduction

Broken plurals in the Muscat dialect of Omani Arabic exhibit enormous diversity in their shapes. Broken plurals exhibiting diverse shapes can relate to the particular shapes of their singulars. However, there are divergent shapes that can't be attributed solely to the shapes of their singular forms.

In the Muscat dialect of Omani Arabic, there is a set of broken plurals which resembles in their shapes broken plurals of classical Arabic explored in depth in the literature (McCarthy and Prince 1990a; Abd-Rabbo 1990; Abu-Mansour 1995; Ratcliffe 1998 and McCarthy 2000, and the literature reviewed in these works). These broken plurals form typical iambs. Examples of this type include [(ma.ʔa:).ba.x] 'kitchens' and [(sa.wa:).ʕa.q] 'thunderbolts'. They are dubbed as 'typical or canonical' in this study because the mechanism applied to form them follows straightforwardly from the general rule assumed to form broken plurals of classical Arabic.

In addition to the typical broken plurals, Omani Arabic has a wide range of broken plurals whose shapes are vastly different from the shape of the typical broken plurals. For example, plurals derived from singulars with a single heavy syllable and a consonant cluster at the left edge of them like [nʕa:l] 'shoe, *sing.*' contain two heavy syllables adjacent to one another [(nuʕ).(la:).n] 'shoes, *pl.*'. These broken plurals are demonstrated to follow the same mechanism assumed to map singulars onto the most common shapes.

A last group of broken plurals seem to be notoriously distinct. They do not satisfy the minimal requirement of plural formation in that they map onto a light syllable. They

resist realizing the extra weight typical broken plurals surface with. An example of this type is [xnaš] ‘trolleys’.

This chapter offers an integrated analysis to the diverse shapes of broken plurals in the Muscat dialect of Omani Arabic building on proposals made in McCarthy (2000). The analysis first addresses the typical shapes of broken plurals in § 5.2.1, presenting the basic assumptions and technical details of McCarthy’s OT analysis to broken plurals in classical Arabic. The same analysis is then extended to account for the shapes with epenthetic glides, medial geminates and even iambs in § 5.2.2, § 5.2.3 and § 5.2.4 respectively. Finally, § 5.3 explores exceptional shapes of broken plurals, highlighting their exceptionality.

5.2 OT Analysis of the shapes of Muscat broken plurals

5.2.1 Typical (canonical) broken plurals

In the Muscat dialect of Omani Arabic, the majority of broken plurals resemble broken plurals of classical Arabic, one of the much studied phenomena in Semitic (McCarthy and Prince 1990a, Abd-Rabbo 1999, Abu-Mansour 1995, McCarthy 2000 among others). The following examples represent the typical shapes of broken plurals in the Muscat dialect of Omani Arabic.

<i>Sing.</i>	<i>Pl.</i>	<i>Gloss</i>
(1). (CVC).CV.C Singular forms	(CV.CV:).CV.C	
a. (maṭ).ba.x	(ma.ṭa:).ba.x	‘kitchens’
b. (daf).ta.r	(da.fa:).ta.r	‘notebooks’
(2).(CVC).CV.C-ah Singular forms	(CV.CV:).CV.C	
a. (mas).ṭa.r- ah	(ma.sa:).ṭa.r	‘rulers’
b. (mal).ṣa.q- ah	(ma.la:).ṣa.q	‘spoons’
(3). (CVC).(CV:).C Singular forms	(CV.CV:). (CV:).C	
a. (qan).(di:).l	(qa.na:).(di:).l	‘lanterns’
b. (mis).(ma:).r	(ma.sa:).(mi:).r	‘nails’

c. (kar).(fu:).n	(ka.ra:).(fi:).n	‘knuckles’
(4). (CVC).CV <i>Singular forms</i>	(CV.CV:).CV	
a. (mak).si	(ma.ka:).si	‘dresses’
b. (kur).si	(kara:).si	‘chairs’
(5).(CV.CV:).C- <i>ah Singular forms</i>	(CV.CV:). jV.C	
a. (ma.ki:).n- ah	(ma.ka:).jin	‘machines’
b. (ha.di:).q- ah	(ha.da:).ja.q	‘parks’
(6). (CV:).CV.C <i>Singular forms</i>	(CV.wV:).CV.C	
a. (ša:).ða.r	(ša.wa:).ða.r	‘bed blankets’
b. (ša:).ra.ʕ	(ša.wa:).ra.ʕ	‘roads’
c. (ta:).(bu:).r	(ta.wa:).(bi:).r	‘line-ups’
d. (ta:).(bu:).q	(ta.wa:).(bi:).q	‘cement blocks’

Three general observations obtained by examining the shapes in (1) through (6) are reported below. These observations are basically inspired by similar conclusions made in McCarthy (2000).

1. The first foot at the left-edge of the singular forms which has the shapes C_1VC_2 in forms (1-4) or C_1VV in forms (6) is mapped into a typical iamb $[C_1VC_2V:]$ in forms (1-4) and $[C_1VwV:]$ in forms (6). In forms (5), the shape C_1VC_2V contained in the first iamb to the left edge of the singular forms as in (5.a) $[(ma.ki:).n- ah]$ is extracted from this foot and expanded into an iamb. The iamb constructed contains a light syllable L followed by a heavy one H.
2. The weight of the final syllable of broken plurals is not affected by the mapping of the first foot of the singulars onto an expanded foot. Thus, the weight or length of the final syllable of both the singular and broken plural is identical (McCarthy 2000; McCarthy and Prince 1990a).
3. The position of the epenthetic glide in broken plurals is determined by the position of the long vowel in the singular forms. In the singular forms in (6), the

first syllable ([ša:] in form 6.a) is long and contains just one consonant. Broken plurals epenthesize a glide /w/ to fill the second consonant position pertaining to the second syllable of the first foot at the left-edge in the shape C_1VC_2V : [šawa:]. However, if the second syllable of the singular forms is long as in forms (5) ([ma.ki:.n- ah], broken plurals epenthesize /j/ to fill the onset of the third syllable in broken plurals $CV.CV:..jV.C$ [maka:jin].

McCarthy (2000) assumes that the preservation of weight in the final syllable of both the singular and broken plural is a consequence of the constraints $DEP_{OO}^{35}-\mu$ (against epenthesis of μ) and $MAX_{OO}-\mu$ (against deletion of μ).

(7) **$DEP_{OO}-\mu$** For every μ in $output_2$, there is a correspondent μ in $output_1$.

This constraint is violated when the broken plural surfaces with an extra mora compared with the singular form.

(8) **$MAX_{OO}-\mu$** For every μ in $output_1$, there is a correspondent μ in $output_2$.

This constraint is violated when the broken plural surfaces with fewer morae than its singular form.

The analysis adopted in this study assumes instead Positional Faithfulness constraints (Beckman 1998). Beckman (1998:1) pinpoints the possibility of considering final syllables as a privileged position. She illustrates “Positions of phonetic prominence include stressed syllables, syllable onsets, long vowels and **possibly final syllables**” (emphasis added). McCarthy (2000: 186) also demonstrates that the final-stem of the broken plurals in classical Arabic is a privileged position and warrants Positional Faithfulness to capture its special behaviour. This leaves us with evidence for the special

³⁵ OO stands for Output-Output correspondence relation between the singulars and broken plurals.

condition of syllable final position and justifies adopting Positional Faithfulness constraints.

The fact that weight in the final syllable of both the singular and broken plural is identical can be captured using the following Positional Faithfulness constraints.

(9) MAX_{OO-σ_F} (μ)

For every μ in the final σ of output₁, there is a correspondent μ in the final σ of output₂.

This constraint militates against the loss of morae from the final syllable of broken plurals when they are derived from singulars whose final syllable is long (length retained).

(10) DEP_{OO-σ_F} (μ)

For every μ in the final σ of output₂, there is a correspondent μ in the final σ of output₁.

This constraint bans lengthening of the final syllable of broken plurals when their singular forms have a final short syllable.

In order to capture the mapping from a trochee C₁VC₂ or C₁VV with two morae onto a typical iamb C₁VC₂V: with three morae, a constraint against epenthesis at a particular position is required. The position which receives the extra weight is attested to be the first foot at the left-edge of broken plurals. Therefore, the following constraint is adopted.

(11) DEP_{OO-F₁} (μ)

For every μ in the first F of output₂, there is a correspondent μ in the first F of output₁.

This constraint evaluates the output broken plural and is violated when the broken plural surfaces with an extra mora as shown in the following representations.



Each initial trochee of the singular forms contains two morae. When broken plural is formed, the foot gets an extra mora and creates a typical iamb $C_1V.C_2V$:

This constraint is not introduced in McCarthy's (2000) OT analysis of broken plurals in classical Arabic. He, however, paves the way for adopting this constraint by assuming that the distinction between the singular and plural forms lies in an affixed μ ($DEP_{OO-}\mu$)³⁶ added to a certain locus in the plural forms (McCarthy 2000: 186).

The basic constraints needed to derive broken plurals are Positional Faithfulness constraints. They include the constraints monitoring identity of weight in the final syllable of both the singular and plural ($DEP_{OO-}\sigma_F(\mu)$ and $MAX_{OO-}\sigma_F(\mu)$) which outrank the constraint militating against realizing the affixed mora in the first foot of broken plurals ($DEP_{OO-}F_1(\mu)$).

To see how these constraints interact, observe the following representations showing the number of morae in the output singular [mulhaq] and candidates a. and b. in tableau (1) below.

(13)	<i>Sing.</i>	<i>Correct plural</i>	<i>Wrong plural</i>
	$\mu \mu \mu$	$\mu \mu \mu \mu$	$\mu \mu \mu \mu$
	$\begin{array}{ c c c } \hline \mu & \mu & \mu \\ \hline \end{array}$	$\begin{array}{ c c c } \hline \mu & \mu & \mu \\ \hline \end{array}$	$\begin{array}{ c c c } \hline \mu & \mu & \mu \\ \hline \end{array}$
	(m u l).ħa .q	√ a. (ma. l a:). ħa .q	* b. (m a l) (ħ a:). q

The first foot of the correct form (13.a) surfaces with one more mora than the first foot of the singular form. The final syllable has exactly the same number of morae as the final syllable of the singular form. However, the first foot of the wrong form (13.b) has the same number of morae as the first foot of the singular form. The final syllable affixes a mora and violates $DEP_{OO-}\sigma_F(\mu)$ (weight of the final syllable should be retained).

³⁶ This assumption conversely entails that if a mora is in the input, then Input-Output- μ is obeyed.

Tableau (1)

O: /(mul).ħa.q/ + μ ‘appendix’	DEP _{OO} - σ_F (μ)	DEP _{OO} - F ₁ (μ)
↗ a. (ma.la:).ħa.q		*
b. (mal). (ħa:)q	*!	

Tableau (2)

O: /(bar). (qu:). ʕ/ + μ ‘veil’	MAX _{OO} - σ_F (μ)	DEP _{OO} - F ₁ (μ)
↗ a. (ba.ra:). (qi:).ʕ		*
b. (bar).qi.ʕ	*!	

McCarthy’s (2000) DEP_{OO}- μ constraint (translated from his assumption ‘affixed- μ) is too general and doesn’t capture the fact that a mora is affixed at a designated position. However, DEP_{OO}- F₁ (μ) which this study advocates judges which of these candidates is the winner as it restricts the added mora to be affixed to the first foot of the singular forms to form broken plurals. Candidates b. in tableaux (1) & (2) are out because they violate the high-ranked constraints DEP_{OO}- σ_F (μ) and MAX_{OO}- σ_F (μ) fatally because (1.b) adds a mora to the final syllable of broken plural and (2.b) loses a mora from the final syllable of broken plural. The optimal output a. in both tableaux completely satisfies the high-ranking constraints at the expense of violating the low ranked DEP_{OO}- F₁ (μ) by affixing a mora to the first foot.

Adopting Positional Faithfulness constraints offers an elegant analysis that reflects the contrast in weight between the first foot and final syllable of broken plurals. This analysis basically shows that where DEP_{OO}- F₁ (μ) is always violated by having an extra weight realized in the first foot of broken plurals, DEP_{OO}- σ_F (μ) has to be obeyed because the final syllable surfaces without an extra weight being imposed into it. This is manifested in tableau (1). Moreover, MAX_{OO}- μ is strictly adhered to when forming broken plurals as will be demonstrated in tableau (2) below.

The idea of affixing a mora to the first foot of the singular forms admits potentially different shapes of feet to emerge. Observe these kinds of feet.

(14) $C_1VC_2 + \mu$

- a. $* C_1V + \mu C_2$ $[C_1VVC_2]$
- b. $* \mu + C_1VC_2$ $[VC_1VC_2]$
- c. $\sqrt{ } C_1VC_2 + \mu$ $[C_1VC_2V:]$

Syllabic well formedness constraints govern the locus of the affixed mora. These constraints regulate the permissible syllable shapes and prosodic structures in the whole language in general. To illustrate, candidate (14.b) fatally violates the requirement for having an onset which requires that every syllable starts with a consonant. Candidate (14.a), on the other hand, produces a trimoraic³⁷ structure, a highly marked structure cross-linguistically.

(15) $*\mu\mu\mu]\sigma$ Syllables don't have three morae. (McCarthy and Prince 1990a; 1990b)

A syllable like CV:C violates this constraint since it has three morae.

(16) **ONSET** Every syllable has an onset (McCarthy and Prince 1993).

Syllables such as V and VC violate ONSET as they don't begin with a C. The following tableau illustrates the interaction between syllabic well formedness constraints and positional faithfulness constraints.

Tableau (3)

O: /(max).ba.z/+ μ 'bakery'	DEP _{OO} - σ_F (μ)	MAX _{OO} (μ)	ONSET	$*\mu\mu\mu]\sigma$	DEP _{OO} -F ₁ (μ)
a. (ma.xa:).bi.z					*
b. (ma:x).bi.z				*!	*
c. (max). (bi:).z	*!				
d. (max).a.bi.z			*!		
e. m.(xab).z		*!			

³⁷ Three morae (units of weight) in a syllable.

This tableau illustrates that the locus of the added mora is not random and is governed by prosodic and syllabic well formedness in the language. The prosodic well formedness constraints along with the general mechanisms of forming broken plurals (these are basically two mechanisms: ‘preserve the weight of the final syllable’ and affix a mora to the first foot of broken plurals) produce the correct output. The affixed mora settles in a position that suits the structure of the language. Candidates b., c. and d. violate one of the high-ranking constraints. To illustrate, candidate b. has a trimoraic syllable (two morae are associated with the long vowel and one with the coda consonant), the final syllable of candidate c. is not identical in weight with the final syllable of the singular output and candidate d. has an onsetless syllable. Candidate e. loses a mora and violates $\text{MAX}_{\text{OO}}(\mu)$, a highly ranked constraint. Candidate a., on the other hand, obeys all the high-ranking well formedness constraints and violates the low-ranked constraint $\text{DEP}_{\text{OO}}\text{-F}_1(\mu)$. It is selected as the winning candidate.

This tableau concludes the discussion of the typical broken plurals. Well-formedness constraints together with the constraint monitoring identity in weight of the final syllable of the singular and broken plural dominate the constraint against adding a mora to the first foot at the left edge of the singulars.

5.2.2 Shapes with default glides

In the Muscat dialect of Omani Arabic, there is a group of broken plurals which exhibits an additional consonant, specifically an extra glide in their surface forms. This glide doesn’t exist in the singular forms from which these broken plurals are derived. Observe the following patterns of broken plurals with the extra glide inserted.

- (17). (CV.CV).VC-ah *Singular forms* (CV.CV:).jV.C
 a. (ma.ki:).n- ah (ma.ka:).ji.n ‘machines’

b. (ħa.di:).q- ah	(ħa.da:).ja.q	‘parks’
(18).CVV.CV(V).C Singular forms	(CV.wV:).CV.C	
a. (ša:).ða.r	(ša.wa:).ða.r	‘bed blankets’
b. (ša:).ra.ʕ	(ša.wa:).ra.ʕ	‘roads’
c. (ta:).(bu:).r	(ta.wa:).(bi:).r	‘line-ups’
d. (ta:).(bu:).q	(ta.wa:).(bi:).q	‘cement blocks’

The singular forms in (17) and (18) have fewer consonants than four base consonants and their broken plurals expand by inserting a default glide to conform to the broken plural shape. For example, in (18), the first foot of the singular [ša:]ðar contains only one consonant and a long vowel [ša:] and requires another consonant to create a well-formed foot (C_1VC_2V); [šawa:]ðar results. The singulars in (17) have a long high vowel in their second syllable [Ci:] as seen in [ma.ki:.n-ah]. After mapping C_1VC_2V [maki] contained in the first iamb (ma.ki:) of the singular form (17.a) onto C_1VC_2V [maka:], the residue of the singular [in] requires a glide to form the onset of the third syllable in the broken plural [ma.ka:.jin]. This behavior is not peculiar to broken plurals in the Muscat dialect of Omani Arabic. It is discussed in McCarthy and Prince (1990a) and McCarthy (2000). In classical Arabic, a glottal stop /ʔ/ and not glide /j/ is inserted to form the onset to the third syllable of the broken plurals.

McCarthy (2000) makes a fourth crucial observation with respect to the mapping of the consonantal segments from the singular to plural shapes. He attributes the complex relation between the long vowels in the singulars and epenthetic glide in broken plurals to a conservation of consonantal positions in singular \rightarrow plural mappings (refer to forms (17) and (18) above). He accounts for this relation by proposing undominated

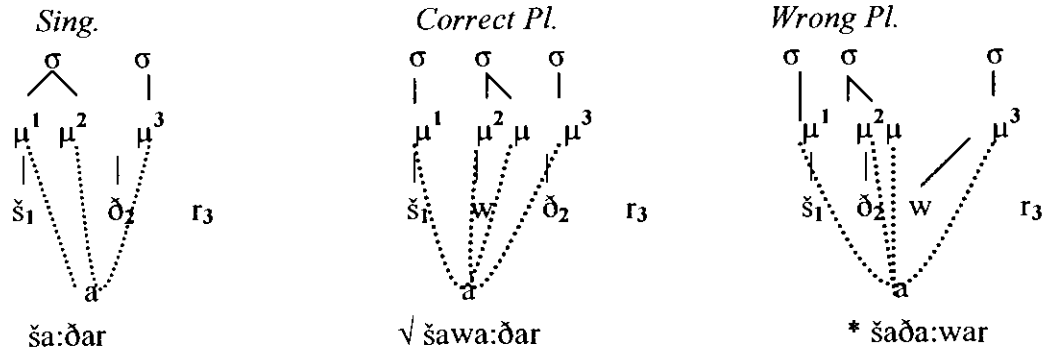
associational faithfulness constraints such as NO-SPREAD_{oo}(μ , SEG) and NO-DELINK_{oo}(μ , SEG). I define them as follow.

(19) NO-SPREAD_{oo}(μ , SEG) segment to mora linkage is preserved in the output-output mapping.

(20) NO-DELINK_{oo}(μ , SEG) segment to mora linkage is not delinked in the output-output mapping.

These constraints ensure that if, for example, the third segment of the singular is associated with the second syllable (second mora, in this case), then it also should be associated with the same syllable (likewise, same mora) in broken plurals. The following represents the correspondence relations adopted from McCarthy (2000) but used to represent the data under investigation.

(21) Correspondence Relations in ša:ðar → šawa:ðar, *šaða:war



In these representations, onsets [\check{s} , w , \emptyset] are associated with μ , forming together with the vowels that immediately follow them a CV sequence. Final consonant [r] is not linked to a mora. As seen in the representation above, \emptyset_2 is linked to μ^3 in both the singular form and correct plural. The second broken plural form (incorrect) has \emptyset_2 linked to μ^2 instead of μ^3 as in the singular form, violating NO-DELINK_{oo}(μ , SEG). The superscripts as well as subscripts help keep track of this correspondence relation.

Therefore, NO-DELINK_{OO} (μ , SEG) is undominated and governs the preservation of the association lines³⁸.

Tableau (4)

O: /(<i>ša:</i>). <i>ða.</i> r/ + μ 'blankets'	DEP _{OO} - σ_F (μ)	NO-DELINK _{OO} (μ , SEG)	DEP _{OO} -F ₁ (μ)
a. (<i>ša.wa:</i>). <i>ða.</i> r			*
b. (<i>ša.ða:</i>). <i>wa.</i> r		*!	*
c. (<i>ša:</i>).(<i>ða:</i>).r	*!		

/ð/ which is linked to the final syllable in the singular form is associated with the second syllable in the broken plural in candidate b. This incurs a fatal violation of NO-DELINK_{OO} (μ , SEG). Therefore, this candidate is out (refer to representation (21)).

An important detail remains; an epenthetic glide is inserted to fill the empty onset position. The requirement for having an onset is more important than the constraint against inserting an extra consonant (McCarthy 2000).

(22) DEP_{OO}- Glide Every glide in output₂ has a correspondent in output₁

This constraint is a faithfulness constraint which ensures that glides in the output broken plural have correspondents in the output singular forms. This constraint is violated when the output broken plural surfaces with an extra glide.

Tableau (5)

O: /(<i>ša:</i>). <i>ða.</i> r/ + μ 'blankets'	ONSET	DEP _{OO} - Glide
a. (<i>ša.wa:</i>). <i>ða.</i> r		*
b. (<i>ša. a:</i>). <i>ða.</i> r	*!	

³⁸ The domination of the association faithfulness constraints accords with McCarthy's (2000) analysis.

The second syllable in candidate b. has no onset. It fatally violates ONSET while candidate a. wins because all its syllables have onsets. It inserts a glide at the expense of violating the low-ranked constraint DEP_{OO}- Glide.

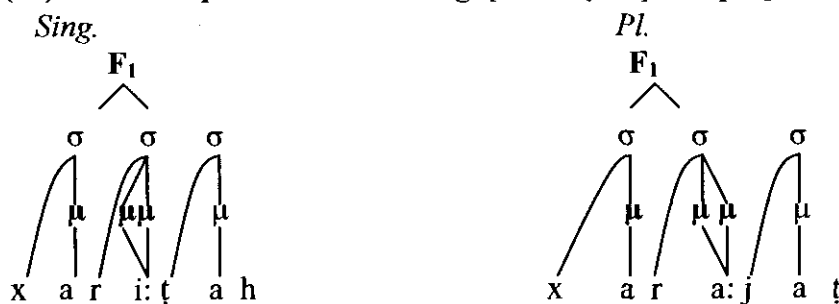
When the second syllable of the singular forms has the vowel /i:/, broken plurals insert the glide /j/ to fill in the onset position of the third syllable of broken plurals as exemplified below.

(23).(CV.CV:).C-ah <i>Singular forms</i>	(CV.CV:).jV.C	
a. (ma.ki:).n- ah	(ma.ka:).jin	‘machines’
b. (ha.di:).q- ah	(ha.da:).ja.q	‘parks’
c. (na.ti:).g-ah	(na.ta:).ji.g	‘results’
d. (ka.ni:).s-ah	(ka.na:).ji.s	‘churches’

When the singular forms above form broken plurals, the bimoraic shape C₁VC₂V [maki] belonging to the first iamb (ma.ki:) of the singular form is mapped onto C₁V.C₂V: [ma.ka:]³⁹, maintaining an iamb in the first foot and keeping the same number of morae in the singulars (refer to (24) below). Both the singulars and plurals have an iamb with three morae in their first foot and a mora in their final syllables. These broken plurals pose problems to the assumption that affixed mora is the basic distinction between singulars and broken plurals since both the singulars and broken plurals have the same number of morae. Therefore, MAX_{OO} (μ), which bans deletion of morae between related strings, is strictly obeyed. Observe the following moraic representations of both the singular and broken plural.

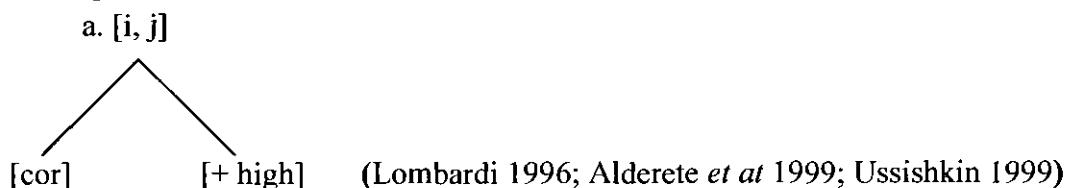
³⁹ This approach is similar to McCarthy and Prince’s (1990a) and McCarthy’s (2000).

(24) Moraic representation of sing. [xa.ri:.t-ah] and pl. [xara:jaɬ] ‘maps’



The singular foot is an iamb, so there is not a straightforward mapping from a trochee onto an iamb in these forms. Because only the first two morae of the singulars are mapped onto an iamb, this iambic foot structure is preserved in the plural by mapping the vowel /i/ to a glide in the broken plural.

(25) Representation of the place features



This representation shows that both /i/ and /j/ share the same place features; both are coronal and high. This tendency is translated in OT by the constraint IDENT-COR or IDENT-HIGH (Ussishkin 1999) which requires coronal/ high segments in the singular form to have coronal/ high correspondents in the output plurals. The following tableau shows the ranking of the constraints involved in deriving broken plurals with the glide /j/.

Tableau (6)

O: /(xa.ri:ɣ).t-ah/ 'map'	MAX _{OO} (μ)	ONSET	IDENT-COR	*Pl/cor	DEP _{OO} -GLIDE
a. (xa.ra:).jɣa.t				*	*
b. (xa.ra:).wɣa.t			*!		*
c. (xa.ra:).iɣ.t		*!		*	
d. (xa.ri).jɣit	*!			*	*
e. (xa.ri:).t	*!				

Candidate b. inserts a glide /w/ to fill in the onset position of the third position of broken plurals. Thus, it violates IDENT-COR since the place feature of the glide /w/ is labial/ round and not coronal/ high. Candidate c. has the third syllable without an onset. This exhibits a violation of ‘have onsets’. Both candidate d. and e. lose one mora and violate the high-ranking constraint MAX_{OO} (μ). The optimal output is structurally well formed as it obeys all the high ranking constraints at the expense of violating the low ranked *Pl/cor and DEP_{OO}-GLIDE. Another interesting candidate to be considered is (xa:ra).ja.t̪. This candidate is ruled out because it doesn’t have a proper iamb.

The epenthesis of glides results from a need to have onsets as a syllabic well-formedness requirement in Arabic. However, the inserted glides shouldn’t disturb the existing associational relations in singular → plural mappings because of the high-ranking constraint NO-DELINK_{OO} (μ, SEG).

5.2.3 Shapes with medial geminates

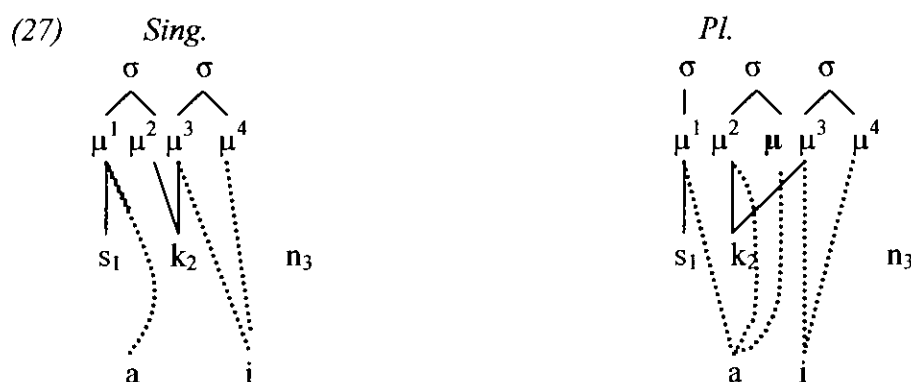
In the Muscat dialect of Omani Arabic, singulars with medial geminates preserve their geminates when they map onto broken plurals. However, certain syllabification restrictions pertaining to gemination come into play to govern the acceptable final shape of broken plurals.

26.(CVC₂). (C₂V:).C <i>Singular forms</i>	(CV.C₂V:). (C₂V:).C	
a. (sak).(ki:).n	(sa.ka:).(ki:)n	‘knives’
b. (θal).(la:).g- ah	(θa.la:).(li:).g	‘refrigerators’

Singular forms in (26) have a medial geminates [sakki:n] with the first half of the geminates belonging to the first foot of the singular and the second half filling the onset position of the second syllable. The geminates being adjacent to each other in the

singular maps onto two feet in the broken plural [(saka:)₁(ki:)₂n] as a result of the expansion of the left foot C₁VC₂ of the singulars into a different shape C₁VC₂V:, maintaining the length of the final syllable of the singular forms.

The following representation illustrates the effects of the singular-plural mapping of the word forms [sakki:n] → [saka:ki:n]:



When the affixed mora is added to the trochaic first foot of the singular forms to form broken plurals, several potential output shapes might surface. However, well-formedness constraints decide which output best adheres to the language as a whole.

- (28)
- a. sak + μ → √ saka:
 - b. μ + sak → * asak
 - c. sa + μ k → *sa:k

Shapes b. and c. are ill formed in the Muscat dialect of Omani Arabic. Shape b. is an onsetless syllable, violating the requirement for having onsets. Shape c. is composed of three morae, a structure which is highly marked cross-linguistically. A closer look at the actual broken plural reveals the fact that syllabification canons ensure that geminates don't surface in one syllable. OT translates this prohibition by the constraint *σ [C_xC_x

- (29) *σ [C_xC_x geminates are banned from the edges of syllables (McCarthy 1998 and Gafos 2003)

This constraint militates against having geminates occur at the margins of syllables. The following tableau illustrates the ranking constraints to produce the optimal broken plural with geminates.

Tableau (7)

O: /(duk).(ka:).n/ + μ 'shop'	MAX _{OO} - σ _F (μ)	ONSET	*μμμ]σ	*σ [C _x C _x	DEP _{OO} -F ₁ (μ)
a. (da.ka:).(ki:).n					*
b. (da:k).(ki:).n			*!		*
c. (da:).(kki:).n				*!	
d. (da.ka:).ki.n	*!				*
e. (da.ka).a.(ki:).n		*!			

Candidate b. has a trimoraic syllable, violating the constraint against trimoraicity. Therefore, it is out. Candidate d. violates the high-ranking constraint against loss of weight from the final syllable of the broken plural since they are derived from singulars with a final heavy syllable. Candidate e. has an onsetless syllable. This fatal violation excludes it from further evaluation since the requirement for having an onset is highly ranked. Candidate c. fatally violates the constraint against having geminates surface at the margins of syllables. Thus, it is doomed. However, the optimal output obeys all the high-ranking well-formedness constraints and incurs a violation to DEP_{OO}-F₁ (μ) by adding an extra mora to the first foot.

McCarthy (2000) concludes that the preservation of consonantal mapping from the singular to broken plurals is given priority even at the expense of original geminates becoming long-distance linked; in other words belonging to two different feet (McCarthy 2000: 178).

5.2.4 Plurals with even (H) iambs

The Muscat dialect of Omani Arabic allows the formation of broken plurals with two expansions of iambs (L H) or (H). Broken plurals can either realize a typical iamb L H or the even one H.

The mapping of the trochaic foot⁴⁰ from the singular to the even iamb in broken plurals is motivated by the unusual shapes of the singular forms which when undergoing the ‘affixed + μ formalism’ are forced to be shaped in a way that conforms to the prosodic and syllabic canons of the language. Therefore, the mechanism applied to form these broken plurals is exactly similar to the proposal advocated to account for the typical broken plurals in classical Arabic. The general shape of the singular form as well as the prosodic well-formedness constraints of the language as a whole govern the locus of the ‘affixed + μ ’ and the final accepted shape of broken plurals.

(30). C.(CV:).C <i>Singular forms</i>	(CVC).(CV:).C	
a. n.(ʕa:).l	(nuʕ).(la:).n	‘sandals’
b. t.(ra:).b	(tur).(ba:).n	‘sands’
c. g.(da:).r	(gid).(ra:).n	‘walls’
d. b.(la:).d	(bil).(da:).n	‘countrysides’

The singular forms have a consonant cluster at the left edge followed by a long vowel. These broken plurals end in an extra consonant that the singulars don’t have due to the requirement that nouns end in a consonant in Arabic (McCarthy and Prince 1990b). This final consonant is extrametrical and doesn’t participate in the prosody of the language as whole.

The mechanism applied to form these broken plurals is that a mora is affixed to the singular form. The resultant shape of the broken plural has to satisfy all the prosody

⁴⁰ The mapped trochaic foot in these forms is of the shape H and has a cluster at its left edge.

canons of the language in order to be admitted as an actual surface form. The locus of the affixed mora is highly determined by the prosody of the language.

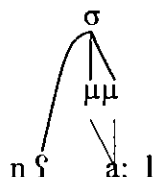
Moreover, the actual broken plural ends in a consonant /n/. The insertion of the nasal /n/ stems from the requirement for words in Arabic to end in a consonant. It is translated into the constraint Final-C.

(31.a) Final-C A prosodic word doesn't end in a vowel (McCarthy and Prince 1993a: 176)

An important detail remains to be addressed; the singular forms have a final heavy syllable which remains heavy when they map onto broken plurals. Therefore, $\text{MAX}_{\text{OO-}\sigma_{\text{F}}}(\mu)$ which bans deletion of morae from the final syllable of broken plurals is strictly obeyed.

Before we show the ranking of these constraints, let us observe the moraic representation of both the singular and the actual output broken plural. It shows that the actual output broken plurals surfaces with two extra morae than the singular form.

(32) *Sing.*



Pl.

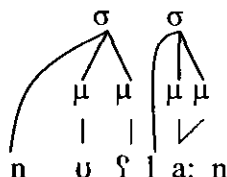


Tableau (8)

O: /nʕa:l/ + μ 'shoe'	*COMPLEX	ONSET	* $\mu\mu\mu]\sigma$	$\text{MAX}_{\text{OO-}\sigma_{\text{F}}}(\mu)$	Final-C	$\text{DEP}_{\text{OO-}}(\mu)$
a. (nuʕ).(la:).n						**
b. (nʕla:).a	*!	*			*	*
c. (an).(ʕa:).l		*!				*
d. n(ʕa:l). n			*!			*
e. (nʕa:). la	*!				*	*
f. naʕa:la:n						***!
g. (nuʕ).la.n				*!		*
h. (nu.ʕa:).l						*

Candidates b. and c. fatally violate *COMPLEX since their first syllables begin with consonant clusters at their left edge. In candidate b., the second syllable is onsetless. Therefore, it is also out because of two crucial violations, namely *COMPLEX and ONSET. Candidate d. has a syllable with three morae. Such a structure is highly marked and violates the constraint against trimoraicity. Candidate g. loses a mora from the final syllable and violates MAX_{OO-} σ_F (μ). Candidate h. fails to add an extra consonant to conform to the four consonants in the plural and seems identical to the singular output. The optimal candidate completely adheres to the well-formedness constraints of the language and incurs a violation of having two morae. But this constraint is low-ranked. Candidate f. is ruled out because it has more morae than the optimal output.

This tableau illustrates that the locus of mora insertion complies with the prosodic structure licensed in the language. Due to the fact that the singular form begins with a cluster at the left-edge, the mora gets inserted between the two consonants, to eliminate markedness in the output broken plurals even at the expense of radically changing the association lines.

Another intriguing shape of broken plurals is derived from singulars with a sole long syllable and two consonants.

(33). CVV.C Singular forms	CV.CV:.C	
a. ko:.b	ki.ba:.n	‘cups’
b. na:.r	ni.ra:.n	‘fires’
c. ko:.ʃ	ki.ʃa:.n	‘elbows’

When these singular forms map onto broken plurals, they affix a mora and insert a nasal /n/ to ensure conformity with the Arabic requirement for having all nouns end in a consonant. These broken plurals also keep the length of the final syllable. Thus, MAX_{OO-}

$\sigma_F(\mu)$ is highly adhered to when forming this shape of broken plurals. Observe the following tableau:

Tableau (9)

O: /na:r/ + μ 'fire'	ONSET	*COMPLEX	* $\mu\mu\mu$] σ	Final-C	MAX _{OO-} $\sigma_F(\mu)$	DEP _{OO-} (μ)
Ⓢ a. (ni.ra:).n						*
b. (nra:).na		*!		*		*
c. n.(raa:)			*!	*		*
d. n.(ra:).na				*!		*
e. (an).(ra:).n	*!					*
f.(na.wa:).ra:n						***!
g. ni.ra.n					*!	

All candidates have an extra mora; however, the locus of the affixed mora differs from one candidate to another. The high-ranking well-formedness constraints ensure a particular position for the extra mora. All the above candidates with the exception of candidate a. (the optimal candidate) violate one of the high-ranking constraints. Thus, they are excluded from further violation. To clarify, the first syllable of candidate e. is onsetless and violates the requirement for having an onset. Candidate b. has complex clusters at the margin of one of its syllables. Candidate c. has a trimoraic syllable and candidate d. ends in a vowel and violates Final-C. Candidate g. loses a mora from the final syllable and violates MAX_{OO-} $\sigma_F(\mu)$, a highly ranked constraint. The optimal output obeys all the well-formedness constraints at the expense of violating the low ranked constraint DEP_{OO-} μ . Candidate f. is ruled out because of the excessive number of morae it adds. An interesting candidate to be considered is n.ra:~n which completely obeys all the above constraints. However, this candidate can't be an optimal output, as it exhibits no extra mora, a requirement for forming broken plurals.

In the Muscat dialect of Omani Arabic, some singular forms with exactly similar shapes as those forming the typical shapes map onto diverse shapes of broken plurals. For example, there is a group of singular forms whose shape lumps together the first two syllables contained in the foot (CV.CVV) into one heavy syllable C.(CVV). They map the first trochee of the singulars onto an even iamb H.

34. CVC.CV(V).C Singular forms C.(CV:). CV(V). C

a. maq.ʃa.ʔ	mqa:ʃaʔ	‘matches’
b. maq.ʃa.f	mqa:ʃuf	‘small vendors’
c. maʃ.xa.l	mʃa:xil	‘sieves’
d. muy.ba:r	mʃa:bi:r	‘curing spells’
e. muʃ.la:q	mʃa:li:q	‘hooks’
f. muʃ.ta:h	mʃa:ti:h	‘keys’

These broken plurals collapse the first two syllables in the expected typical iambic foot into even iamb and surface with a cluster at the left-edge of broken plurals. Shaaban (1977) notices free variation between forming these broken plurals with the typical iamb and collapsing the two syllables into one even iamb. For example [mqa:ʃaʔ] and [maqa:ʃaʔ] ‘matches’ are both possible broken plurals.

According to Shaaban (1977), there is a socio-linguistic factor involved in this variation. Despite exposure to education and standard Arabic which obviously favours forms with the typical iamb, young Omanis of Muscat in 1977 still have a great preference and tendency to retain their parents’ way of pronouncing these plurals with the clusters at the left edge and even iamb.

The tendency for shaping the first foot of broken plurals into CCV: instead of the typical foot CVCV: can also be analyzed phonologically. The Muscat dialect of OA is attested to have an active process of vowel deletion (Shaaban 1977; Glover 1988) in

which [a] drops in unstressed positions. Adjectives and plural nouns of OA, as reported in Shaaban, exhibit free variations between the following patterns:

(35) Plural nouns⁴¹

a. mda:ris/ mada:ris ‘schools’

b. mra:wiḥ/mara:wiḥ ‘fans’ (Shaaban 1977: 91)

(36) Adjectives

a. kari:m ‘generous’

b. sqi:m ‘sick’

c. qadi:m ‘old’

d. kbi:r ‘large’ (Shaaban 1977: 91)

The plural nouns in (35) drop [a] between C₁ and C₂ without exhibiting any shift in meaning. The adjectives in (36) alternate in whether to have [a] between C₁ and C₂ or to leave it out. Shaaban (1977) proposes the following linear rule to account for this variation in the broken plural formation.

(37) $V_1 \rightarrow \emptyset / \# CV_1.CVV$ resulting in a cluster at the left edge of the plural forms and heavy syllable CCVV.

In applying the analysis proposed above, one would encounter a dilemma between having two potential output broken plurals. However, I would suggest that candidate b. in tableau (10) below violates the constraint against having extrametricality at the left-edge of words. This constraint is dominated by DEP_{OO}-F₁ (μ). I formulate this constraint as follow.

(38) NOEXTRAM-L No extrametrical consonants are allowed at the left-edge of words. Observe the following ranking:

Both candidates a. and b. are potential outputs since they obey all the high ranking constraints. I won’t delve into the complication of this variation due to space limitation (see Antilla (1997) who discusses free variation on OT when studying Finnish genitives).

⁴¹ The transcription of these forms are modified to fit in the IPA system adopted throughout this thesis.

Tableau (10)

O: /(maq)šaʔ/ +μ 'match'	DEP _{OO-} σ _F (μ)	ONSET	*μμμ]σ	DEP _{OO-} F ₁ (μ)	NoEXTRAM-L
☺ a. (ma.qa:).ša.ʔ				*	
☹ b. m(qa:).ša.ʔ					*
c. (ma:q).ša.ʔ			*!	*	
d. (maq). (ši:).ʔ	*!				
e. (maq).a.šaʔ		*!			

Moreover, the Muscat dialect of Omani Arabic has a group of broken plurals with only a sole heavy foot and extrametrical C at the left-edge. These broken plurals are similar to the forms discussed above in that they collapse the expected typical iamb into the even type.

(39). CCVC- (ah) Singular forms CCV:..C

a. mlaʔ	m la: f	'folders /binders'
b. mxam- ah	m xa: m	'brooms'
c. mšuʔ	m šu: ʔ	'combs'

(40). CVCC- (ah) Singular forms CCV:..C

a. xurq	x ru: q	'holes'
b. ħurq	ħ ru: q	'burns'
c. ħarf	ħ ru: f	'letters'

(41). CVCVC Singular forms C.(CV:).C

a. šaħan	š.(ħu:).n	'plates'
b. ʔabal	ʔ.(bu:).l	'drums'
c. qabal	q.(ba:).l	'mountains'

In classical Arabic, forms (39-41) include two syllables (light followed by heavy).

Examples extracted from McCarthy and Prince (1990a) are as follows:

(42) Examples of broken plurals in Classical Arabic

Sing.	Pl.	Glos
a. nafs	nufuus	'souls'
b. qidħ	qidaaħ	'arrows'
c. ʔasad	ʔusuud	'lions'

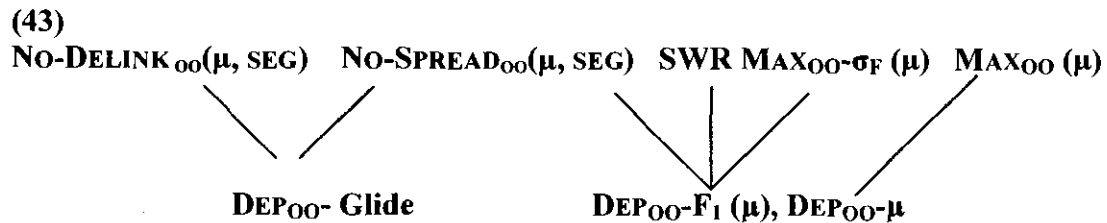
The dilemma imposed in the analysis of these forms is similar in nature and effect to the problem created from collapsing the first two syllables of the typical iamb into only one heavy syllable. The only difference between these groups of broken plurals and the ones discussed above lies in the fact that these contain fewer syllables.

A socio-linguistic factor has also an active role. The variations between classical Arabic broken plurals surfacing with a typical iamb and broken plurals in the Muscat dialect of Omani Arabic collapsing the two syllables contained in the typical iamb into an even iamb supports the tendency of Omanis to retain their parents' way of pronouncing these forms.

To sum up, McCarthy's (2000) proposal that the distinction between the singular forms and broken plurals lies in an affixed mora provides an adequate analysis to broken plurals in the Muscat dialect of Omani Arabic. The affixed mora has to choose a locus that doesn't disturb the existing association lines in the singular → plural mapping and conform to the syllabic well-formedness constraints.

For convenience and preciseness of analysis, I will include all the constraints pertaining to syllabic and prosodic well-formedness constraints such as ONSET, $*\mu\mu\mu]\sigma$, $*\text{COMPLEX}$, Final-C, and $*\sigma [C_x C_x$ under the rubric Syllabic Well-formedness Requirement (SWR). These constraints have the same priority and they place a pivotal importance on what shape of the broken plural has to be realized. The general ranking established to account for the diverse shapes of the broken plurals is $\text{MAX}_{OO-} \sigma_F (\mu)$, SWR, (NO-SPREAD $_{OO}(\mu, \text{SEG})$, NO-DELINK $_{OO}(\mu, \text{SEG})$), $\text{MAX}_{OO} (\mu)$, $\gg \text{DEP}_{OO-} (\mu)$, $\text{DEP}_{OO-} \text{Glide}$ $\text{DEP}_{OO-F_1} (\mu)$.

The following lattice summarizes the grammar or ranking of the constraints adopted to offer an integrated analysis to the diverse shapes of broken plurals in the Muscat dialect of Omani Arabic.



5.3 Exceptional broken plurals

The discussion above has elaborately analyzed the typical and most productive broken plurals in the Muscat dialect of Omani Arabic, leaving out the exceptional shapes for further speculation. This section is dedicated to exploring the divergent shapes of broken plurals, explaining the exceptionality in their final shape.

There are three exceptional shapes of broken plurals in the Muscat dialect of Omani Arabic: broken plurals with partial reduplication, broken plurals with a single heavy iamb preceded by the glide /j/ and more strikingly broken plurals with a sole light syllable.

Noun plurals showing partial reduplication occur sporadically in the list of broken plurals in the Muscat dialect of Omani Arabic. They are also documented in a wide variety of Afroasiatic languages particularly in the Chadic, Cushitic and Semitic groups (Ratcliffe 1996: 296).

(44) Broken plurals with partial reduplication

a. xaṭ	xṭu:ṭ	‘lines’
b. šat	štu:t	‘covers’
c. ḥal	hlu:l	‘solutions’
d. šaf	šfu:f	‘classrooms’

These broken plurals are derived from singulars with two base consonants. The singulars have a single light syllable. When these singulars are mapped onto broken plurals, the second consonant in the singular form spreads to the third consonant position in the shape $C_1C_2V:C_2$, where similar subscripts indicate reduplicated consonants. The long vowel in the broken plurals is always /u:/.

Ratcliffe (1996) notes that reduplication occurs only as a feature of noun plurals whose singulars have one or two root consonants. Singulars with one or two root consonants consistently expand to a three or four consonant structure in the derivation. Ratcliffe also claims that reduplication of the final stem consonant is one way in which this is accomplished (p. 299). More relevant to broken plurals in the Muscat dialect of Omani Arabic is Ratcliffe's observation that the most common form of reduplication in Neo-Aramaic dialects and South Arabian languages is *suffixal reduplication* of a single final stem consonant with a predictably fixed vowel appearing between reduplicated consonants. The predictability of the vowel between the reduplicated consonants is a feature observed in these broken plurals.

The second group of exceptional shapes of broken plurals encompasses shapes mapped from singulars with a single heavy syllable /e:/⁴² and two consonants *modulo* the singulars deriving broken plurals with partial reduplication.

(45) Broken plurals with /j/ and heavy syllable

a. se:h	sju:h	'barren lands'
b. se:f	sju:f	'swords'
c. ʕe:š	ʕju:š	'rices'

⁴² The singular forms are underlyingly /CjC/. For example, the triliteral verb (verbs with three root consonants of form (45.c) is /ʕjʃ/.

When the singulars with two consonants and heavy syllable with the vowel /e:/ map onto broken plurals, the long mid vowel /e:/ in the singulars assimilate to the glide /j/ which precedes the long vowel /u:/. Thus, the final shape of broken plurals surfaces with consonant clusters, taking the shape CjV:C. The glide /j/ surfacing in broken plurals is attributed to underlying /j/ in the base forms. For example, the singular form [se:h] is /sjh/ in the underlying structure.

More striking are broken plurals which do not realize an extra weight in their surface shapes. Although these broken plurals are derived from singulars with three consonants and there might be a potential for the trochee C₁VC₂ to map onto the typical iamb C₁V.C₂VV, surprisingly enough, these singulars map onto a single light syllable and consonant clusters at the left edge of broken plurals.

(46) Broken plurals with trochee

a. xanš- ah	xnaš	‘trolleys’
b. buqʕ-ah	bqaʕ	‘stains’
c. durg- ah	drag	‘stairwells’
d. ʃanʔ- ah	ʃnaʔ	‘hand bags’
e. dakj- ah	dkaj	‘pillows’

5.4 Summary of chapter five

This chapter analyzes the shapes of broken plurals in the Muscat dialect of Omani Arabic building on proposals made by McCarthy (2000). The analysis adopted here basically derives the shapes of broken plurals from interaction of the Positional Faithfulness constraint **DEP_{OO}-F₁ (μ)** which maps the trochaic foot at the left edge of the singulars onto an iamb by affixing a mora to the very first foot and constraints keeping the weight of the final syllable of both the singular and broken plurals identical.

The constraint adding a mora doesn't work in isolation from the well-formedness constraints in the language. These constraints govern the locus of the added mora. This analysis proves adequate as it successfully accounts for the typical shapes, shapes with default glides, shapes with medial geminates and shapes with even iambs.

The final discussion presents an overview of some interesting issues relevant to the formation of exceptional broken plurals. It discusses shapes with partial reduplication, trochee and heavy syllable preceded by the glide /j/.

CHAPTER SIX

Vocalism

6.1 Introduction

Broken plurals in the Muscat dialect of Omani Arabic are characterized by two distinct types of fixed vocalism. The first type is manifested by the vowels contained in the *first foot at the left-edge* of the canonical broken plurals which always have the vowel [a]. It fills all the vowel positions in the first iambic feet (CV.CVV) and (C.CVV). The forms in (1) have either the typical iamb CV.CVV or the even type C.CVV at their left edge (**bold-faced**). In both these kinds of feet, [a] occurs in *all the vowel positions*. These broken plurals have a foot and a light ‘unfooted’ syllable. The final consonant is extrametrical.

(1) Vowel invariance [a] in the first foot of the broken plurals

- | | | | |
|---------------------------|--------------|---------------------------|------------|
| a. (ma.za:).ra.ʃ | ‘farms’ | c. (ma.ka:).si | ‘dresses’ |
| b. m.(qa:).ba.ð | ‘door knobs’ | d. (ma.ʔa:).ba.x | ‘kitchens’ |

The second type is phonological vocalism in which the quality of the vowels in the final short syllables of these broken plurals is phonologically dependent on the place features of the consonants that follow them. This chapter provides a formal analysis of both these types drawing on work done by Alderete *et al* (1999) and Urbanczyk (1999). It starts with a description of the *phonologically determined vowels* which are contained in the final syllables of broken plurals.

In forms (2) below, the underlined vowel in the final syllable agrees in place features with the consonant that follows it. When the final consonant is back /ʕ/ or /ħ/, the

vowel preceding it is also back [a]. Coronal consonants such as /n/ and /d/ follow front vowel [i] while round labial vowel [u] precedes labial consonants like /m/ and /b/.

(2) The vowels in the final short syllable

[a]	[i]	[u]
a. <u>ṣawa:baʕ</u> ‘fingers’	c. <u>gara:jid</u> ‘newspapers’	f. <u>maka:tub</u> ‘offices’
b. <u>rawa:jaḥ</u> ‘bad smells’	d. <u>saka:šin</u> ‘sections’	e. <u>mara:hum</u> ‘lotions’

Such a phenomenon is missing from broken plurals of classical Arabic in which the final consonants don’t affect the quality of the vowels in the final syllable. The vowel in the final syllable of broken plurals in classical Arabic is invariantly [i]. This justifies McCarthy and Prince’s (1990a) proposal to rewrite the vocalic melody [i] to associate it with the vowel position in the last syllable of broken plurals in classical Arabic.

The following table offers a summary of the types of extrametrical consonants and the quality of vowels contained in the short final syllable of broken plurals. It also presents the number of forms containing these consonants and vowels. These forms are taken from the actual data set in appendix A.

Table (1)

<i>Final C</i>	<i>V-σ_F</i>	<i>Gloss</i>	<i>Number of forms</i>
a. With emphatic, pharyngeal consonants- [a] in σ _F			
ð	mqa:bað	‘door knobs’	1
ṭ	mqa:šaṭ	‘matches’	3
ḥ	ðaba:jaḥ	‘kosher meats’	5
ʕ	ṣawa:raʕ	‘roads’	11
ṣ	mara:qaṣ	‘casinos’	1
b. With back consonants- [a] in σ _F			
x	maṭa:baḵ	‘kitchens’	1
q	ḥada:jaq	‘parks’	10
y	maba:lay	‘sums of money’	1

c. With /r/- [a] in σ_F			
r	dafa:tar	‘notebooks’	14
d. With labial consonants- [u] in σ_F			
b	ʔaqa:rub	‘scorpions’	7
m	mara:hum	‘lotions’	11
e. With labiodental consonant- [u] in σ_F or [i] in σ_F			
f	mqa:ʃuf	‘small vendors’	4
f	sawa:lif	‘gossips’	1
f. With coronals- [i] in σ_F			
n	maka:j <u>i</u> n	‘machines’	3
d	masa:q <u>i</u> d	‘mosques’	5
s	maga:li <u>s</u>	‘rooms for guests’	4
z	maxa:bi <u>z</u>	‘bakeries’	2
ʃ	haʃa:ji <u>ʃ</u>	‘grasses’	1
l	fara:mi <u>l</u>	‘brakes’	15

The above summary table establishes the fact that both the vowel and the final extrametrical consonant VC# in broken plurals’ final position share the same features for place. Alderete *et al* (1999) observe the same phenomenon for Nancowry⁴³ reduplication where a vowel assimilates to a following coda consonant. This linkage is determined by language specific tendencies and the prosodic rules of the segments involved which favors VC# place linkage over CV# place sharing (Itô and Mester 1995; Alderete *et al* 1999 and works reviewed there).

Another type of phonological vocalism is shown by the vowel /i:/ in the final syllable of broken plurals. When the final syllable of singular forms is long, broken plurals surface with a long final syllable (weight retained). However, the vowel in the final syllable of broken plurals always surfaces as /i:/ regardless of the featural quality of

⁴³ Nancowry (also known as Nicobarese) is an Austroasiatic language spoken in the Andaman Islands (Alderete *et al* 1999: 375)

the adjacent consonants and regardless of the quality of the final vowel in the singular forms.

(3) Fixed /i:/ in the last long syllable of the typical broken plurals

- | | | |
|------------------|-----------|---------------------------|
| a. (muʃ).(la:).q | mʃa:li:q | ‘hooks’ |
| b. (man).(du:).s | mana:di:s | ‘traditional Omani boxes’ |
| c. (muħ).(ħa:).r | maħa:hi:r | ‘sea shells’ |

The length of the final syllable in broken plurals corresponds to the long vowel of the singular forms. However, broken plurals change the quality of the vowels in the singulars to a fixed long vowel /i:/. These broken plurals have either the typical iamb (CV.CVV) or the even one (C.CVV) at the left-edge followed by a final heavy syllable identical in weight with the final heavy syllable in the singular forms.

This chapter is structured as follows: § 6.4.1 addresses the fixed vowel [a] in the first foot of broken plurals. The analysis then extends to account for the vowels in the final short syllables which depend highly on the place features of the consonants following them in § 6.5.1. In § 6.5.2, I analyze the phonologically determined vowel /i:/ in the final syllable of broken plurals when they are derived from singulars with a final long syllable. Before embarking on the formal analysis of the vocalism, I shall review McCarthy and Prince’s (1990a) vocalic analysis of broken plurals in classical Arabic. The analysis adopted here is inspired by arguments and thoughts raised in Alderete *et al* (1999). Therefore, § 6.3 discusses Alderete *et al*’s (1999) analysis of fixed segmentism in reduplication and shows how the current analysis relates to proposals made in this work.

6.2 Overwriting of Vocalism (McCarthy and Prince 1990a)

In accounting for the fixed vocalism of broken plural forms in classical Arabic, McCarthy and Prince (1990a) argue that the invariant vowel [a] showing up in the first

foot (CV.CVV) and the fixed [i] vowel in the second syllable (CV) of these forms result from overwriting the vowels [a] and [i] in the (CV.CVV) CV.C- shape of broken plurals.

(4) Classical Arabic broken plurals (McCarthy and Prince 1990a: 217)

<i>Sing.</i>	<i>Pl.</i>	<i>Gloss</i>
a. jundub	janaadib	‘locusts’
b. sultaan	salaatiin	‘Sultan’

In this analysis, McCarthy and Prince propose that the invariant vowels in broken plurals associate with the vowel positions in the CV-shape of these broken plurals. They pre-specify a fixed shape of broken plurals (CV.CV:). CV.C onto which singulars are mapped. While the C positions of this shape are filled with consonants from the singular stems, invariant [a] and [i] associate with the V positions in the first foot and final syllable respectively. This analysis is driven by the fact that the vowels appearing in the vowel positions of broken plurals are always fixed [a] and [i].

The use of melodic overwriting has been proposed to account for various morphological phenomena attested in a number of the world languages. For example, English ‘ʃm’ prefixal morpheme is demonstrated to be a consequence of overwriting the onset with the fixed segments ‘ʃm’ and attaching it to the beginning of words such as ‘table-schmable’ and ‘resolutions-schmesolutions’ (McCarthy and Prince 1990a; Bruening 1997, Alderete *et al* 1999).

6.3 Fixed segmentism (Alderete *et al* 1999)

Alderete *et al*’s (1999) analysis of fixed segmentism constitutes a basic grounding for the analysis of fixed vocalism of broken plurals in the Muscat dialect of Omani

Arabic. The following paragraph reviews Alderete *et al*'s theory of fixed segmentism and shows how their proposals relate to the analysis adopted here.

Alderete *et al* (1999) classify fixed segmentism which prevails in patterns of reduplication into two distinct types: phonological and morphological. Phonological fixed segmentism refers to phonological defaults which are the least marked segments that emerge in reduplicative affixes instead of expected copied segments from the base. It results from the preference of unmarked structures to occur in particular domains (reduplicative affixes, for example) while permitting marked structures to occur elsewhere (in bases, for example) in the language. Morphological fixed segmentism, on the other hand, is shown to exhibit the properties of affixation. One property they observe is 'morphological fixed segmentism has the alignment properties of an affix' (Alderete *et al* 1999: 357). This leads to adopting alignment constraints to account for the fixed [a] at the left edge of broken plurals.

As for the phonological vocalism in the final short syllable of broken plurals, the constraint AGREE-VC# (Place) monitoring identity in place features between the vowel in the final syllable and final extrametrical consonant dominates alignment constraints specifying [a] to occur at the right edge of syllables in broken plurals. The vowel /i:/ is also phonologically driven by the interactions of the constraints filtering identity in the weight of the final syllable of both the singular and broken plurals and constraints aligning [a] at the right edge of syllable. By and large, these two types of phonological vocalism reflect the occurrence of defaults in the final syllable of broken plurals.

6.4 Analysis of the fixed vocalism

6.4.1 Fixed [a]

Fixed vocalism in broken plural forms is manifested by the vowel [a] which invariably links to all V-positions in the first foot (CV.CVV) or (C.CVV) of broken plurals. The vowel [a] is [pharyngeal] and [low] (Alderete *et al* 1999).

(6) Pharyngeal [a] in the first foot (C.CVV) & (CV.CVV) of the broken plurals

<i>Sing.</i>	<i>Pl.</i>	<i>Gloss</i>
a. maki:n-ah	ma.ka:jin	‘machines’
b. maqšaṭ	m.qa:šaṭ	‘matches’
c. maqšaf	m.qa:šuf	‘small vendors’

Because [a] surfaces in the final V position when followed by a back and pharyngeal final extrametrical consonant, this provides evidence that [a] is pharyngeal as well. Moreover, this fact is encoded in the universal place markedness hierarchy proposed in Prince and Smolensky (1993) and finalized by Lombardi (1996).

(7) Place markedness hierarchy (Prince and Smolensky 1993; Lombardi 1996)

*Pl/dorsal, *Pl/labial » *Pl/coronal » *Pl/pharyngeal

There are two pre-OT analyses of the fixed [a] of broken plurals: pre-specification (Marantz 1982; McCarthy and Prince 1990a, among others) and under-specification (Pulleyblank 1988, among others). In pre-specification, the vowel [a] is underlyingly specified in its respective V-places in broken plurals while in under-specification this vowel is a default and is minimally represented as empty vowel positions which acquire the vowel specification through markedness constraints on place features and language-particulars.

The following discussion adopts quite a different approach than pre-specification to explain the fixed vocalism occurring in the first foot at the left-edge of broken plurals. It assumes that [a] is **specified** through alignment constraints and entails that there isn't an input [a]. This assumption is crucial to the analysis adopted here since it is consistent with the assumption that singulars serve as outputs to the plural forms. This analysis also entails no reference to the shape of broken plural as input to the realized [a] in the output plurals.

As for the variable vowels occurring in the final short syllable of broken plurals, they acquire their features from adjacent consonants to their right.

Two types of alignment constraints derive [a] in the first foot of broken plurals. One constraint aligns [a] to the right edge of syllables in broken plurals.

(8) ALIGN- R (σ , [a]) The right edge of every syllable coincides with the right edge of [a]

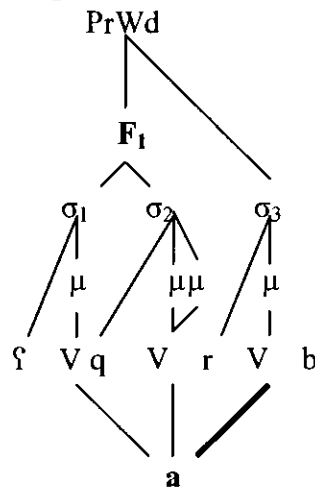
This constraint prescribes [a] to occur at the right edge of syllables in broken plurals. It is an alignment constraint couched in the Generalized Alignment Theory (McCarthy and Prince 1993b) whose general formalism is presented in chapter (3).

Generalized Alignment requires particular edges of categories or constituents to be aligned to some edges of other categories or constituents. To illustrate, it demands a particular edge of every prosodic or morphological constituent of Cat₁ coincide with a particular edge of some other prosodic or morphological constituent of Cat₂.

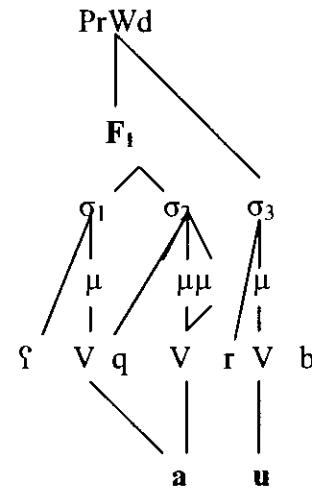
However, because [a] doesn't occur in every σ , Align- R (σ , [a]) is dominated by a constraint requiring a different vowel than [a] to surface in the final syllable of broken

plurals. As demonstrated above, [a] only links to the vowel positions contained in the first foot of broken plurals. We need a constraint that says ‘don’t spread outside the foot’. Such a constraint has been proposed by Itô and Mester (1999) who refine how categories are aligned when there is a shared feature at one or more prosodic edges. The constraint they propose is CrispEdge [Pcat]. A string has a crisp edge *if and only if* every element of that string is contained within the specified prosodic category. For example, a coda geminate which shares a place node with an onset of a following syllable violates CrispEdge [σ]. Refer to the representation in (9) below for the CrispEdge effect on vowels in broken plurals.

(9) a. ***[ʕaqa:rab]** ‘scorpions’



b. **[ʕaqa:rub]**



The effect of CrispEdge is demonstrated above in (9), where [a] doesn’t spread past the initial foot CV.CV:. The final syllable [ru] of the form [ʕaqa:rub] ‘scorpions’ is not contained within the initial foot (**ʕa.qa:**). Because as seen in (9. a), the vowel feature [a] is shared by the vowels in the first foot and the vowel outside this foot (V in σ_3), a violation of CrispEdge is incurred. When [a] fails to link to the vowels past the first foot,

a crisp foot (9. b) results. Please refer to chapter (3) for the general formalism of CrispEdge constraint.

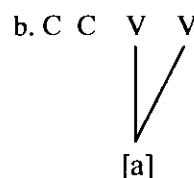
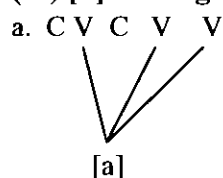
Following proposals by Urbanczyk (1999), CrispEdge constraint can be applied to vowel harmony within a foot as seen in the representation in (9) above. It has to accommodate the fact that [a] refrains from spreading past the foot in the formation of broken plurals.

(10) CrispEdge [Ft] Shared features are contained within a foot. (Urbanczyk 1999)

The third required constraint penalizes linking of [a] to many vowel positions, demonstrating the cost of spreading vowel features or simply maintaining the same place features in many V-positions. In (12.a), NoLink is violated three times by having [a] spread to three V positions while in (12.b), [a] is shared by only two V positions and it violates NoLink only twice.

(11) NoLink No linking between elements (Pulleyblank 1988; Urbanczyk 1999)

(12) [a] linking to V-positions



In the typical broken plural forms, the vowels in the even (C.CVV) and typical (CV.CVV) iambs constructed are filled by [a]. It is more economical to posit that one [a] is supplied in the first foot of broken plurals but then it links to three V-slots in (12. a) and two V-slots in (12. b) above.

The following tableau illustrates how [a] occurs in all the vowel positions contained in the first foot of broken plurals. It shows the ranking of the constraint

aligning [a] at the right edge of syllables in broken plurals and the constraint penalizing [a] from spreading past the initial foot of broken plurals.

Subscripts indicate shared vowels. For example, in candidate **a.** all the vowels which share the same subscript are one vowel which spreads in three V positions. This incurs only one violation of *Pl/phar.

Tableau (1)

O:/(ʔaq).ra.b/+μ 'scorpion'	CrispEdge [Ft]	ALIGN-R (σ, [a])	*Pl/phar	NoLink
Ⓢ a. (ʔa _x .qa: _x).ru.b		*	*	***
b. (ʔa.qii _x).ru.b		**!	*	**
c. (ʔi.qa: _x).ra _x .b	*!	*	*	***
d. (ʔu _x .qu: _x).ru _x .b	*!	***		****

Both candidates c. and d. violate the high-ranking constraint CrispEdge [Ft] by having the vowel in the first foot spread in the final syllable. Therefore, their initial feet have no crisp edge. As for candidate b., it exhibits two violations of ALIGN-R (σ, [a]). Both the second and final syllables have different vowels than [a] being aligned at their right edges. The initial foot of the output a. has a crisp edge because [a] is only restricted to fill in the vowel positions contained in the first foot. It violates ALIGN-R (σ, [a]) once because the vowel in the final syllable isn't aligned to [a]. However, ALIGN-R (σ, [a]) is outranked by CrispEdge [Ft] and the optimal output can minimally violate ALIGN-R (σ, [a]) as long as it completely satisfies the high-ranking constraint CrispEdge [Ft]. Both *Pl/phar and NoLink are low ranked and are violated by the optimal output and other candidates. For example, since [a] is pharyngeal and shared by three vowel positions, the winning candidate a. violates *Pl/phar once and NoLink three times.

The above discussion has demonstrated how the ranking of constraints derives an output with [a] restricted to the vowel positions in the first syllable by alignment constraints and a different vowel filling the V-position in the final syllable. § 6.5 analyzes the vowels in the final syllable of broken plurals. It shows that these vowels are phonologically determined.

6.5 Analysis of the phonological vocalism

6.5.1 Variable vowels

Another interesting characteristic of the fixed vocalism of broken plurals in the Muscat dialect of Omani Arabic pertains to the vowels in the final syllable when it is short. There is an identity in the place features of both the vowel in the final syllable and the consonant that comes after it.

(13) VC# in the broken plurals.

a. ra:tub	rawa:tub	‘monthly allowances’
b. da:faʔ	dawa:faʔ	‘motives’
c. haɖi:d- ah	haɖa:ɖiɖ	‘iron bars’

The quality of the vowel in the final syllable is highly determined by the place feature of the consonant that follows it. Labial consonants are preceded by round vowels. The fact that both are articulated using the lips lends support to the shared place of articulation. When the final consonants in the VC# of broken plurals are back like /ʁ/ in (15.b), the vowel preceding them is constantly back, pharyngeal [a]. This is another piece of evidence that [a] is pharyngeal and back since it assimilates to the place feature of the back consonant that comes after it. Finally, when coronals occupy the final extrametrical consonant position in broken plurals, the vowel in the final syllable is [i] accordingly.

Further evidence of VC# place linkage comes from the imperfective verbs of Omani Arabic⁴⁴. As demonstrated below, the quality of the vowels in the final syllable is determined by the place features of the consonants that follows them.

(14) Imperfectives in Omani Arabic

<i>Perf.</i>	<i>Imperf.</i>	<i>Gloss</i>
a. šaṭab	jišṭ <u>ub</u>	‘cross out’
b. xaṭaf	jixṭ <u>uf</u>	‘kidnap, pass by’
c. yaṣal	jiy <u>sil</u>	‘wash’
d. ṭabax	jiṭ <u>bax</u>	‘cook’

There needs to be a constraint in the grammar which compels assimilation of place features between the final extrametrical consonant and the vowel in the final syllable. Such a constraint would be AGREE (Place) (Lombardi 1996) which basically scans any pair of adjacent segments in a word and ensures that they share the same place features; otherwise, a violation would be incurred if discrepancies of place features are observed. Although this constraint might serve equally well in this particular instance, a more narrow constraint is needed to capture the fact that only VC# in broken plural final position share the identical place features. The way to translate this requirement is:

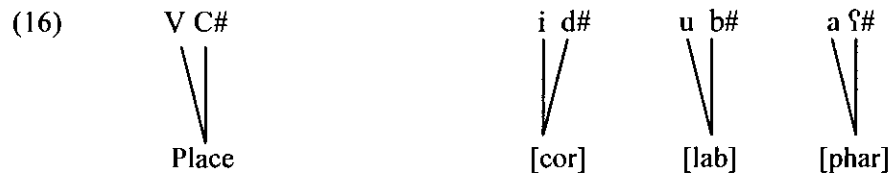
(15) AGREE- VC#(Place) The vowel and consonant in word-final position share the same place features.

Since the forms *rawa:tib and *rawa:tab fare better in having vowels with the least marked place feature than the actual form [rawa:tub], AGREE- VC#(Place) must dominate the constraint aligning the vowel [a] at the right edge of syllables. This conflict of constraints is shown in the tableaux, subsequent to the discussion.

⁴⁴ A similar conclusion to the place linkage between the final extrametrical and preceding vowel in the imperfectives in Omani Arabic is also made by Shaaban (1977).

Moreover, both V in the final syllable and the following C are place-linked. The constraint against having structures which are linked to the same place is NoLink (refer to 12 above).

NoLink is dominated by creating structures in the output forms where both the vowel and the consonant following it are linked through the same place feature. This also implies that there are no new features introduced by the vowels in the final syllable. These vowels are clearly defaults, as they have exactly the same place features as the consonants that follow them.



The following tableaux show that both AGREE-VC# (Place) and CrispEdge [Ft] dominate ALIGN-R (σ , [a]) and produce the optimal output in which [a] only occurs in the vowel positions in the first foot. The vowels filling in the V positions in the final short syllable are variables and depend on the place features of the consonants that come after them.

The identical subscripts in the tableaux below refer to shared features. Therefore, the occurrence of the shared feature only incurs one violation mark regardless of how many times that feature is observed in the same form. This assumption is crucial to the analysis adopted here as it shows that [a] filling all V-positions is only one vowel with the exact place feature and not three distinct ones linked to V-positions, as shown in (14) above.

Tableau (2)

O:/(mah).za.m/+μ 'belt'	AGREE-VC# (Place)	CrispEdge [Ft]	ALIGN-R (σ, [a])	*Pl/phar	NoLink
♣ a. (ma _x .ha: _x).zu _z .m _z			*	*	****
b. (ma _x .ha: _x).za _z .m	*!			**	***
c. (ma.hii _x).zu _z .m			***!	*	***
d. (mi.ha: _x).zi _x .m	*!		**	*	***
e. (mu _x .hu: _x).zu _x .m _x		*!	***		****
f. (ma _x .ha: _x).za _x .m	*!	*		*	****

Tableau (3)

O:/(mis).g i.d/+μ 'mosque'	AGREE-VC# (Place)	CrispEdge [Ft]	ALIGN-R (σ, [a])	*Pl/phar	NoLink
♣ a. (ma _x .sa: _x).gi _z .d _z			*	*	****
b. (ma _x .sa: _x).gu.d	*!		*	*	***
c. (ma.sii _x).gi _z .d _z			***!	*	***
d. (mi.sa: _x).ga _x .d	*!	*	*	*	***
e. (mu _x .su: _x).gu _x .d	*!	*	***		****
f. (ma _x .sa: _x).g i _x .d _x		*!	*	*	****

The violation of NoLink doesn't determine the winning candidate. The optimal output violates NoLink four times by having [a] shared by three V positions in the initial foot and the final vowel linked in place features with the final extrametrical consonants. The agreement in place features between CV# determines the optimal output. The optimal outputs in the above tableaux violate *Pl/phar once. Both CrispEdge [Ft] and AGREE-VC# (Place) are highly ranked and the optimal output obeys them. Where [a] spreads past the foot level, CrispEdge [Ft] is violated and the candidates of this violation are doomed.

An important detail remains to be addressed. [a] in the final syllable of some broken plurals that have a final back consonant is different from the specified [a] associating to the V positions in the first foot. It results from assimilation to the place

feature with the final extrametrical consonant. Such a fact is translated in different subscripted [a]s. Observe the following ranking.

Tableau (4)

O:/(fun).du.q/+μ 'hotel'	AGREE-VC# (Place)	CrispEdge [Ft]	ALIGN-R (σ, [a])	*Pl/phar	NoLink
⦿ a. (fa _x .na: _x).da _z .q _z				**	****
b. (fa _x .na: _x).du.q	*!		*	*	***
c. (fi _x .nii _x).da _z .q _z			**!	*	****
d. (fi.na: _x).da _x .q _x		*!	*	*	***
e. (fu _x .nu: _x).du _x .q	*!	*	***		****
f. (fa _x .na: _x).da _x .q _x		*!		*	****
g. f. (fa _x .na: _x).di.q	*!		*	*	***

Although the optimal output has [a] filling in all the vowel positions, the [a] in the final syllable is driven by the assimilatory process which links the final consonant and preceding vowel in place feature. It is thus distinct from the [a] in the initial foot. Candidates a. and f. both have the vowel [a] in all their syllables. However, candidate a. wins because the vowel [a] in the final syllable isn't the same as the vowel [a] in the first foot at the left edge of broken plurals.

6.5.2 /i:/ in the long final syllable

The second type of phonological vocalism of broken plurals in the Muscat dialect of Omani Arabic also relates to the vowel in the final syllable. It is manifested by the vowel /i:/ in the final syllable of broken plurals which are derived from singulars with final long syllables. In forms (17), the final syllable of both the singulars and plurals is heavy. Regardless of both the quality of the vowels in the final syllable of the singular

forms and featural quality of the final consonants in broken plurals, the final syllable (underlined) of these broken plurals surface with the vowel /i:/.

(17) Broken plurals with long final syllable

<i>Sing.</i>	<i>Pl.</i>	<i>Gloss</i>
a. qa:mu:s	qawa: <u>mi</u> :s	‘dictionaries’
b. kalla:b	kala: <u>li</u> :b	‘clips /wrenches’
c. ʕaʃfu:r	ʕaʃa: <u>fi</u> :r	‘birds’

This pattern clearly incorporates a reduction in phonological markedness in that [i] is [coronal] and it is less marked cross-linguistically (Prince and Smolensky 1993). This fact is manifested by the *Place markedness hierarchy (see (7) above). Prince and Smolensky (1993) suggest that consonants with coronal place feature like /d/ and /t/ are the least marked and most frequent consonants cross-linguistically. Thus, these segments are selected as defaults in languages. Lombardi (1996) extends this assumption by designating that the laryngeals, especially /ʔ/ are the most common default consonants. She stretches the place markedness hierarchy to the lower end by proposing that pharyngeals (which include laryngeals (Alderete *et al* 1999: 335)) are less marked than coronals. Smolensky (1993) observes that a marked place of articulation incurs a mark of violation for every time the feature of that place occurs.

It is important to note that the length in the final syllable of broken plurals is driven by Positional Faithfulness constraints and relates to the long vowel in the final syllable of the singulars. McCarthy (2000) shows that preserving the weight of the final syllable of broken plurals is a consequence of high-ranking $\text{Max}_{\text{OO-}\mu}$ which militates against loss of morae from the final syllable of broken plurals when they map from singulars with a final long syllable.

The constraint $\text{MAX}_{\text{OO-}\sigma_F}(\mu)$ penalizes the loss of mora from the final syllable of broken plurals when they are derived from singulars with final long syllable.

(18) $\text{MAX}_{\text{OO-}\sigma_F}(\mu)$

For every μ in the final σ of output_1 , there is a correspondent μ in the final σ of output_2 .

The vowel /i:/ is coronal and exhibits low ranked violation marks. Therefore, *Pl/cor is dominated by $\text{MAX}_{\text{OO-}\sigma_F}(\mu)$ and CrispEdge [Ft] which monitors identity of weight in the final syllables of the broken plurals which are derived from singulars with a long final syllable and restricts the initial foot to having CrispEdge respectively. The following tableaux show how /i:/ is derived in the final syllable of the broken plurals.

An important detail remains to be addressed: despite the fact that a candidate with a long mid low vowel [a:] in the final syllable of a form like $(\text{Ca}_x, \text{Ca}_x), (\text{Ca}_y), \text{C}$ satisfies all crucial high ranking constraints since it retains weight of the final syllable and has a crisp edge and even fares better in having the right-edge of all its syllables aligned to [a], it can not be an output in Arabic. This is because of a strict adherence to Obligatory Contour Principle (OCP)⁴⁵ which the language ensures not to violate (McCarthy 1979, 1986; Gofos 2003, 1997a among others). This principle bans identical adjacent features from spreading to adjacent positions. [a] doesn't spread to all V positions.

(19) Obligatory Contour Principle (OCP)

At the melodic level, adjacent identical elements are prohibited. (McCarthy 1986:208)

The subscripted vowels show shared elements in that one [a] fills three V positions and incurs three violation marks of NoLink. Other vowels like [u] and [i] filling more

⁴⁵ Arabic is famous for obeying OCP as there is a virtually total absence of nominal and verbal stems of the pattern $\text{C}_i\text{VC}_i\text{VC}_j$. This observation entails two consequences: Arabic roots are subject to OCP and the spreading in Arabic is rightward (McCarthy 1986)

than one V positions and bearing similar subscripts are assumed to be one vowel linking to more than one V position *modulo* to [a].

Tableau (5)

O:/(xur). (xa:) _s /+μ 'toy'	MAX _{OO} - σ _F (μ)	CrispEdge [Ft]	OCP	ALIGN-R (σ, [a])	*Pl/cor	*Pl/phar	NoLink
⊕ a. (xa _x .ra:) _x .(xi:) _s .š				*	*	*	***
b. (xa _x .ra:) _x .(xa:) _x .š		*!				*	*****
c. (xa.rii) _x .(x i:) _z .š				**!	**	*	****
d. (xi.ra:) _x .xi _x .š	*!	*		*	*	*	***
e. (xu _x .ru:) _x .(xu:) _x .š		*!		***			*****
f. (xa _x .ra:) _x .(xa:) _y .š			*!			**	*****

Tableau (6)

O:/(man). (du:) _s /+μ 'box'	MAX _{OO} - σ _F (μ)	CrispEdge [Ft]	OCP	ALIGN-R (σ, [a])	*Pl/cor	*Pl/phar	NoLink
⊕ a. (ma _x .na:) _x .(di:) _s				*	*	*	***
b. (ma _x .na:) _x .(da:) _x .s		*!				*	*****
c. (ma.nii) _x .(d i:) _x .s				**!	*	*	****
d. (mi.na:) _x .da _z .s	*!			*	*	**	***
e. (mi _x .na:) _z .da:) _z .s		*!		*	*	*	****
f. (ma _x .na:) _x .(da:) _y .s			*!			**	*****

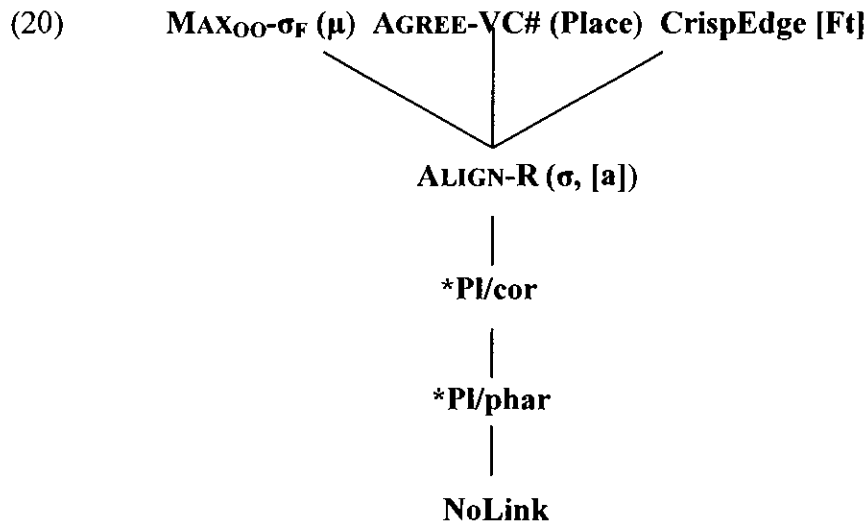
Candidate d. in tableaux (5) and (6) loses a mora in its final syllable and incurs a violation to the high-ranking constraint MAX_{OO}-σ_F (μ). Candidates b. and e. in tableaux (5) and (6) violate crispEdge [Ft] by having [a] extends beyond the first foot. Candidates c. have two syllables whose right edge isn't aligned to [a]. This is one more violation than the optimal output which only incurs one violation mark to ALIGN- R (σ, [a]). Thus, they are excluded from further evaluation. Candidate f. in tableaux (5) and (6) fatally violates OCP because all the adjacent vowel positions have an identical vowel [a]. Candidate a., on the other hand, violates *Pl/phar once by having the same [a] fill in all

V-positions in the left foot of the broken plurals and *Pl/cor by having /i/ fill the V position in the final syllable. These two constraints are low ranked.

It is worth mentioning that linking of the extrametrical consonant and vowel in the final syllable isn't possible in these broken plurals because of the long vowel in broken plurals which corresponds to the long vowel in the final syllable of the singulars. Therefore, AGREE-VC# (Place) isn't applicable in these forms.

To sum up, the discussion explores the fixed vocalism observed in the first foot at the left-edge of broken plurals and the phonological vowel /i:/ attested in the final syllable of broken plurals when they are derived from singulars with a final long syllable. The length is thus retained but the quality of the vowel is neutralized to a less marked vowel (high and coronal). Constraints like NoLink come into play to evaluate that the fixed [a] is shared by all V-places, thus banning new features from being introduced. In the case where /i:/ always surfaces in the last syllable of broken plurals, a Positional Faithfulness constraint $\text{MAX}_{\text{OO}-\sigma_F}(\mu)$ is needed to make sure that weight is retained from the singular form.

In summary, the analysis has offered an integrated approach of the two types of fixed vocalism in broken plurals in the Muscat dialect of Omani Arabic. The fixed vowel [a] is restricted to spread in the vowels contained within the initial foot allowing vowels in the final syllable to assimilate in place to the final extrametrical consonant. The grammar or ranking of the vocalism in broken plurals is summarized below in the form of a lattice.



The general ranking is **MAX_{OO-σ_F} (μ), CrispEdge [Ft], AGREE-VC# (Place) » ALIGN-R (σ, [a]) » *Pl/cor » *Pl/phar » NoLink.**

6.6 Vocalism in the exceptional broken plurals

There are large numbers of exceptional broken plural forms which don't conform with the vocalic invariance exhibited in the typical broken plurals. These exceptional forms have only either a heavy syllable H or a light syllable L. In the forms with the heavy syllable, the pervasive vowels linked to VV-positions in CCV:C shape are [a:], [u:] or [i:]. However, when the vowel in the only syllable of broken plural forms is light, the invariant vowel [a] surfaces. The following table surveys the vowels and surrounding consonants occurring in the exceptional broken plural forms.

Table (2)

<i>Cs surrounding V</i>	<i>[u:]</i>	<i>Gloss</i>	<i>Number of forms</i>
a. Between labials and back consonants or /l/, /r/			
m ʃ	šmu:ʃ	‘candles’	1
m x	šmu:x	‘scratches’	1
f l	qfu:l	‘locks’	1
m r	xmu:r	‘wines’	1
b l	ʔbu:l	‘drums’	1
b. Between coronals and back consonants			
š ʔ	mšu:ʔ	‘combs’	5
ħ n	ʃhu:n	‘plates’	5
c. Between glides and back consonants or coronals			
j x	šju:x	‘tribal chiefs’	2
j š	ʃju:š	‘rices’	3
d. Between back consonants			
x ʔ	šxu:ʔ	‘lines’	1
ʔ ʔ	xʔu:ʔ	‘lines’	1
<i>Cs surrounding V</i>	<i>[a:]</i>	<i>Gloss</i>	<i>Number of forms</i>
a. Between labials and coronals			
m l	gma:l	‘camels’	4
b. Between back consonants and coronals			
ʃ l	mʃa:l	‘sieves’	6
c. Between two coronals			
l l	mlla:l	‘bowls’	2
<i>Cs surrounding V</i>	<i>[i:]</i>	<i>Gloss</i>	<i>Number of forms</i>
a. Between labials and coronals			
r m	ħri:m	‘women’	2
b. Between back consonants and coronals			
x l	nxi:l	‘palm trees’	1

Obviously, there is a high diversity in the quality of consonants that surround the three long vowels which precludes them from being classified as a natural class triggering one vowel or the other. Besides, the shapes of these broken plurals are idiosyncratic, having only one heavy syllable and permitting clusters of consonants at the

edges of forms. These broken plurals are also lexically conditioned as they only map to a form with a sole heavy syllable. They differ from the typical broken plurals which map onto a form with an iamb and a second syllable whose length is related to the length of the final syllable of the singular forms from which they are derived.

The exceptionality of these broken plurals relates to the unusual shapes of the singular forms from which these plurals are derived. The singulars are characterized by a sole light syllable and consonant clusters at either the left or right edges of words. The general two shapes of singular forms are CCVC or CVCC. Observe the following examples.

(21) Exceptional shapes

<i>Sing.</i>	<i>Pl.</i>	<i>Gloss</i>
a. ʔarf	ʔru:f	‘envelopes’
b. xamr	xmu:r	‘wines’
c. hiʃn	hʃu:n	‘forts’
d. mʃal	mʃa:l	‘sieves’
e. mgaz	mga:z	‘grass cutters’

6.7 Summary of chapter six

This chapter offers an analysis of the two distinct types of fixed vocalism of broken plurals in the Muscat dialect of Omani Arabic. The first type of fixed vocalism is manifested by the invariant vowel [a] in the first foot at the left-edge of broken plurals. The phonological vocalism is shown by the vowels in the final short syllable of broken plurals which are highly dependent on the place features of the consonants that follow them. When the final syllable of the singular forms is long, broken plurals also surface with a long final syllable. However, the final syllable of broken plurals always has less marked vowel /i:/. These facts can be explained if we assume that the fixed vowel in the

first foot of broken plurals is **specified** by alignment constraints. As demonstrated in the surface forms of broken plurals, [a] is aligned at the right edge of the syllables contained in the first foot of the plurals. The constraint CrispEdge [Ft] restricting [a] to link to all the vowels within a prosodic constituent dominates ALIGN-R (σ , [a]) which aligns [a] to the right edge of all syllables.

Analyzing [a] as a default (under-specified) or pre-specified in the plural shape would create problems to the correspondence relations assumed between the singulars and broken plurals. Furthermore, under-specification requires that the underlying structure of broken plural shape (input) be represented with empty V positions which get their vocalic specification by supplying the most unmarked vowel by *Place markedness hierarchy. It doesn't show why vowels other than [a] don't occur in the first foot of broken plurals since other vowels like [u] and [i] will be ruled out by *Place markedness hierarchy which excludes any candidate with these vowels from further evaluation. For example, *matu:bax is ruled out by *Place markedness in which *Pl/lab » *Pl/phar.

As for the vowel /i:/, the length relates to the long final syllable of the singulars. Therefore, the constraint MAX_{OO- σ_F} (μ) which penalizes the loss of μ from the final syllable of broken plurals is highly ranked. Moreover, the fact that /i/ is an unmarked vowel is supported by the *Place markedness hierarchy. The phonological vocalism in the short final syllable is analyzed by having the constraint AGREE-VC# (Place) that dooms any candidate whose final C and V don't share place features.

CHAPTER SEVEN

Conclusions and Implications

This thesis has examined the morphological phenomenon of broken plurals in the Muscat dialect of Omani Arabic. It documents the various shapes of broken plurals mapped from singulars with diverse patterns. Canonical broken plurals are demonstrated to relate in their overall shapes to the singulars. However, the Muscat dialect of Omani Arabic also exhibits notorious shapes of broken plurals that can't be attributed directly to the shapes of the singulars. The extra weight distinguishing the singulars from their broken plurals doesn't apply to form plurality in these forms. They simply resist mapping onto any expansions of iambs *modulo* to the typical broken plurals. Some exceptional shapes also appear with partial reduplication.

This thesis has built on proposals made by McCarthy (2000) who assumes that the distinction between singulars and broken plurals lies in an affixed μ at a particular locus in the singular forms. Despite the fact that the affixed μ enforces a particular foot structure namely iamb to be realized in broken plurals, the analysis proposed here assumes along with premises of Generalized Template Theory (GTT) that such a templatic effect (PLURAL = IAMB) is best interpreted as interactions of markedness constraints of Universal Grammar. The analysis also entails that well-formedness and prosodic faithfulness constraints play a major role in determining where the affixed μ is added and how the shapes of broken plurals are finally realized.

Positional Faithfulness constraints (Beckman 1998) encoded in DEP_{OO}-F₁ (μ) account for the extra weight realized in the first foot at the left-edge of broken plurals. Prior to McCarthy's (2000) OT proposals, Prosodic Circumscription (McCarthy and

Prince 1990a) addresses this fact by assuming a mapping of a trochaic foot at the left edge of the singulars C_1VC_2 or C_1VV or C_1VC_2V onto an iamb C_1VC_2VV . This mechanism requires reference to iambs which this thesis dispenses with altogether.

McCarthy's proposal provides a well-established mechanism that basically applies the general rule for forming broken plurals (affixed $+\mu$) not in isolation from the well-formedness constraints that govern the structure of the language as a whole. Therefore, it has been demonstrated in the analysis of the shapes of broken plurals that when an extra μ gets attached at the first foot of a singular with an idiosyncratic shape, new well-formedness constraints are used to basically filter the occurrence of a structure that the language doesn't permit. For example, in forming broken plurals from singulars with medial geminates, generally motivated constraints like 'geminates are banned from margins of syllables' are called upon to license the final shape of the admissible broken plural.

The basic argument that underlies the analysis of the shapes of broken plurals is that although forming broken plurals imposes an extra mora to be realized in their surface structures, Universal Grammar filters how the final shape will be structured by defining the location of the affixed mora.

Broken plurals in the Muscat dialect of Omani Arabic exhibit interesting vocalism that differs from the vocalism contained in broken plurals of classical Arabic. The preference for the least marked vowel [a] at the right edge of syllables contained in the first foot at the left edge of broken plurals allows alignment constraints to specify this vowel. As there is a restriction on [a] occurring within just the first foot, a constraint banning this vowel from spreading past the foot level is required. Such a constraint is

available in the OT literature and dubbed as CrispEdge [Pcat] (Itô and Mester 1999). This proposal definitely provides an elegant analysis for [a] which is restricted to occurring at a certain prosodic constituent which is the Foot domain.

Another type of fixed vocalism in broken plurals of the Muscat dialect is phonological vocalism. The vowels in the final short syllable of broken plurals depend on the place features of the consonants that follow them. This can be best understood as an undominated AGREE- VC# (Place) effect which assimilates the place features for both the vowel in the final syllable and the extrametrical consonant.

The long vowel /i:/ in the final syllable of broken plurals is driven from the length of the final syllable of the singular forms. Such a relatedness and identity of weight in the final syllable of both the singulars and plurals is captured by Positional Faithfulness constraints. McCarthy (2000) shows that stem-final position is privileged in that contrast in the final position is maintained. Moreover, Beckman (1998:1) refers to final syllables as a **possibly** privileged position (using Beckman's word). These empirical pieces of evidence extracted from the OT literature serve perfectly well in accounting for a whole range of interesting phenomena in the course of offering an integrated analysis to broken plurals in the Muscat dialect of Omani Arabic.

To sum up, the analyses of both the shapes and vocalism of broken plurals in the Muscat dialect of Omani Arabic tie in with previous work on OT. The constraints adopted as well as the general mechanism of constraint interactions and ranking OT offers provide a well-motivated mechanism. Reference to Prosodic Circumscription and pre- or under-specification to account for the shapes and vocalism respectively are challenged by the elegance of analysis provided by the Optimality Theory framework.

Bibliography

- Abd-Rabbo, M. (1988). *Some Morphological Constraints in Classical Arabic*. Ph.D Dissertation. Stanford University.
- Abd-Rabbo, M. (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: John Benjamins. 55-93
- Abu-Mansour, A. H. (1995). The interface between morphology and phonology: The case of the broken plurals in Arabic. *LACUS Forum* 22, 320-339
- Alderete, J. 1999. *Morphologically Governed Accent in Optimality Theory*. Ph.D Dissertation, University of Massachusetts, Amherst. ROA-309.
- Alderete, J., Beckman, J., Benua, L., Gnanadesikan, A., McCarthy, J., & Urbanczyk, S. (1999). Reduplication with fixed segmentism. *Linguistic Inquiry* 30, 327-64
- Anttila, A. (1997). Deriving Variation from Grammar: A Study of Finnish Genitives. *Variation, Change and Phonological Theory*. In F. Hinskens, R. van Hout, and L. Wetzels (eds). Amsterdam: John Benjamins. Rutgers Optimality Archive ROA-63.
- Archangeli, D. and Pullyblank, D. (1994). *Grounded Phonology*. Cambridge: MIT
- Beckman, J. (1998). *Positional Faithfulness*. Ph.D Dissertation. University of Massachusetts, Amherst. ROA-234-1297
- Benhallam, A. (1980). *Syllable Structure and Rule Type in Arabic*. Ph.D Dissertation. University of Florida.
- Benua, L. (1995). Identity effects in morphological truncation. *University of Massachusetts Occasional Papers in Linguistics 18: Papers in Optimality Theory*. In J. Beckman, L. Walsh Dickey, and S. Urbanczyk (eds.), GLSA, University of Massachusetts, Amherst, 77-136 [Rutgers Optimality Archive #74]
- Benua, L. (1997). *Transderivational Identity: Phonological Relations Between Words*. Ph.D Dissertation, University of Massachusetts, Amherst. ROA-259-0498
- Brame, M. (1970). *Arabic Phonology: Implication for Phonological Theory and Historical Semitic*. Ph.D Dissertation. MIT.
- Bruening, B. (1997). Abkhaz Mabkhaz: M-Reduplication in Abkhaz, weightless syllables, and base-reduplicant correspondence. In B. Bruening, M. McGinnis, and Y. Kang (Eds.). *MIT Working Papers in Linguistics* 30, 291-329

- Brockett, A. (1985). *The spoken Arabic of Khabura. Journal of Semitic Studies* 33. University of Manchester Press: UK. 146-149.
- Clements, G. N., Hume, E. (1995). The internal organization of speech sounds. In Goldsmith (ed.). *Handbook of Phonological Theory*. Blackwell: Cambridge. 245-307
- Crystal, D. (1997). *A Dictionary of Linguistics and Phonetics*. Cambridge: Blackwell Publishers Ltd.
- Gafos, A. (1996). *The Articulatory Basis of Locality in Phonology*. Ph. D Dissertation. The Johns Hopkins University.
- Gafos, A. (1997a). Eliminating Long-distance Consonantal Spreading. Ms., University of Massachusetts, Amherst. [Revision of Rutgers Optimality Archive #106]
- Gafos, A. (2003). Greenberg's asymmetry in Arabic: A consequence of stems in paradigm. *Language* 79, 317-355.
- Glover, B. (1988). *The Morphophonology of Muscat Arabic*. Ph.D Dissertation. University of California, Los Angeles.
- Goldsmith, J. (1976). *Autosegmental Phonology*. Bloomington: Indiana University Linguistics Club.
- Greenberg, J. (1955). *Studies in African Linguistic Classification*. New Haven: Compass Press.
- Guda, A. (1988). *Qur'anic Recitation: phonological analyses*. Ph.D Dissertation: Georgetown University.
- Hammond, M. (1988). Templatic transfer in Arabic broken plural, *Natural Language and Linguistic Theory* 6, 247-70.
- Hayes, B. (1979). *A Metrical Theory of Stress Rules*. Ph. D Dissertation. MIT, Cambridge, Mass. (Published 1985, New York: Garland Press)
- Hayes, B. (1987). A revised parametric theory. In J. McDonough and B. Plunkett (eds.), *NELS 17*. Amherst, Mass.: Department of Linguistics. University of Massachusetts. 274-289
- Hayes, B. (1995). *Metrical stress theory: Principles and case study*. Cambridge, Mass.: MIT Press.
- Hetzron, R. (1974). La division de langues semitiques. In A. Caquot and D. Chen (eds.). *Actes du Premier Congres International d'Etudes Semitiques et Chamito-Semitiques*. The Hague: Mouton, 103-127

- Holes, C. (1989). Towards a dialect geography of Oman. *London University of Oriental and African Studies Bulletin*, 52, 446-62
- Horwood, Graham. 2001. Anti-faithfulness and subtractive morphology. [Rutgers Optimality Archive ROA-466-0901]
- Itô, J., Kitagawa, Y and Mester, A. (1996). Prosodic faithfulness and correspondence: Evidence from a Japanese argot. *Journal of East Asian Linguistics* 5, 217-294
- Itô, J. and Mester, A. (1995). Japanese Phonology. *The Handbook of Phonological Theory*. In J. Goldsmith (ed.). Oxford: Blackwell. 817-838
- Itô, J. and Mester, A. (1999). Realignment. *The Prosody Morphology Interface*. In R. Kager, H. van der Hulst and W. Zonnevald (eds.). Cambridge University Press. 189-217
- Jayakar, A. (1889). The O'manee dialect of Arabic. *JRAS*, 649-87 and 811-89
- Jayakar. A. (1903). The Shahee dialect of Arabic. *Journal of the Bombay Branch of the Royal Asiatic Society* 21, 649-880
- Johnstone, T. (1977). *Harsusi Lexicon*. London: Oxford University Press.
- Johnstone, T. (1981). *Jibbali Lexicon*. London: Oxford University Press.
- Kager, R. (1988). Metrical constituency and rhythmic adjustments. *Phonology* 5, 21-71
- Kager, R. (1993a). Alternatives to the iambic law. *Natural Language and Linguistic Theory* 11, 381-432
- Kager, R. (1999). *Optimality Theory*. Cambridge University Press: UK. 142-190
- Kager, R. and Zonneveld, W. (1999). Introduction. *The Prosody-Morphology Interface*. In R. Kager and H. van der Hulst (eds.), Cambridge University Press. 1-38
- Leben, W. (1980). A metrical analysis of length. *Linguistic Inquiry* 11, 497-509
- Liberman, M and Prince, A. (1977). On stress and linguistic rhythm. *Linguistic Inquiry* 8, 249-336
- Liven, J. (1985). *A Metrical Theory of Syllabicity*. Ph.D Dissertation, MIT.
- Levy, M. (1971). The Plural of the Noun in Modern Standard Arabic. Ph.D Dissertation. University of Michigan. Ann Arbor: University Microfilms International.
- Levy, M. & Fidelholtz, J. (1970). Arabic plurals, rule features and lexical features. *Glossa* 5, 57-70

- Lombardi, L. (1996). Why place and voice are different, m.s. University of Maryland.
- Lombardi, L. and McCarthy, J. (1991). Prosodic circumscription in Choctaw morphology. *Phonology* 8, 37-71
- McCarthy, J. (1979). *Formal Problems in Semitic Phonology and Morphology*. Ph.D Dissertation, MIT, Cambridge, Mass.
- McCarthy, J. (1981). A Prosodic Theory of Non-concatenative Morphology. *Linguistic Inquiry* 12, 373-418
- McCarthy, J. (1982). Prosodic structure and expletive infixation. *Language* 58, 574-590
- McCarthy, J. (1985). The phonetics and phonology of Semitic pharyngeals. In Keating (ed.). *Papers in Laboratory Phonology* 3: Cambridge: CUP. 191-283
- McCarthy, J. (1986). OCP effects: Gemination and Antigemination. *Linguistic Inquiry* 17, 207-263
- McCarthy, J. and Prince, A. (1986). Prosodic Morphology, manuscript, University of Massachusetts and Brandies University.
- McCarthy, J and Prince, A. (1990). Foot and word in prosodic morphology: The Arabic broken plural. *Natural Language and Linguistic Theory* 8, 209-283.
- McCarthy, J & Prince, A. (1990b). Prosodic morphology and templatic morphology. In M. Eid and J. McCarthy (eds.). *Perspectives on Arabic Linguistics: Papers from the second Symposium*, Amsterdam: John Benjamins. 1-54
- McCarthy, J and Prince, A. (1993a). Prosodic Morphology I: Constraint interaction and satisfaction. Ms.. University of Massachusetts, Amherst, and Rutgers University. MIT Press.
- McCarthy, J and Prince, A. (1993b). Generalized alignment. In G. Booij and J. van Marle. *Yearbook of Morphology 1993*. Dordrecht: Kluwer. 79-153
- McCarthy, J and Prince, A. (1994a). The emergence of the unmarked: Optimality in Prosodic Morphology. *Proceedings of the North East Linguistic Society* 24. GLSA, University of Massachusetts, Amherst. 333-379
- McCarthy, J and Prince, A. (1995). Faithfulness and Reduplicative Identity. In J. Beckman, S. Urbanczyk and L. Walsh (eds.). *University of Massachusetts Occasional Papers in Linguistics* 18: *Papers in Optimality Theory*, Graduate Linguistic Student Association, Amherst, Massachusetts. 249-384.

- McCarthy, J. (1998). Morpheme structure constraints and paradigm occultation. *Papers from the Regional Meetings 34*, Chicago Linguistic Society. 125-150
- McCarthy, J. (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. 151-189
- McCarthy, J. (2002). *A Thematic Guide to Optimality Theory*. Cambridge University Press: New York.
- Paradis, C. and Prunet, J. (1990). The coronal vs. placelessness controversy. *McGill Working Papers in Linguistics 6*, 192-228.
- Prochazka, T. (1981) The Shi'i dialects of Bahrain and their relationship to the eastern Arabian dialects and the Omani dialect of al-Ristaq. *Journal of Arabic Linguistics 6*, 16-55.
- Prince, A & Smolensky, P. (1993). Optimality Theory: Constraint interaction in generative grammar. Ms., Rutgers University, New Brunswick, and University of Colorado, Boulder. MIT Press.
- Prince, A. (1980). A metrical theory for Estonian quantity. *Language 66*, 511-62
- Pulleyblank, D. (1988). Vocalic underspecification in Yoruba. *Linguistic Inquiry 19*, 233-270
- Ratcliffe, R. (1988). *Defining Morphological Isoglosses: The Broken Plural and Semitic sub-classification*. Tokyo Gaikokugu Daigaku Publishing Company: Japan.
- Ratcliffe, R. (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: John Benjamins. 94-119
- Ratcliffe, R. (1992). *The Broken Plural Problem in Arabic, Semitic and Afroasiatic: A Solution Based on the Diachronic Application of Prosodic Analysis*. Ph.D Dissertation. Yale University.
- Ratcliffe, R. (1996). Drift and noun plural reduplication in Afroasiatic. *Bulletin of the School of Oriental and African Studies, LIX (2)*. 296-311.
- Reinhardt, C. (1894). Ein Arabischer Dialekt Gesprochen in 'Oman and Zanzibar. Berlin: W. Spemann.
- Rose, S. (1997). *Theoretical Issues in Comparative Ethio-Semitic Phonology and Morphology*. Ph. D. Dissertation, McGill University.

- Sa'adeddin, M & Thelwall, R. (1999). *Handbook of the International Phonetic Association*. Cambridge University Press. 51-54
- Shaaban, K.A. (1977). *The Phonology and Morphology of Omani Arabic*. Ph.D. Dissertation. University of Texas, Austin.
- Shaaban, K.A. (1985). Regularization processes in Arabic dialects: The verb in Omani Arabic. *Arab Journal of Language Studies: Journal of the Khartoum International Institute of Arabic*, 4, 157-165
- Spaelti, P. (1997). *Dimensions of Variation in Multi-Pattern Reduplication*. Ph. D Dissertation. University of California, Santa Cruz.
- Smolensky, P. (1993). Harmony, markedness and phonological activity. Talk presented at Rutgers Optimality Workshop 1.
- Urbanczyk, S. (1995). Double reduplication in parallel. *University of Massachusetts Occasional Papers in Linguistics 18: Papers in Optimality Theory*. In J. Beckman, L. Walsh Dickey, S. Urbanczyk (eds.). GLSA, University of Massachusetts, Amherst. 499-532
- Urbanczyk, S. (1996a). Morphological templates in reduplication. *Proceedings of NELS 26*. GLSA, University of Massachusetts, Amherst. 425-440
- Urbanczyk, S. (1996b). *Patterns of Reduplication in Lushootseed*. Ph.D Dissertation. University of Massachusetts, Amherst.
- Urbanczyk, S. (1999). Echo vowels in Coast Salish. In M. Coldecott, S. Gessner and E-S Kim (eds.). *Workshop on Structure and Constituency in the Languages of the Americas (WSCLA)*, University of British Columbia Working Papers in Linguistics 2, 165-184
- Ussishkin, A. (1999). The inadequacy of the consonantal root: Modern Hebrew denominal verbs and output-output correspondence. *Phonology* 19, 401-442.
- Watson, J. (2002). *The Phonology and Morphology of Arabic*. Oxford University Press: UK
- Webster, R. (1991). Notes on the dialect and way of life of the Al-Wahiba Bedouin of Oman. *Bulletin of the School of Oriental and African Studies* 54 (3), 473-485
- Wright, W. (1971). *A Grammar of the Arabic Language*. Cambridge University Press.
- Yip, M. (1988). Template morphology and the direction of association. *Natural Language and Linguistic Theory* 6, 551-577

APPENDIX A

Muscat Broken Plural Nouns

Note: - ah is a marker of feminine gender in the Muscat dialect of Omani Arabic.

Group (I)

Sing. CVC.CV.C Singular forms	Pl. (CV.CV:).CV.C	Gloss
maṭbax	maṭa:bax	'kitchens'
daftar	dafa:tar	'notebooks'
sakšan	saka:šin	'sections'
xangar	xana:gar	'daggers'
marham	mara:hum	'lotions'
margaḥ	mara:gaḥ	'references'
maxbaz	maxa:biz	'bakeries'
ʿaqrab	ʿaqa:rub	'scorpions'
ṭalsam	ṭala:sum	'curing spells'
marwad	mara:wid	'metal bars of iron used to put kohl in the eyes'
maktab	maka:tub	'offices'
ʔarnab	ʔara:nub	'rabbits'
maṭʿam	maṭa:ʿum	'restaurants'
mazbal	maza:bil	'lips'
mathaf	mata:huf	'museums'
manbar	mana:bar	'pulpits'
maṣḥaf	maṣa:huf	'copies of Holy Qura'an'
misgid	masa:gid	'mosques'
margaḥ	mara:gil	'cauldrons'
xandaq	xana:daq	'ditches'
ṭahlab	ṭaḥa:lub	'fungus'
gadwal	gada:wil	'timetables'
manzil	mana:zil	'houses'
markab	mara:kub	'small boats'
funduq	fana:daq	'hotels'
masbah	masa:baḥ	'showers'
mulhaq	mala:haq	'appendices'
ḍufdaḥ	ḍafa:daḥ	'frogs'
ṣandal	ṣana:dil	'blocks of perfumed tree'

farmal	fara:mił	woods'
marsam	mara:sum	'brakes'
maľfab	mala:ľub	'places for artists to draw'
mablay	maba:lay	'play grounds'
mafraq	mafa:raq	'sums of money'
marfaľ	mara:faľ	'crossroads'
		'wooden lifting apparatus for the Holy book'
maľzam	maľa:zum	'belts'
malbaq	mala:baq	'matches'
madxal	mada:xil	'entrances'
maxrag	maxa:rag	'exits'
madfaľ	mada:faľ	'canons'
maşraf	maşa:ruf	'banks'
maďrab	maďa:rub	'cricket bats'
maghar	maga:har	'microscopes'
maxba?	maxa:bi?	'hiding places'
mangam	mana:gum	'mines'
marqaş	mara:qaş	'casinos'
markaz	mara:kiz	'centers'
maďhab	maďa:hub	'Islamic sects'
	C(CV:).CV.C	
maqşat	mqa:şat	'matches'
maqşaf	mqa:şuf	'small vendors'
maşxal	mşa:xil	'sieves'
magmar	mga:mar	'incense burners'
maglas	mga:lis	'rooms for guests'
maqbaď	mqa:baď	'door knobs'
	C(CV:).CVV.C	
muľris	mľa:ri:s	'bridegrooms'

Group (2)

Sing.	Pl.	Gloss
CVC.CV.C- ah <i>Singular forms</i>	(CV.CV:).CV.C	
maştar- ah	masa:tar	'rulers'
maľfaq- ah	mala:faq	'spoons'

maq̣lam- ah	maq̣a:lum	‘pens’ cases’
maḥkam-ah	maḥa:kum	‘courts’
qunbal-ah	qana:bi	‘bombs’
maṭṭhan-ah	maṭa:ḥin	‘mortars’
mazraʿ- ah	maza:raʿ	‘farms’
marḥal-ah	mara:ḥil	‘stages’
madrās-ah	mada:ris	‘schools’
manṭaq-ah	mana:ṭaq	‘regions’
marwah-ah	mara:wah	‘fans’
	C(CV:).CV.C	
maq̣bar- ah	mqa:bar	‘graveyards’
maỵsal- ah	mya:sil	‘sinks’
	(CV.CV:).CV	
sufrij- ah	safa:ri	‘cooking pots’
kurfaj- ah	kara:fi	‘beds’
CVCVC-ah Singular form		
qaḍij-ah	qaḍa:ja	‘cases’

Group (3)

Sing.	Pl.	Gloss
CVC.CV Singular forms	(CV.CV:).CV	
maksi	maka:si	‘dresses’
kursi	kara:si	‘chairs’
muxba	maxa:bi	‘pockets’
muqla	maqa:li	‘frying pans’
malha	mala:hi	‘casinos’
maq̣ha	maqa:hi	‘cafes’
maṛsa	mara:si	‘harbors’

Group (4)

Sing.	Pl.	Gloss
CV.CV:C- ah Singular forms	(CV.CV:). jV.C	
maki:n- ah	maka:jin	‘machines’
ḥadi:q- ah	ḥada:jaq	‘parks’
gari:d- ah	gara:jid	‘newspapers’
ḍabi:h-ah	ḍaba:jah	‘goats slaughtered in the

xari:ʔ-ah	xara:jaʔ	Islamic way, kosher meats'
qabi:l-ah	qaba:jil	'maps'
nati:g-ah	nata:jig	'tribes'
xabi:θ-ah	xaba:jiθ	'results'
kani:s-ah	kana:jis	'great sins'
ħadi:d- ah	ħada:jid	'churches'
ʕazi:m- ah	ʕaza:jum	'iron bars'
risa:l-ah	rasa:jil	'invitations /feasts'
wsa:d- ah	wasaja:jid	'letters'
CV.CV.V.C singular form	CV.CV.V.jV.C	'pillows'
badi:l	bada:jil	'alternatives'
ʕaʕi:r	ʕaʕa:jar	'juices'
ħaʕi:r	ħaʕa:jar	'carpets'
CVV.CV.V.C Singular form	(CV. jV:). CVV.C	
ʕi:ʔa:n	ʕaja:ʔi:n	'devils'

Group (5)

Sing.	Pl.	Gloss
CVV.CV.C Singular forms	(CV.wV:).CV.C	
ša:ðar	šawa:ðar	'bed blankets'
ša:raʕ	šawa:raʕ	'roads'
ʔo:bag	ʔawa:big	'round, flat pans used to bake Omani bread'
da:faʕ	dawa:faʕ	'motives'
ʕa:mil	ʕawa:mil	'factors'
ħa:diθ	ħawa:diθ	'car accidents'
ða:baʔ	ðawa:baʔ	'restrictions'
ga:maʕ	gawa:maʕ	'large mosques'

Group (6)

Sing.	Pl.	Gloss
CVV.CV.V.C Singular forms	(CV.wV:).(CV:).C	
ʔa:bu:r	ʔawa:bi:r	'line-ups'
ʔa:bu:q	ʔawa:bi:q	'cement blocks'

qa:nu:n	qawa:ni:n	‘laws’
ša:ru:x	šawa:ri:x	‘missiles’
qa:mu:s	qawa:mi:s	‘dictionaries’
ta:ri:x	ta:wa:ri:x	‘dates’

Group (7)

Sing. CVV.CV <i>Singular forms</i>	Pl. (CV.wV:).CV	Gloss
ri:du	rawa:di	‘radios’
gu:ti	gawa:ti	‘pairs of shoes’
qo:ti	qawa:ti	‘cans’
	(CV.wV:).jVC	
ri:ha	rawa:jah	‘bad smells’

Group (8)

Sing. CVV.CV- ah <i>Singular forms</i>	Pl. (CV.wV:).CV.C	Gloss
sa:lf-ah	sawa:lif	‘gossips’
qa:jm-ah	qawa:jum	‘lists’
sa:fq-ah	sawa:faq	‘thunderbolts’
qa:fd-ah	qawa:fid	‘rules’
mo:xr- ah	mawa:xar	‘noses’
mo:qf-ah	mawa:qaf	‘grinders’
fa:jl-ah	fa:wa:jil	‘families’
ta:jr- ah	tawa:jar	‘tires’
	(CV.wV:).CV	
ga:rj-ah	gawa:ri	‘young women’
CVV.CVC- (ah) <i>Singular form</i>	(CV.wV:).CV	
go:nij- ah	gawa:ni	‘large sacks’
ša:rub	šawa:rub	‘mustaches’
ta:baq	ta:wa:baq	‘floors’
ha:mil	ha:wa:mil	‘pregnant’
fa:nis	fa:wa:nis	‘spinsters’
ra:tub	rawa:tub	‘monthly allowances’

CVV.C- ah *Singular forms*

ħa:r- ah	ħawa:jar	'small streets in a village or town'
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CwVC

ṣu:r- ah	ṣwar	'pictures'
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Group (9)**Sing.****CVC₂C₂V:C** *Singular forms*

sakkī:n

θalla:g- ah

karra:s- ah

šubba:k

dukka:n

kalla:b

dabbu:s

tannu:r-ah

sugga:d-ah

xajja:t

ṭabba:x

sannu:r

muħħa:r

ṣallu:m

Pl.**(CV.C₂V:).(C₂V:).C**

saka:ki:n

θala:li:g

kara:ri:s

šaba:bi:k

daka:ki:n

kala:li:b

daba:bi:s

tana:ni:r

saga:gi:d

xaja:ji:t

ṭaba:bi:x

sana:ni:r

maħa:ħi:r

ṣala:li:m

Gloss

'knives'

'refrigerators'

'drawing pads'

'windows'

'shops'

'clips /wrenches'

'pins'

'skirts'

'prayer mats'

'tailors'

'cooks'

'cats'

'sea shells'

'sun flower seed'

Group (10)**Sing.****CVCCV:C-ah** *Singular forms*

kirxa:n- ah

dihda:š- ah

maḡgu:n

Pl.**(CV.CV:).(CV:).C**

kara:xi:n

daha:di:š

maḡa:gi:n

Gloss

'machines'

'traditional Omani males' outfits'

'toothbastes'

Group (11)**Sing.****CVC.CV:..C** *Singular forms*

barqu:ḡ

Pl.**(CV.CV:).(CV:).C**

bara:qi:ḡ

Gloss

'veils'

xurxa:š	xara:xi:š	'kids' toys'
mandu:s	mana:di:s	'traditional Omani boxes'
şandu:q	şana:di:q	'boxes'
qandi:l	qana:di:l	'lanterns'
misma:r	masa:mi:r	'nails'
karfu:n	kara:fi:n	'knuckles'
mashu:q	masa:hi:q	'powders'
mandi:l	mana:di:l	'handkerchiefs'
funga:n	fana:gi:n	'small coffee cups'
tafsi:r	tafa:si:r	'interpretations of the Holy Qura'an'
minša:r	mana:ši:r	'sows'
ʔaşfu:r	ʔaşa:fi:r	'birds'
marsu:m	mara:si:m	'royal decrees'
ʔusta:ð	ʔasa:ti:ð	'teachers'
şurwa:l	şara:wi:l	'pairs of pants'
tafşi:l	tafa:şi:l	'details'
xanzi:r	xana:zi:r	'pegs'
tarki:b	tara:ki:b	'structures'
barnu:s	bara:ni:s	'blankets'
qurṭa:s	qara:ti:s	'papers'
	C(CV:).(CV:).C	
muyra:f	mya:ri:f	'ladles'
muyba:r	mya:bi:r	'curing spells'
mufla:q	mʔa:li:q	'hooks'
mufta:h	mfa:ti:h	'keys'

Group (12)

Sing.	Pl.	Gloss
CCVCC-ah <i>Singular forms</i>	C(CV:).CV.C	
mqamš- ah	mqa:miš	'spoons'
mbaxr- ah	mba:xar	'baskets with holes used to perfume the clothes'
C.CV:C-ah <i>Singular form</i>	C(CV:).jV.C	
dri:š- ah	dra:jiš	'windows'

Group (13)

Sing. C.CVV.C <i>Singular forms</i>	Pl. (CVC).(CV:).n	Gloss
nfa:l	nuʃla:n	'sandals'
tra:b	turba:n	'sands'
gda:r	gidra:n	'walls'
ħza:q	ħizqa:n	'belts'
ʃsu:	ʃiswa:n	'sticks taken from palm trees'
ffa:	fuʃja:n	'snakes'
dla:y	dilya:n	'pairs of socks'
gla:s	gilša:n	'glasses'
kra:z	kurza:n	'tubes'
qfi:r	qufra:n	'baskets made of palm leaves'
yla:m	yilma:n	'slave boys'
lha:f	luħfa:n	'head scarves'
bla:d	bilda:n	'countrysides'
xru:f	xirfa:n	'sheeps'
ɣza:l	ɣizla:n	'gazelles'
ɣdi:r	ɣidra:n	'brooks'
lha:m	luħma:n	'meats'
qḏi:b	quḏba:n	'twigs'
ʃḏu:m	ʃuḏma:n	'bones'
qmi:s	qumša:n	'shirts'
ɣra:b	ɣirba:n	'crows'
šda:y	šidya:n	'cheeks'
ḏfu:r	ḏufra:n	'fingernails'

Group (14)

Sing. CVV.C <i>Singular forms</i>	Pl. (CV.CV:).n	Gloss
ho:š	hiša:n	'backyards'
ɣu:l	ɣila:n	'snakes'
zo:ʃ	ziʃa:n	'vomitings'
ba:b	biba:n	'doors'

θo:r	θira:n	‘bulls’
ko:t	kita:n	‘coats’
sa:q	siqa:n	‘legs’
ko:b	kiba:n	‘cups’
na:r	nira:n	‘fires’
ko:f	kiʃa:n	‘elbows’
ħu:t	ħita:n	‘whales’
ta:g	tiga:n	‘crowns’
ko:š	kiša:n	‘shoes’

Group (15)

Sing. CCVC-(ah) <i>Singular forms</i>	Pl. C.(CV:).C	Gloss
mraš	mra:š	‘traditional bottles for spraying perfume’
mlaf	mla:f	‘folders /binders’
mnaz	mna:z	‘cots’
mxam- ah	mxa:m	‘brooms’
mšuṭ	mšu:t	‘combs’
mkab- ah	mka:b	‘bowls’
mšal	mša:l	‘sieves’
mgaz	mga:z	‘grass cutters’
qfil	qfu:l	‘locks’
šbuṭ	šba:f	‘fingers’
mšar	mša:r	‘turbans’
	(CV.wV:).CV.C	
šbuṭ	šawa:baṭ	‘fingers’

Group (16)

Sing. CVCC-(ah) <i>Singular forms</i>	Pl. C.(CV:).C	Gloss
šuxṭ	šxu:t	‘lines’
naqṭ	nqu:ṭ	‘decorations’
baḥθ	bħu:θ	‘research projects’

sign	sgu:n	'prisons'
šarṭ	šru:ṭ	'conditions'
ḍarf	ḍru:f	'envelopes'
xamr	xmu:r	'wines'
ḥiṣn	ḥṣu:n	'forts'
ḍurs	ḍru:s	'teeth'
riḡl	rgu:l	'legs'
ʔarḍ	ʔru:ḍ	'lands'
qalb	qlu:b	'hearts'
sahl	shu:l	'hills'
nagm	ngu:m	'stars'
ḍanb	ḍnu:b	'sins'
šahr	šhu:r	'months'
šumx	šmu:x	'scratches'
ḥurz	hru:z	'curing spells'
kalb	kla:b	'dogs'
katf	ktu:f	'shoulders'
ṯilḡ	ṯlu:g	'snows'
xurq	xru:q	'holes'
ḥurq	hru:q	'burns'
ḥarf	hru:f	'letters'
kurš	kru:š	'bellies'
naxl- ah	nxi:l	'palm trees'
qalʕ-ah	qla:ʕ	'forts'
šumʕ- ah	šmu:ʕ	'candles'
ḡahl- ah	ḡha:l	'pieces of pottery'
mall- ah	m̥la:l	'bowls'
ṣahl- aḥ	ṣha:l	'pots for washing hands'
warq- ah	wra:q	'papers'
šagr- ah	šga:r	'trees'
hur̥m-ah	hri:m	'women'
	CVCV:CV:n	
xalq-ah	xala:qi:n	'garments'
	C.CV.C	
xanš- ah	xnaš	'trolleys'
buqʕ-ah	bqaʕ	'stains'
durg- ah	drag	'stairwells'

janɫ- ah	ʃnaɫ	‘hand bags/ suitcases’
dakj- ah	dkaj	‘pillows’
xatm- ah	xtam	‘copies of the Holy Qura’an’
ɣadf-ah	ɣdaf	‘scarves’
ħufr-ah	ħfar	‘holes’
ħilq- ah	ħlaq	‘earrings’
ɣarš- ah	ɣraš	‘bottles’
ħuɣr-ah	ħgar	‘rooms’
ʃulb-ah	ʃlab	‘cans’
bugm- ah	bgam	‘bulging bruises’
luħj-ah	lhaj	‘beards’
bidʕ-ah	bdaʕ	‘innovations’
	(CV.CV:). jV.C	
watj- ah	waɬa:jah	‘sandals’

Group (17)

Sing.	Pl.	Gloss
CVVC-(ah) Singular forms	C.(jV:).C	
ʕe:n	ʕju:n	‘eyes’
be:t	bju:t	‘houses’
ðe:l	ðju:l	‘tails’
se:ħ	sju:ħ	‘barren lands’
se:f	sju:f	‘swords’
ʕe:š	ʕju:š	‘rices’
še:x	šju:x	‘tribal chiefs’
	CC₂V:C₂	
ðin	ðnejn	‘ears’
xat	xɬu:ɬ	‘lines’
šat	štu:t	‘covers’
ħal	ħlu:l	‘solutions’
šaf	šfu:f	‘classrooms’
raf	rfu:f	‘shelves’
xad	xdu:d	‘cheeks’
ðil	ðla:l	‘shades’
sad	sdu:d	‘dams’

fax	fxu:x	‘traps’
ħad	ħdu:d	‘limits’
kaf	kfu:f	‘palms of the hands’
mux	mxu:x	‘brains’
kum- ah	kmi:m	‘Omani traditional caps’
yub-ah	ybi:b	‘swamps’

Group (18)

Sing.	Pl.	Gloss
CVCVC Singular forms	C.(CV:).C	
ṣaħan	ṣħu:n	‘plates’
ṭabal	ṭbu:l	‘drums’
gabal	gba:l	‘mountains’
gamal	gma:l	‘camels’
šabak	šba:k	‘nets’
wagaʔ	wga:ʔ	‘pains’

Group (19)

Sing.	Pl.	Gloss
CV:CV C Singular forms	C.CV.C	
xa:tum	xtum	‘rings’
CV:C-ah Singular forms	C.jV.C	
sa:ʔ- ah	sjaʔ	‘watches’

APPENDIX B

Glossary of Technical Linguistic Terms

Below I provide a glossary of the technical linguistic terms and Optimality Theory constraints used in this thesis.

1. Technical Linguistic Terms

AFFIX Refers to an invariant string of segments attached to a BASE. It denotes a particular meaning. Affixes are classified into three types depending on their position with respect to the base. *Prefixes* are attached to the beginning of the base, *suffixes* are attached to the end and *infixes* are added in the middle of the root.

AUTOSEGMENT Refers to a feature which is considered to be independent and represented on its own TIER. For example, TONE is seen as an independent feature of the consonant and vowel contained together with the tone in the same word.

BASE Refers to the basic unit of segments in a word to which a morphological operation can be applied. It is used alternatively with STEM.

BROKEN PLURAL Noun plural which is expressed by an internal change of the singular STEM. An example to illustrate the broken plural is [masa:gid] ‘mosques’ whose singular is [misgid]. The C_1VC_2 portion of the singular stem which corresponds to [mis] is expanded into C_1VC_2V : which refers to [masa:] in this particular form.

CANONICAL Refers to a linguistic form or word shape cited as a norm or standard for the purposes of comparison (Crystal 1997: 51). For instance, the most common syllable shape is CV wherein C refers to a consonant and V to a vowel.

CODA The closing consonant of a syllable (Crystal 1997: 375). C_2 in a CVC_2 syllable is a coda.

DEFAULT Refers to an UNMARKED segment or feature that emerges in a morphological or phonological operation either automatically or when certain conditions apply.

EXTRAMETRICALITY A notion in METRICAL THEORY which designates a consonant or particular PROSODIC CONSTITUENT such as a FOOT or SYLLABLE as invisible for the purpose of rule application (Hayes 1995). In stress assignment, the final syllable can be invisible to the assignment of stress.

FIXED SEGMENTISM Refers to invariant segments that emerge in certain morphological or phonological processes. For example, in reduplication, fixed segments can emerge in reduplicated affixes instead of expected copied segments from the base.

FOOT Refers to the grouping of syllables into metrical units. A foot maximally consists of two syllables and minimally one syllable. There are two major foot types: iambic and trochaic.

GEMINATE (GEMINATION) Refers to a string of identical adjacent consonants in a word, e.g. [sa~~k~~ki:n] ‘knife’ has a geminate consonant /k/.

HEAVY SYLLABLE A syllable shape which has two units of weight (morae) either because it has a long vowel CVV or its coda consonant is moraic CVC. Whether the final consonant is moraic or not depends on language-particulars.

IAMBIC FOOT A right-headed foot (the second syllable contained in this foot is more prominent). It can be either disyllabic or monosyllabic. If disyllabic, it has a light-heavy syllable (CV.CVV) dubbed as typical iamb or light-light syllable (CV.CV). If monosyllabic, it is always heavy (CVV) and known as even iamb.

LIGHT SYLLABLE A syllable shape which has a single unit of weight (monomoraic). Syllables such as CV and V are light. In some languages, CVC is also a light syllable because the coda consonant is nonmoraic.

MARKEDNESS A crucial notion in linguistics whereby pairs of linguistic forms or features, seen as distinct, are evaluated as frequent and common (unmarked) and less common (marked) (Crystal 1997: 233). For example, in syllable theory, a CCV syllable shape is considered to be marked because it has a consonant cluster while CV is regarded as unmarked cross-linguistically. In OT, markedness CONSTRAINTS evaluate marked structures in OUTPUT forms.

MELODIC OVERWRITING Allows fixed/invariant segments/melodies to be overwritten in the SKELETAL TIER of that form.

METRICAL THEORY Originally introduced as a hierarchical theory of stress to reflect relation of prominence between morphological and syntactic constituents. In this theory, phonological strings are represented using notions of segment, syllable, foot and prosodic word (Crystal 1997: 241).

MORA A unit of weight. The analysis of segments into morae is applied to syllabic NUCLEUS and CODAS and not to ONSETS. Heavy syllables are bimoraic (contain two morae) whereas light syllables are monomoraic (contain a single mora on the vowel). Codas can be nonmoraic in some languages.

NON-LINEAR PHONOLOGY Assumes that phonological representations such as features and tones be represented in hierarchical levels and not on a single level.

NUCLEUS The central segment of a syllable (Crystal 1997: 375). V in a CV syllable shape is the centre of the syllable.

ONSET The beginning/initial consonant of a syllable. C in a CV syllable pattern is an onset.

PROSODY Assumes that phonological words are represented in a metrical hierarchy which is composed of the units of prosody such as- MORA, SYLLABLE, FOOT and prosodic word. It also refers to non-segmental aspects of speech such as pitch and duration.

SOUND PLURAL Noun plural which is formed by a regular AFFIXATION process whereby an AFFIX is attached to the singular stem. An example to illustrate sound plurals is [qiṭaar-aat] 'trains' whose singular is [qiṭaar]. The plural suffix- aat is attached to the singular stem /qiṭaar/.

REDUPLICATION A morphological process of copying wherein an AFFIX copies segments of the BASE.

SYLLABLE A unit of pronunciation typically larger than a single sound and smaller than a word (Crystal 1997:373). The combination of sounds in individual languages creates sequences of sounds. A consonant-vowel (CV) sequence is a syllable shape which commonly occurs in all languages. Because this syllable isn't closed by another consonant, it is named open syllable. Syllables can either be LIGHT as in V and CV or HEAVY as in CVV.

SYNCOPE Vowel deletion.

STEM Constitutes the basic element of the structure of a word. It has a distinct meaning. It refers to the BASE to which a certain morphological process such as affixation is applied to express different meanings.

TEMPLATE Refers to a fixed phonological pattern (shape-invariant) of words whose actual segments/melodies are represented as a sequence of consonants C and vowels V. Arabic is famous for expressing different meanings by specifying a fixed word shape. For example, verbs of the CVC_xC_xVC shape are perfect active.

TIER A level of phonological representation wherein segments and features are represented. **SKELETAL TIER** is the tier which includes an abstract representation of the consonants (C) and vowels (V) contained in a particular form. Melodic tier has the actual segments of a word. The C and V in the skeletal tier associates to the actual segments by lines called association lines.

TONE A term used in phonology to refer to the pitch level of a syllable.

TROCHAIC FOOT A left-headed foot which has either two light syllables with the stress falling on the left or a single heavy syllable. There are two types of trochaic feet: moraic trochee vs. syllabic troches. Moraic trochees as in CVC shape have two

morae. Syllabic trochees as in CVCV are composed of two light syllables with the stress falling on the left. Trochaic feet have the shapes CVC, CVCV or CVV.

2. Optimality Theory Constraints

ALIGNMENT CONSTRAINTS A family of constraints in OPTIMALITY THEORY which demands particular edges of categories/constituents to be aligned to some edges of other categories/constituents.

***ComplexOnset** A markedness CONSTRAINT which evaluates the syllable shape of OUTPUT forms. It bans clusters of consonants at the left-edge of syllables.

CONSTRAINTS Linguistic filters which evaluate the structures of output forms.

Correspondence Theory Assumes that any two strings of words have correspondence relations. The general formalism of this theory is “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 α (an element of S_1) and β (an element of S_2) are referred to as correspondents of one another when $\alpha R \beta$ ” (McCarthy and Prince 1995). An example of strings in correspondence includes input-output pairings.

CrispEdge alignment Refines alignment by requiring that identical segments/features (geminate or shared features, for example) in a word be contained within a PROSODIC CONSTITUENT. The general formalism of this constraint is “Let $/A/$ be a terminal substring in a phonological representation, \mathfrak{I} a category of type Pcat and $/A/ = |\mathfrak{I}|$ (the content of \mathfrak{I}). Then \mathfrak{I} is crisp (has crisp edges) if and only if A is-a \mathfrak{I} : $\forall A (/A/ = |\mathfrak{I}| \supset /A/ \equiv \mathfrak{I})$ ” (Itô and Mester 1999).

CrispEdge (F) An example of CrispEdge constraints which requires identical segments/features (such as geminate) be contained within a FOOT.

DEP A general faithfulness constraint which bans epenthesis of segments/features. It requires the relation between correspondent strings be complete. If the output form adds a feature or segment, then this constraint is violated.

DEP_{OO}-F₁ (μ) A POSITIONAL FAITHFULNESS constraint which bans insertion of morae in the first foot of the correspondent strings. If a mora is added to the first foot of a related word, then this constraint is violated. The general formalism of this constraint is “For every μ in the first F of output₂, there is a correspondent μ in the first F of output₁”.

DEP_{OO}- σ_F (μ) A POSITIONAL FAITHFULNESS constraint which bans deletion of morae in the final syllable of the correspondents strings. If a mora is added to the final syllable of a related word, then this constraint is violated. The general formalism of this constraint is “For every μ in the final σ of output₂, there is a correspondent μ in the final σ of output₁”.

FAITHFULNESS CONSTRAINTS A family of constraints in Optimality theory which monitors identity between correspondent forms. They penalize epenthesis, deletion, metathesis and featural change of output forms.

FINAL-C A markedness constraint which requires words to end in a consonant.

GENERALIZED ALIGNMENT Demands particular edges of categories/ constituents to be aligned to some edges of other categories/constituents. To illustrate, it requires a particular edge of a prosodic or morphological constituent of Cat_1 coincide with a particular edge of some other prosodic or morphological constituent of Cat_2 . The formalism of this constraint is “Align (Cat_1 , Edge₁, Cat_2 , Edge₂) =_{def} $\forall Cat_1 \exists Cat_2$ such that Edge₁ of Cat_1 and Edge₂ of Cat_2 coincide.
 $Cat_1, Cat_2 \in Pcat \cup Gcat$
 Edge₁, Edge₂ $\in \{Right, Left\}$ ” (McCarthy and Prince 1993).

Generalized Template Theory (GTT) Dispenses with constraints that articulate a particular CV-shape or specific foot type of the surface form. It proposes that interaction of constraints of Universal Grammar yields the outcome shape of a word.

IDENT (F) A faithfulness constraint which requires segments contained in pairs of correspondent strings of words have identical values for the feature (F). It is violated when a segment changes its value.

INPUT A linguistic form from which potential outputs are generated and filtered by a ranked set of constraints.

MAX A general faithfulness constraint which bans deletion of segments, features or morae. It stipulates that the relation of correspondent strings must be complete

*** $\mu\mu\mu$] σ** A markedness constraint which evaluates the syllable shape of output forms. It penalizes trimoraic syllables (syllables with three morae).

*** σ [$C_x C_x$** A markedness constraint which evaluates the syllable shape of output forms. It prohibits geminates at the left-edge of syllables.

MAX_{OO}- $\sigma_F(\mu)$ A POSITIONAL FAITHFULNESS constraint which bans deletion of morae in the final syllables of the correspondent strings. If a mora is lost from the final syllable of a related word, then this constraint is violated. The general formalism of this constraint is “ For every μ in the final σ of output₁, there is a correspondent μ in the final σ of output₂”.

NO-DELINK (μ , SEG) An example of constraints demanding conservation of association lines. It checks that segment to mora linkage not delinked in the mapping of

correspondent strings. For example, delinking of a certain mora associated with a particular segment in the input from the output causes violation of this constraint.

NO-SPREAD (μ , SEG) An example of constraints demanding conservation of association lines. It checks that segment to mora linkage be preserved in the mapping of correspondent strings. For example if a mora is linked to the second consonant in the input form, then it has to be linked to the same consonant in the output form.

ONSET A markedness constraints which evaluates the syllable shape of output forms. It penalizes syllables which have no consonants at the left-edge of them.

OPTIMAL The final OUTPUT is known as optimal; it satisfies high-ranking constraints at the expense of violating low-ranked ones. It is the most harmonic form.

OPTIMALITY THEORY (OT) A constraint-based model of grammar. It assumes that linguistic forms are evaluated by a ranked set of constraints supplied by Universal Grammar.

OUTPUT is the surface form of a linguistic form.

OUTPUT-OUTPUT CORRESPONDENCE Extends the correspondence relation from underlying-surface forms to include correspondence relations between morphologically related forms.

PLACE MARKEDNESS CONSTRAINTS Evaluates place markedness of segments in surfaces forms. They are contained in a fixed constraint hierarchy which proposes that coronal place is less marked than labial and dorsal. It is thus more likely to find more languages with coronals than with labials. The general formalism of this hierarchy is $*Pl/labial, *Pl/dorsal \gg *Pl/coronal \gg *Pl/pharyngeal$

POSITIONAL FAITHFULNESS Captures the fact that certain positions in a word are more privileged in that they maintain phonological distinctions.