Chapter Three
Complications/Further Complexities

3.1 Introduction

In the previous chapter, we presented the basic syllable structure constraints that are employed to generate the basic syllable types of TA. Our discussion was rather general in the sense that those constraints, ONS, -COD, PARSE, FILL, are always employed by almost all languages to generate different syllable types. In this chapter, however, we will focus on different sets of constraints that are, of course, universal, or at least belong to a universal family of constraints, yet not always functional in all languages. This means that out of the universal constraints, provided by UG, there are some constraints that are not always essential to some languages but very fundamental to others. This distinction is drawn as a result of some language-particular phenomena or as a result of language-particular motivation or analysis of some familiar cross-linguistic processes. In other words, our main objective in this chapter is to analyse some processes that are quite related to syllable structure but, at the same time, motivated by environments that are sometimes rather peculiar to TA. Our analysis, as it is the main goal of the whole study, will be within the framework of Optimality Theory.

We will focus on three main syllable structure changing processes, viz. epenthesis, vowel shortening, and syncope. These are viewed as syllable changing, or modifying, processes due to the fact that they are quite related to the internal structure of the syllable. They are motivated by the internal syllable structure, and their application affects it. Epenthesis, for example, is motivated by the structure of the syllable as we sometimes epenthesize to break up a tri- or quadri-consonantal clusters or to solve a sonority violation exhibited by the coda. The outcome of such epenthesis will surely have a direct effect on the syllable structure since the epenthetic vowel will occupy the

nucleus of a new syllable. Similarly, vowel shortening and syncope, as will be seen below, have some effect on the internal structure of the syllable and are also motivated by it.

To discuss these issues, this chapter will be divided into three sections. The first section will deal with the instances of epenthesis that are motivated by sonority sequencing violation and syllable structure and position. In the second part of this chapter, vowel shortening will be tackled, and the interesting effect of the dative affix will be explored. Lastly, the deletion of the high front vowel will be analysed in the third section designated for syncope.

3.2 Epenthesis

3.2.1 Sonority and Epenthesis

One of the motivations of epenthesis, in TA, is the violation of the Sonority Sequencing Generalization in the coda cluster of the superheavy syllable cvcc. An epenthetic vowel is inserted between the last two consonants, and a new syllable is created. The two syllables that result, cv.cvc., will surely exhibit the restriction of sonority imposed on syllables.

3.2.1.1 Syllable and Sonority

Sonority is a property of some sounds that are produced by having the vocal tract relatively opened for the flow of air :

> "Sonority is related to voicing. The greater the propensity a sound has of spontaneous voicing, the more sonority it has." (Katamba, 1989(p.104))

From this definition of sonority and sonorous sounds, we may put the basic sound classes in an order showing the extremes of sonority exhibited by them. More than one grading of sonority have been presented by different scholars, and we choose the one that follows as it is quite clear and covers all, the basic sound classes.

(1) 1. (Oral) stops
2. fricatives
3. nasals
4. liquids
5. glides
6. vowels
(Roca, 1994 (p. 152))

This sequence, which we will call Sonority sequencing Generalization (SSG) hereafter, shows the two extremes of sonority, with vowels as the most sonorous and oral stops as the least. Yet, what is the relation between this SSG and syllable structure ? In other words, how may such a sequencing contribute to the internal structure of the syllable?

It has been claimed, since the last century, that there is a relation between sonority and syllable structure in the sense that syllables are mountains of sonority. This means that the syllable always has a peak of sonority represented by its nucleus, which is usually a vowel; this peak may be preceded and/or followed by margins that are less in sonority if compared to that peak. This configuration results in a mountain-like curve of sonority starting from the onset ascending towards the peak and the descending towards the coda. This is not everything, however. This order starts from and throughout the onset, if it is a complex one, and ends at the coda affecting it in the same manner. This means that complex onsets and codas demonstrate this order of sonority, in well-behaved syllables. The closer to the margin a segment is, the lower in sonority and vice versa. The property of sonority curve exhibited by syllables can be summarized as follows :

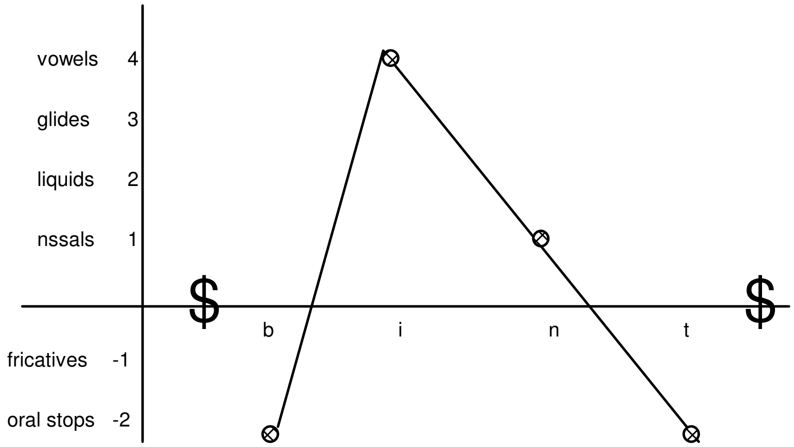
(2) Sonority Sequencing Principle (SSP)

The sonority profile of the syllable must slope outwards from the peak.
(Roca, 1994 (p.153))

To see how this principle functions, let us consider a concrete example. Take the Arabic word [bint] `a daughter' as an example of a monosyllabic word of the from

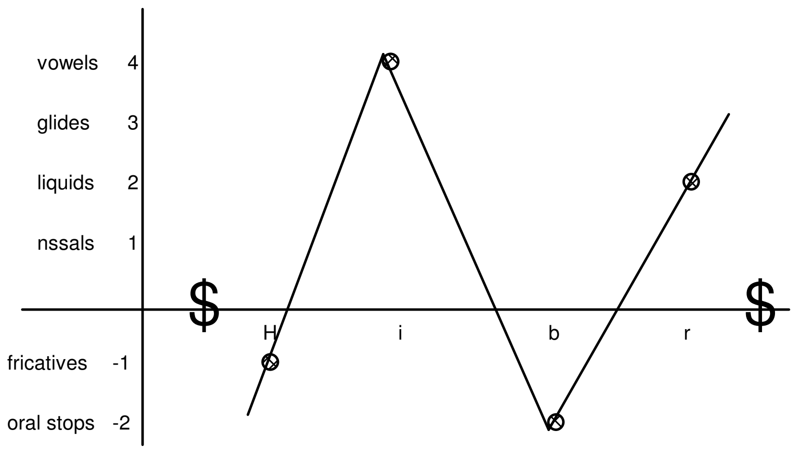
cvcc. This syllable has a simple onset, as it is the case with all Arabic syllables, but it has a complex coda which makes it a potential example to demonstrate the SSP. Consider the following representation:

(3)



Apparently, this syllable is well-behaved by virtue of respecting the SSP. This means that this syllable has only one peak preceded and followed by smoothly descending sonority values towards the syllable boundaries. It starts with an obstruent onset segment /b/ ascending upwards to the peak that is occupied by a vowel, and then it descends towards the other syllable boundary without experiencing any troughs as the first consonant of the coda, the one closer to the peak, is more serious than the other one, which is closer to the margin; /n/ is higher in the sonority scale than /t/ (cf. (1) above). Unfortunately, this is not always the case with all syllables. There are some ill-behaved syllables that violate SSP. Consider the Arabic word [Hibr] `ink', which is again a mono-syllabic word. Let us put this syllable to the test as we have done with [bint] above:

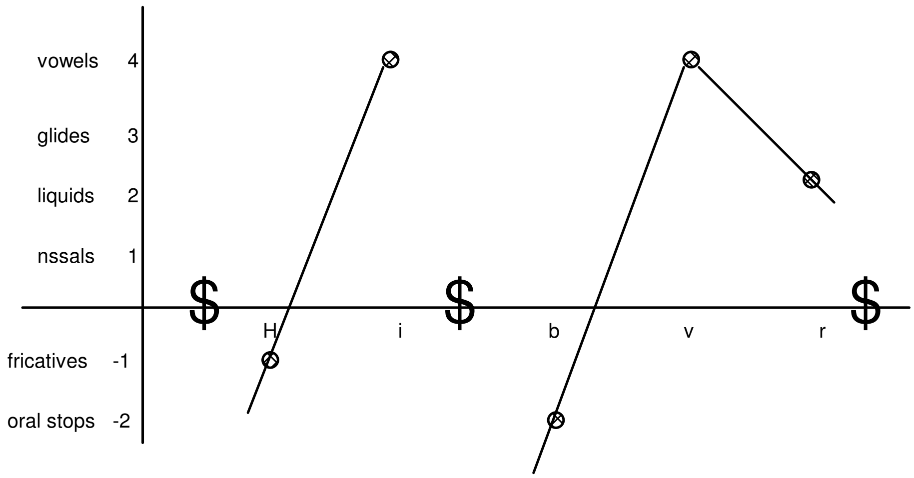
(4)



From this representation, we find that the syllable in question exhibits a violation of SSP. This violation happens because the member of the consonant cluster of the coda closer to the syllable boundary is more sonorous than the one closer to the peak. Consequently, the curve is not as smooth as it should be; a sonority trough on /b/ is created.

To solve such a violation of the SSP, TA, among other dialects of Arabic, inserts an epenthetic vowel, whose identity and specification are determined by other factors that will be dealt with in subsequent sections, between the two coda consonants creating a new vowel and, consequently, a new sonority curve. Obviously, this process of epenthesis is totally motivated by the internal structure of the syllable, especially the complex coda. And, as it results in having two syllables instead of one, it has a direct effect on the structure of the syllable as well. To see this process in action graphically, consider the following representation :

(5)



In this representation, where the syllable boundaries are determined by other factors, ONS for example, and whose under-specified vowel of the ultimate syllable is defined later, the violation of SSP is solved by epenthesis /Hibr/ -> [HibVr]. So, we end up with two syllables that apply the SSP.

According to Zec (1988), the relation between sonority and syllable structure results from the morification and syllabification algorithms. She claims that the segments are grouped into sequences (moras) of ascending sonority. So, this property of sonority is imposed on the syllable that is in fact made up of mora(s). In a bimoraic syllable, however, the initial mora, the strong one, will convey the ascending sonority while the weak one will do the opposite :

(6) σ

μ_S μ_W

(Zec, 1988 p. 109)

Now, we know that syllables are, to a large extent, mountains of sonority. These mountains have high peaks and smooth down-hills that have no troughs. And, we

know that TA is a language that usually does not tolerate syllables with sonority troughs. Yet, if such sequences are encountered, which is not uncommon, an epenthetic vowel is inserted between the two segments that cause the trough to create a syllable. The thing we would like to know, however, is the method that we may use to account for this phenomenon within O.T. framework. This is the topic of the next section.

3.2.1.2 Sonority Constraint

Almost all of the syllable types of TA respect the SSP due to the fact that four out of six syllable types of TA exhibit no consonant clusters. These syllables, cv, cvc, cvv, and cvvc, demonstrate the smooth sonority curve very clearly. The other two syllable types, however, viz. cvcc, cvvcc, appear to be rather problematic. This is because the consonant cluster occupying the coda positions of these syllable types may violate SSP by virtue of having the consonant closer to the syllable boundary more sonorous than the one closer to the peak. This phenomenon is only experienced with the syllable type cvcc[1]. To solve this problem, the language inserts an epenthetic vowel, as discussed above, and creates a new SSP-violation-free syllable. In TA, there are some monosyllabic nouns of the form cvcc that surface with an epenthetic vowel between the two consonants of the coda, cvcc -> cvcvc. Consider the following examples (all the data in what remains of this study are taken from Jarrah, (1993), unless otherwise indicated):

(7)	a. /Hibr/	Hibir	\`ink'
	b. /gism/	gisim	\`part'
	c. /rub9/	rubu9	\`quarter'
	d. /Hukm/	Hukum	\`verdict'
	e. /faHm/	faHam	\`coal'
	f. /baHr/	baHar	\`sea'
	g. /Habl/	Habil	\`rope'
	h. /?akl/	?akil	\`eating'
	i. /fajr/	fajur	\`dawn'

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[1]cvvcc does not usually violate SSP as the consonant cluster in the coda is always occupied by a geminate. However, loan words like *faaks* \`fax' apparently may do.

j. /Sabr/ Sabur `patience'

In all the forms in (7), an epenthetic vowel is inserted between the last two consonants as a result of SSP violation. The identity of the epenthetic vowel will be dealt with later. On the other hand, consider the following examples :

(8)	a. /?uxt/	?uxt ,	*?uxut	`sister'
	b. /sam9/	sam9 ,	*sama9	`hearing'
	c. /Hilm/	Hilm ,	*Hilim	`a dream'
	d. /wirk/	wirk ,	*wirik	`hip'
	e. /misk/	misk ,	*misik	`musk'
	f. /surb/	surb ,	*surub	`drinking'
	g. /li9b/	li9b ,	*li9ib	`playing'
	h. /sumk/	sumk ,	*sumuk	`thickness'

These nouns, in (8), surface without an epenthetic vowel inserted between the last two consonants of the underlying form. This is simply because these consonants clusters do not violate SSP by virtue of having the first one more sonorous than the second one which is the desired environment as far as SSP is concerned. So, how can we account for this phenomenon within O.T. framework ?

Obviously, we will need a constraint that is able to discriminate between the analyses that violate SSP and the ones that do not. By reviewing the O.T. literature at hand, I could not find a constraint that fully captures the restriction imposed by SSP on syllables. What is discussed rather elaborately does not cover the whole issue suggested by that principle, and consequently could not provide us with a solution. Chapter (8) of Prince and Smolensky (1993), as I understand it, if I do at all, focuses on the point of who wins as a nucleus and who wins as a margin as far as segments are concerned. Sonority, according to them, is the determining factor : the higher in sonority a segment is the more likely it is designated as a nucleus, and the lower in sonority, the more likely a segment be considered as a margin. This, in essence, is what SSP is all about. Nevertheless, the sonority relation between consonants within consonant clusters that may appear at the margins is overlooked. And, as mentioned

above, this is the centre of our problem, i.e. the violation of SSP exhibited by the sequence of consonants in the coda position of cvcc syllables. To solve the problem, I, based on a personal contact with Roca, will suggest using SSP itself (cf. (2) above) as a constraint. This constraint will discriminate between analyses like [Hibr] and [Hibir] for the favor of the latter as the sequence /-br/ violates it. To see the importance of this constraint and to have an idea about its ranking consider the following tableau that does not make use of it :

(9) Evaluating input /Hibr/ :

/Hibr/	ONS	PARSE	FILL	-COD
→.Hibr.				*
.Hi.b∇r.			*!	*
.Hib<r>.		*!		*
.Hib.r∇.			*!	*

This tableau presents [.Hibr.] as the optimal candidate analysis which is not the true output of the input /Hibr/. This is because the tableau does not employ the constraint SSP. So, we will have to use this constraint to determine [.Hi.b∇r.] as the optimal analysis. Yet, how will we rank it ? To answer this question, and similar ones in the future, we need to know why our true analysis lost to another one. In our particular case, our true analysis [.Hi.b∇r.] lost to [Hibr.] because it violates FILL while the latter does not. So, we want to put a constraint that is violated by [.Hibr.] but not by [.Hi.b∇r.] higher than FILL to stop the former and allow the latter to pass. This constraint is, of course, SSP. Consider the following tableau in which SSP is employed to determine the true output of the input /Hibr/:

(10)

/Hibr/	ONS	PARS	SSP	FILL	-COD
.Hibr.			*!		*
.Hib<r>.		*!			*
.Hi.b∇r.				*	*
.Hib.r∇.				*	*

Though this tableau is successful in filtering out [.Hibr.], it could not determine the optimal analysis. This is because [.Hi.b∇r.], our desired output, and [Hib.r∇.], a false one, are totally the same as far as violations are concerned. Each of these analyses violates FILL once and -COD once. So, how can we distinguish between them ? I think we do need a constraint to do so. This constraint belongs to the family of Generalized Alignment (GA). Yet, before presenting this constraint, we should have a clear idea about this family of constraints.

3.2.1.3 Generalised Alignment Constraints

This rather important and quite powerful family of constraints is originally presented by McCarthy and Prince (1993) to solve problems of Prosodic Morphology. The focus, here, is centred around Categories and Edges. In other words, the edges of categories (Cat1, Cat2, ... etc.), whether prosodic or morphological, are aligned with edges (Edge1, Edge2, ... etc.), of whether prosodic or morphological categories, to formally describe a universal or a language-particular phenomenon, -ka- affixing in Ulwa for example (cf. McCarthy & Prince 1993). The general schema of such constraints looks as follows :

(11) Align (Cat1, Edge1, Cat2, Edge2).

(McCarthy & Prince, 1993 (p.10))

(11) above is read and understood as follows : Edge1 of each and every Cat1 must be aligned with Edge2 of some Cat2. This means that categories belonging to different

hierarchies, either prosodic or morphological, can share, either the same or different, edges by virtue of having two categories and two edges in this schema[2]. The edges can be either left (L) or right (R), and that categories may belong to either of the following hierarchies :

(12) (a) Prosodic Hierarchy

PrWd
↓
Ft
↓
Syllable

(b) Morphological Hierarchy

Mwd
↓
Stem
↓
Root

(cf. McCarthy & Prince, 1993, (p.5-6))

So, how can we employ this family of constraints to solve our original problem, i.e., how can we discriminate between [.Hi.b∇r.] and [.Hib.r∇.] in a manner favoring the former? If we look at our true output, that we want a constraint to be able to designate as optimal, we will notice a rather important feature. The right edge of [.Hi.b∇r.] is in itself the right edge of both the lexical and the prosodic word. On the other hand, it is not the case with [.Hib.r∇.] whose right edge is the prosodic word's but never the one of the lexical word. This means that this analysis exhibits a misalignment of the right edges of prosodic and lexical words. This misalignment is the factor that will distinguish [.Hi.b∇r.] as the optimal candidate analysis.

Now we want to translate this finding into a constraint that we may incorporate into our hierarchy of constraints mentioned above. Consequently, we will follow

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[2]A rather similar approach was suggested by Prince & Smolensky under the name of EDGEMOST. EDGEMOST(phi; E; D), which means that item phi is situated at the edge E of domain D (cf. Prince & Smolensky, 1993, (p.35)), is the general schema of this approach. According to McCarthy and Prince, there are, however, two shortcomings of this approach that may restrict the domain of application: it restricts the hierarchical relation of Cat1 and Cat2 to either prosodic or morphological hierarchy, and it requires that both categories should share the same edge, either left or right, meaning that the right edge of some category, for example, can not align with the left edge of some other.

McCarthy and Prince when they introduced the constraint that they called ALIGN[3] to account for similar problems cited in Axininxa Campa :

(13) ALIGN
]stem = $]_\sigma$ (McCarthy & Prince, 1993, (p.36))

This constraint means that the right edge of every stem must be aligned with the right edge of some syllable. It was written in this manner to be, according to them, ``more memorable." For our present purposes, we may depend on this constraint to determine the true output of the input /Hibr/. yet, for the sake of generality, we may introduce a rather similar constraint with a wider scope, though. We will move higher in the hierarchies by using lexical word (LxWd) instead of stem and prosodic word (PrWd) instead of syllable maintaining the same edges. This means that the constraint will look as follows:

(14) ALIGN
]LxWd =]PrWd

Align(LxWd, R, PrWd, R)

This constraint[4] says that the right edge of every lexical word must correspond to the right edge of some prosodic one. Now, let us examine this constraint to see whether it may help us solve our problem. Consider the following tableau :

(15)

/Hibr/	SSP	ALIGN]LxWd=]PrWd	FILL
→.Hi.b∇r.			*
.Hib.r∇.		*!	*

---

[3]This constraint was first introduced, as hinted at by McCarthy and Prince (1993), by Prince and Smolensky to account for some phenomenon in Lardil: ALIGN: The final edge of the stem corresponds to the final edge of a syllable.(Prince & Smolensky, (1993)(p.103))

[4]A more general constraint on the relation between lexical and prosodic words was introduced by Prince and Smolensky (1993) : Lx ≈ PR(M Cat) (p.43). It means that a morphological category corresponds to a PrWd. They claim, though, that an approach demanding the matching of corresponding edges of prosodic and morphological categories, which we are using here, may be employed.

Obviously, this constraint satisfies our needs and helps us distinguish [.Hi.b∇r.] as the optimal candidate analysis of /Hibr/. It should be mentioned, though, that I am not suggesting that this constraint must be ranked higher than FILL and lower than SSP, at least for the time being. This is because it was only used to discriminate between two identical analyses, as far as violations of constraints are concerned. So, ranking it anywhere in the hierarchy will yield the same result. In future arguments in this chapter, however, we may need to properly rank it in an order of dominance with respect to other constraints active in the language's hierarchy of constraints. By this, we may say that this family of constraints could provide us with a solution to a problem and will provide us with more, as we shall see later in this chapter.

3.2.1.4 Lexical Distinctness

We saw, from the discussion above, that the motivation of epenthesis, so far, is the violation of SSP exhibited by the coda cluster of some monosyllabic nouns of the canonical shape cvcc. So, we epenthesise since the first consonant of the coda cluster is less sonorous than the second one. Yet, there are some examples cited in the language where such a violation is exhibited but no epenthetic vowel is inserted to break up the coda cluster. Consider the following examples :

(16)	a. /madH/	madH	`praising'
	b. /da9m/	da9m	`support'
	c. /Ta9n/	Ta9n	`stabbing'
	d. /lakm/	lakm	`punching'
	e. /fatH/	fatH	`opening'
	f. /dafn/	dafn	`burying'

All these nouns, in (16) above, show a violation of SSP in their final consonant clusters, yet no epenthetic vowel is used to avoid such a violation. According to Roca (personal communication), the only explanation that may account for this type of behaviour is related to the tendency of lexical distinctness active in the language. Jarrah (1993) pointed out that we avoid epenthesis, in these particular cases, because

if we do, we will end up with nouns that have the same forms of the verbs derived from them. And, these verbs are present in the lexicon (Jarrah, 1993 (p.112)). This means that if we use an epenthetic vowel, which must be /a/ for the nouns in (16) above, and for similar ones, for reasons to be made clear when we talk about the identity of epenthetic vowels later, we will find ourselves deriving the verbs. Consider the following list where an epenthetic /a/ is inserted between the last two consonants of the nouns in (16) above:

(17)	a. /madH/	madaH	\`to praise'
	b. /da9m/	da9am	\`to support'
	c. /Ta9n/	Ta9an	\`to stab'
	d. /lakm/	lakam	\`to punch'
	e. /fatH/	fataH	\`to open'
	f. /dafn/	dafan	\`to bury'

I cannot see how we may translate this behaviour and its motivation into a constraint that points [.madH.], for example, as the optimal analysis rather than [.ma.d∇H.] which has an empty nucleus position. The thing that we may suggest for the sake of argument, based on personal communication with Roca, is that the grammar, or the phonological component of grammar to be more precise, provides us with nouns of the form .cv.c∇c. The empty nucleus position is not filled unless the insertion of the epenthetic vowel suitable for a particular noun under consideration does not create a verb, present in the lexicon of the language, that is derived from that particular noun. Otherwise, the language will have to tolerate SSP violation, and the noun will surface as cvcc. This is due to the fact that the language does employ the requirement of lexical distinctness (that advocates the distinctness of verbs, nouns, adjectives, etc.) rather actively.

3.2.1.5 Identity of Epenthetic Vowels

As you may have noticed, from (7) above, the epenthetic vowel inserted between the last two consonants, in cvcc type nouns, if they violate SSP is either /i/, /u/, or /a/.

However, is such a behaviour of alternating vowels haphazard, or is it determined by certain factors? According to Jarrah (1993), this vowel's identity is determined by either the vowel of the stem or by one of the final two consonants of the noun.

The vowel of the stem will spread rightwards to occupy the empty position that was created for already clear reasons only if it is either /i/ or /u/. Consider the following:

(18)

(i)	a.	/?idn/	?idin	\`ear'
	b.	/Hibr/	Hibir	\`ink'
	c.	/Tifl/	Tifil	\`baby'
	d.	/jism/	jisim	\`body'

(ii)	a.	/guTn/	guTun	\`cotton'
	b.	/rub9/	rubu9	\`quarter'
	c.	/Hukm/	Hukum	\`verdict'
	d.	/su9r/	su9ur	\`calory'

The phonological motivation of such a spreading is rather logical and clear:

(19)

```
          σ               σ

O              R    O              R
|         N         |     N              C
|         |         |     |              |
C         V         C     ∇              C
          |
          []
```

What (19) shows is the spreading of the stem vowel towards the empty vowel position.

On the other hand, if the stem vowel is /a/, it will never spread to occupy the empty position of the nucleus of the following vowel. The newly created vowel position will

be filled by /u/, /i/, or even /a/. This is determined by one of the two consonants between which the epenthetic vowel is inserted.

To make things clearer, (20) below will provide some examples of the various environments :

(20)

(i)	a.	/baHr/	baHar	\`sea'
	b.	/nahr/	nahar	\`river'
	c.	/sa9r/	sa9ar	\`hair'
	d.	/naxl/	naxal	\`palm trees'
	e.	/laγm/	laγam	\`mine'
(ii)	a.	/9agl/	9agil	\`mind'
	b.	/?akl/	?akil	\`food'
	c.	/faSl/	faSil	\`chapter/season/class'
	d.	/Habl/	Habil	\`rope'
(iii)	a.	/Sabr/	Sabur	\`patience'
	b.	/fajr/	fajur	\`dawn'
	c.	/nasr/	nasur	\`eagle'
	d.	/tamr/	tamur	\`dates'
(iv)	a.	/sagf/	sagf	\`sealing'
	b.	/XaSm/	XaSm	\`opponent'
	c.	/SaTH/	SaTH	\`roof'
	d.	/madH/	madH	\`praising'
	e.	/TaHn/	TaHn	\`grounding'
	f.	/da9m/	da9m	\`support'

We may be tempted to believe that the epenthetic vowel in the examples under (20(i)) above results from spreading the stem vowel /a/ rightward to occupy the empty nucleus position. Yet, this is not what happens, according to Jarrah. He suggested that the first member of the consonant cluster in the coda, in the underlying forms, is responsible, in (20(i)) in particular, for having the epenthetic vowel surfaces as /a/. In (20(i)) the first member of the cluster is always a guttural, a class of sounds that has [+pharyngeal] as its characteristic feature.

So, this feature will spread causing /a/, the only [+pharyngeal] vowel in the language, to occupy the empty nucleus position. This phonological relation is clarified in (21) below :

(21)

```
            σ                        σ

     O              R        O               R
     |      N                |      N                C
     |      |                |      |                |
     C      V                C      ∇                C
                             |
                             [+phar]
```

(cf. Jarrah, 1993 (p.109))

To demonstrate this claim, i.e., the epenthetic vowel surfaces as /a/ only when the stem vowel is /a/ and only when the first member of the consonant cluster in the coda is a guttural, consider the example under (20(ii),(iii), and (iv)). The epenthetic vowel in these examples is either /i/, /u/, or totally absent. This is because the first member of the cluster is not a guttural sound, or it is a guttural (20(iv) (d),(e), and (f)), but inserting /a/ will result in deriving the verb form which is not favourable by some process active in the language (cf. 3.2.1.4. above). In other words the only environment motivating /a/ as an epenthetic vowel is the one mentioned and discussed above.

On the other hand, if we look at the groups of examples under (20(ii) and (iii)), we will notice that all of the stems presented contain the vowel /a/, which does not spread as we already know. And we will notice that the epenthetic vowel is /i/ when the second member of the coda cluster is /l/ and /u/ when that member is /r/, (20(ii) and (iii)) respectively. This means that the second member is the motivating factor here. Unfortunately, and as Jarrah mentioned, to me there appears to be no logical phonological relation between /i/ and /l/, other than the fact that they both are

[+coronal], or between /u/ and /r/ where the latter in each case motivates the appearance of the former. However, we will take it as it is and treat it as a case of abnormality in the language leaving it for further research.

Finally, and to support our earlier claim concerning the restriction imposed on /a/ as an epenthetic vowel, consider (20(iv) a, b, and c). These nouns exhibit violation of SSP in the coda, yet no epenthetic vowel is inserted between the final two consonants although inserting /a/ will not derive the verb form. This means that *[sagaf], for example, is not a verb; it does not appear in the lexicon. This does drive us towards the generalization for which we have been fishing for quite a while: If the stem vowel under consideration is /a/, it will never spread, and no epenthetic vowel is inserted between the last two consonants, to solve sonority violation, unless the first member of the cluster is a guttural and the resulting form is not a verb, where we epenthesise /a/, or unless the first member of that cluster is not a guttural, and the second member is either /l/ or /r/, where we epenthesise /i/ and /u/, respectively.

So, the power of the requirement of lexical distinctness, discussed above, made the language generalize the discrimination against /a/, which is used to derive verbs, but in very limited cases. And the use of /i/ and /u/ with /l/ and /r/ was a technique to avoid /a/, and then was generalized over the whole group of /l/ and /r/ final cvcc nouns.

3.2.2 Syllable Structure and Position Motivating Epenthesis

In the previous subsection, we saw how violation of SSP motivated vowel epenthesis, and we demonstrated how we many account for such a behaviour within O.T. framework. In this subsection, we will tackle a similar issue. We will discuss instances of vowel epenthesis motivated by syllable structure, position, or both. And, as it is the theme of this study, our analysis will be based on O.T.

3.2.2.1 Complex Onset

Many modern Arabic dialects, TA for example, as it has been stressed before, never tolerate complex onsets, although onsetless syllables are banned. These two restrictions are enforced in the O.T. literature by using two constraints : the superordinate *COMPLEX and the highly ranked ONS. In the previous chapter, we ranked ONS as the highest constraint in the hierarchy active in the language. Nevertheless, we chose not to incorporate *COMPLEX for reasons that were clarified (cf. 2.2.2. and 2.3.1. above). What I want to say is that we tried to avoid using this constraint in its most general meaning, but we hinted at the possibility of parameterising it to suit some syllable structure restrictions, i.e. no complex onsets.

Forms like the seventh binyan /nkatab/ (McCarthy 1979a, 1981) do exhibit complex onsets. The solution employed by the language, as discussed above in chapter 2, is to place an epenthetic vowel before the cluster in the onset of the penultimate syllable which will result in an onsetless syllable motivating the epenthesis of a consonant, the glottal stop, to serve as its onset. For some reason or another, the language chooses to do that instead of breaking up the input string by inserting the epenthetic vowel between the two consonants in the onset to achieve the same goal, i.e. solve the complexity of the onset.

From an O.T. point of view, two constraints are activated to account for this piece of behaviour. One should aim at disfavouring complex onsets, and the other should maintain the contiguity of the input string disfavouring any instance of epenthesis that breaks up the string and forcing it, if needed, to take place at the boundaries. These constraints are *COMPLEX Ons and CONTIGUITY, respectively. The formal definition of these constraints is as follows :

(22) *COMPLEX ONS
No more than one C may associate to any onset node

(cf., Prince & Smolensky, 1993, p.87)

(23) CONTIGUITY(CONT.)[5]
The segments of the input string are not separated.

After having the constraints that we will use to account for this behaviour, we should know how to rank them within the overall order of dominance. Obviously, *COMPLEX Ons is going to be ranked highly due to the strong discrimination against complex onsets. In other words, it should be ranked in an order that allows it to filter out each and every syllable with a complex onset. This means that it must be equally ranked with respect to ONS, so the language will never allow onsetless nor complex onset syllables.

(24) ONS, *COMPLEX ONS >> Other Constraints

On the other hand, ranking CONT. is not as obvious or as simple as ranking *COMPLEX Ons. It should be relatively ranked with FILL and with ALIGN]LxWd =]PrWd

CONT. was basically introduced to determine the desired remedy for the violation of *COMPLEX Ons. In other words, it was suggested to distinguish [∇∇nkatab], that will be phonetically realised as *?inkatab.* instead of [.n∇.ka.tab.], which is a false output. Obviously, the true output has two empty positions and consequently will violate FILL twice. On the other hand, the false output, n∇katab, that violates CONT., only violates FILL once. This means that if we do not use CONT. or use it but rank it lower than FILL, n∇katab will be designated as the optimal analysis because there is nothing that can stop it, or because it violates FILL less than [.∇∇n.ka.tab.] So, CONT. should dominate FILL. Consider the following tableau to see these constraints in action:

---

[5]In this particular context, this constraint was suggested by Roca, phonology workshop. However, the meaning it conveys was first hinted at by McCarthy and Prince (1993) when they disfavored epenthesis that `introduces a discontinuity into the root.' (McCarthy and Prince (1993) (p.50)).

(25)

nkatab	ONS	*COMPLEX ONS	PARSE	CONT.	FILL	-COD
.nka.tab.		*!				**
.n∇.ka.tab.				*!	*	*
.∇n.ka.tab.	*!					
→∇∇n.ka.tab.					**	*
.<n>ka.tab.			*!			*

(The relative ranking between PARSE and CONT. is not indicated since they do not directly interact. This means that violating PARSE does not mean satisfying CONT. and violating CONT. does not mean satisfying PARSE. Also, violating either of them does not mean violating the other.) So, (25) above, demonstrates rather clearly that the suggested ranking of these constraints distinguishes [.∇∇n.ka.tab.] as the optimal analysis, and after all, this is what we want.

As it is important to relatively rank CONT. with respect to FILL (CONT. >> FILL), it is quite essential to consider the relative ranking of CONT. with respect to ALIGN]LxWd =]PrWd. When this alignment constraint was introduced, above, to ensure that epenthesis takes place at the required position, we did not suggest a relative ranking due to the fact that all the constraints used then could not discriminate between [.Hi.b∇r.] and [.Hib.r∇.], so any ranking of ALIGN]LxWd =]PrWd could distinguish [.Hi.b∇r.] as the optimal analysis(cf. 3.2.1.3. above). However, and after introducing new constraints, *COMPLEX Ons and CONT., a need for relatively ranking ALIGN with respect to CONT, in particular, is rather evident. This is because these two constraints may directly interact with each other, i.e. violating one of them may result in satisfying the other. This is because CONT. is against interrupting the input string by epenthesis while ALIGN]LxWd =]PrWd will tolerate such and interruption for the sake of having the right edge of each lexical word aligned to the

right edge of a prosodic word. This means that if CONT. is ranked higher than ALIGN]LxWd=]PrWd, true outputs like [.Hi.b∇r.] will be filtered out because they violate a higher ranked constraint, CONT. But if the ranking is the other way around, i.e ALIGN]LxWd =]PrWd >> CONT., no such mistakes will happen, and the need for which CONT. was introduced , at the first place, i.e., formally enforcing the onset requirement by epenthesis, will still be fulfilled, and the contiguity of the string, on the left periphery, will be maintained. To make things clear, let us update tableau (10) above with all the constraints and rankings introduced so far and evaluate some candidate analyses of the input /Hibr/:

(26)

/Hibr/	ONS	*COMPLEX ONS	PARSE	SSP	ALIGN	CONT	FILL	-COD
.Hibr.				*!				*
.Hib<r>.			*!					*
.Hib.r∇.					*!		*	
→.Hi.b∇r.						*	*	*

3.2.2.2. Superheavy Syllables

In many modern Arabic dialects, TA for example, there is a very well-established restriction on the distribution of superheavy syllables banning them from occupying non-final positions. One of the techniques employed to impose this restriction in derived environments, where superheavy syllables may be caught in non-final positions, is epenthesis. This happens when nouns or verbs that end in superheavy syllables are suffixed with consonant initial affixes such as /kitaab-ha/ --> [kitaabaha] `her book' or /katabt-hum/ --> [katabtahum] `I wrote them.' According to Jarrah 1993, the epenthetic vowel, which is always /a/, may receive stress depending on the type and position of the syllable it creates (Jarrah, 1993 (p.116)). On the other hand, there is no need for such an epenthetic vowel if the affix is a vowel-initial one because this particular affix will serve as the nucleus of a newly created syllable the onset of

which is the last segment of the superheavy syllable which means that the superheavy syllable does not exist any longer :

(27)	a.	/kitaab-i/	→	[.ki.taa.bi.]	`my book'
	b.	/katabt-u/	→	[.ka.tab.tu.]	`I wrote him'

For this reason, we will only focus on the cases that involve epenthesis and try to account for them within O.T.

3.2.2.2.1. CVVC in Non-final Position

cvvc, as a superheavy syllable, is very uncommon to appear in non-final position. As a result of this restriction, as presented above, epenthesis is sometimes used to create a new syllable , and the superheavy syllable will cease to exist. Consider the following examples in which nouns and verbs of the canonical shape cvvc are suffixd with consonant-initial affixes:

(28)

a.	/Tiin-na/	Tiinana	`our clay'
b.	/Xaal-kum/	Xaalakum	`your (pl) maternal uncle'
c.	/beet-ha/	beetaha	`her house'
d.	/muus-hum/	muusahum	`their razor'
e.	/jaab-ha/	jaabaha	`he brought her'
f.	/siib-na/	siibana	`leave us alone'
g.	/Saad-hum/	Saadahun	`he hunted them'
h.	/siil-hum/	siilahum	`pick them up'

To account for such a behaviour within O.T. framework, we will need to postulate a constraint that forbids superheavy syllables from occupying non-final position. In other words, such a constraint must limit the existence of superheavy syllables to final position. This constraint may belong to the constraints family of alignment, and it may be stated as follows :

(29)

ALIGN(S.H.)σ

Align((S.H.)σ, R, PrWd, R)

What this constraint says is that each and every superheavy syllable must have its right edge aligned with the right edge of some prosodic word generalizing the concept of finality related to this type of syllables. This may appear to be an *ad hoc* solution, and although this constraint belongs to a universal family of constraints, it is far from being universal itself. Nevertheless, we badly need such a constraint to account for a piece of behaviour that is by no means uncommon.

So, if we bite-the-bullet and accept this constraint as, at least to my knowledge, the only way to translate the restriction imposed on superheavy syllables, we must now reflect about its ranking within the overall order of dominance. At present, we will say that ALIGN(SH)σ should at least be ranked higher than CONT. and FILL simply because to avoid violating it may require epenthesis which violates CONT. and consequently FILL. And, violating ALIGN(S.H.)σ is more fatal, as far as the language is concerned, than violating FILL and/or CONT. So, let us test this constraint and the suggested ranking in action and try to evaluate some candidate analyses of the input /Tiin-na/ for example :

(30)

/Tii-na/	ONS	*COMPLEX ONS	PARSE	ALIGN (SH)σ	CONT.	FILL	-COD
→.Tii.n∇.na.					*	*	
.Ti.∇in.na.					*	*	*!
.Ti.∇i.n∇.na					*!*	**	
.Tii<n>.na.			*!				
.Ti<i>n.na			*!				*
.Tiin.na.				*!			*

This tableau lists the best candidate analyses of the input /Tiin-na/. These analyses except [.Tiin.na.] exhaust all the possibilities to avoid violating ALIGN(SH)σ but fail to satisfy other constraints that are satisfied by our optimal analysis, which is the true output desired, [.Tii.n∇.na.]. The analysis [.Ti.∇in.na.] is quite interesting because it is a genuine example of the general principle that says : when all is equal, a low ranked constraint emerges decisive , i.e. the emergence of the unmarked. The only

thing that distinguishes between this analysis and the optimal one is the violation of -COD, the lowest ranked constraints. [.Ti.∇in.na.], violates -COD while [.Tii.n∇.na.] does not which results in determining that the latter is the optimal analysis of the input /Tiin-na/.

So, incorporating ALIGN(SH)σ in our constraint hierarchy helped us to enforce an established principle quite particular to the language due to the fact that this constraint is nothing more than a translation of the restriction it was introduced to maintain. Yet, this constraint will prove to be very important and rather decisive in what remains of this study.

3.2.2.2.2. CVCC in Non-final Positions

Like their counterparts, cvcc syllables are disallowed but word finally. The restriction in this case is rather severer because having a cvcc syllable type occupying a non-final position may result in having tri-consonantal or quadri-consonantal medial (intervocalic) clusters that are disallowed for reasons to be made clearer. So, what shall we do if we find a cvcc syllable occupying a non-final position by virtue of suffixing a consonant-initial affix to a word of the canonical shape of that particular superheavy syllable[6]? Consider the following examples :

(31)

a.	/?idn-ha/	?idnaha	\`her ear'
b.	/bint-na/	bintana	\`our daughter'
c.	/?uxt-kum/	uxtakum	\`your (pl) sister'
d.	/baHr-hum/	baHrahum	\`their sea'

(32)

a.	/9amm-na/	9ammana	\`our paternal uncle'
b.	/widd-kum/	widdakum	\`yor (pl) intimacy'
c.	/Hubb-hum/	Hubbahum	\`their love'
d.	/damm-ha/	dammaha	\`her blood'

[6]We limited the environment to consonant-initial affixes because if a vowel-initial affix is suffixed to a word of the form cvcc, the superheavy syllable will disappear as its last consonant will become the onset of the following syllable : /cvcc-v/ →.cvc.cv.

(33)

a.	/suft-kum/	suftakum	\`I saw you (pl)'
b.	/gult-na/	gultana	\`did you say us?'
c.	/katabt-ha/	katabtaha	\`I wrote her'
d.	/jibt-hum/	jibtahum	\`I brought them'

In all these examples, a consonant-initial affix is suffixed to a noun (31,32) or a verb (33) of the form cvcc. To avoid such a violation of the restriction imposed on superheavy syllables, which was translated into the constraint ALIGN(SH)σ, an epenthetic vowel is inserted immediately after the last consonant of the superheavy syllable, and consequently, the constraint is satisfied. Such a behaviour is accounted for within O.T. in the same manner presented above with /cvvc-c/. Consider the following tableau where we will try to evaluate some candidate analyses of the input /cvcc - cv/ that exhibits a tri-consonantal medial cluster:

(34) /cvcc-cv/ like /bint-na/

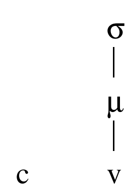
/cvcc-cv/	ONS	*COMPLEX ONS	PARSE	ALIGN (SH)σ	CONT.	FILL	-COD
.cvcc.cv.				*!			*
.cvc.ccv.		*!					*
.cvc<c>.cv.			*!				*
.cvccc.v.	*!			*			*
.cvc.c∇.cv.					*	*	*
.cv.c∇c.cv.					*	*	*
.cv.c∇.c∇.cv.					*!*	**	

This tableau can not determine the optimal analysis though it provided us with a solution to our original problem of having superheavy syllables occupying non-final positions. The tableau could not discriminate between the analyses: [.cvc.c∇.cv.] and [.cv.c∇c.cv.] that are quite equal as far as violations are concerned. This means that we will have to introduce a constraint that completes the job and helps us determine the true output, which should be [.cvc.c∇.cv.] as in [.bin.t∇.na.]. Such a constraint will focus on the difference between the two candidates in question. So, how do these analyses differ, and how can we employ this difference to distinguish [.cvc.c∇.cv.] as the optimal analysis?

The two analyses in question can be distinguished from each other if the position of the epenthetic vowel, to be, is considered. In [.cvc.c∇.cv.] the empty position that will potentially be filled by a vowel is between C2 and C3 of the tri-consonantal medial cluster. On the other hand, this particular position is between C1 and C2 in [.cv.c∇c.cv.]. We will always want this empty position to appear between C2 and C3 whether we are analysing a tri-consonantal or a quadri-consonantal medial cluster, as we will see below. In the traditional approach, the template mapping working together with the parameter on directionality could account for such aspects of, especially, epenthesis (Ito 1985, 1989). And, the analysis of the famous Cairene [?ultilu] vs. Iraqi [gilitla] was always presented as a clarifying example. In optimality, however, we don't rely on such strategies because Gen provides us with all the possibilities, and we are there to choose the optimal analysis that best satisfies the set of constraints we are employing.

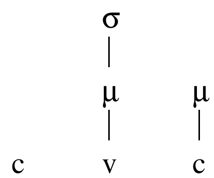
The position of the epenthetic vowel in the two analyses in question affected the type of the initial syllable of these analyses. The initial syllable of [.cv.c∇c.cv.], where the epenthetic vowel is inserted between C1 and C2, is light, .cv., which means it only has a single mora :

(35)



On the other hand, the initial syllable of [.cvc.c∇.cv.] is a heavy one meaning that it is bimoraic:

(36)



If we combine these two representations of the two syllables with a well established constraint presented by McCarthy and Prince (1993): "Feet must be binary under syllabic or moraic analysis[7]" (McCarthy and Prince, 1993, (p.10)), we will say that .cvc. is a foot as it is bimoraic, but .cv. is not as it has only one mora. This is the real difference; one is a foot, and one is not. And, as we are talking about the initial syllable, we will say that the left edge of [.cvc.c∇.cv.] is aligned with a foot, but the left edge of [.cv.c∇c.cv.] is not. This hints at employing a constraint introduced by McCarthy and Prince called ALIGN-PrWd:

(37)

ALIGN-PrWd

Align(PrWd,L,Ft,L)

(McCarthy & Prince 1993, p.13)

Apparently, this constraint will discriminate against [.cv.c∇c.cv.] and distinguish [.cvc.c∇.cv.] as the optimal analysis because the initial syllable of the former is not a foot while the latter's initial syllable is. This is because this constraint says that the left edge of every prosodic word must be aligned with the left edge of some foot.

As we agree to include ALIGN-PrWd, we have to properly rank it with respect to other constraints already existing in our hierarchy. As far as distinguishing between two analyses, any ranking of the constraint will do the job as they are equally violating CONT., FILL, and -COD. But, we should reflect about other inputs' candidate analyses and their relation to this particular constraint. Optimal candidate analyses like [.ba.H∇r.], [.Ha.b∇l], [.Hi.b∇r.], etc. (cf. 3.2.1.3. above) violate ALIGN-PrWd in

[7] The same constraint was presented by Prince and Smolensky (1993) as ``Feet are binary at some level of analysis (μ, σ)." (Prince and Smolensky (1993)(p.47)).

addition to their FILL violation because their initial syllables are light ones and, consequently, can never be feet.

So, if we rank ALIGN-PrWd higher than FILL, it will filter optimal forms like [.Hi.b∇r.] out. And, what about words like: [.ma.rin.] `flexible', [.ma.gaS.] `pair of scissors', and the like where the initial syllable is light? If ALIGN-PrWd is ranked higher than FILL, something will have to be done to these words, like epenthesis, to make their initial syllables heavy. We do not want this to happen because these words are true outputs. Therefore, we must rank ALIGN-PrWd lower than FILL. Let us add this constraint, and in the suggested ranking ,to tableau (34) above and see what will happen:

(38)

/cvcc-cv/	ONS	*COMPLEX ONS	PARSE	ALIGN (SH)$_\sigma$	CONT	FILL	ALIGN-PrWd	-COD
.cvcc.cv.				*!				*
.cvc.ccv.		*!						*
.cvc<c>.cv.			*!					*
.cvccc.v.	*!			*				*
→.cvc.c∇.cv.					*	*		*
.cv.c∇c.cv.					*	*	*!	*
.cv.c∇.c∇.cv.					*!*	**	*	

Obviously, incorporating ALIGN-PrWd, in this particular order, helped us determine the optimal analysis that represents our true output.

Mester and Padgett introduced a rather interesting pair of constraints to account for the position of the epenthetic vowel motivated by the parameter on Ito's directionality. Not surprisingly, they used the famous example of the Cairene [?ultilu] and the Iraqi [gilitla]. For our purposes, we will present and try to apply the constraint suggested to favour [?ultilu] as it quite resembles our desired true output, i.e., [.cvc.c∇.cv.] as in [.bin.t∇.na.]. This constraint is built on an alignment relation between syllable and prosodic word:

(39) S-ALIGN(R).
ALIGN(S,R,PrWd,R)

(Mester & Padgett, 1994)

This constraint says that the right edge of every syllable should be aligned with the right edge of some prosodic word. And, they computed the distance between these edges by moras: the less moras that separate the right edge of a certain syllable from the right edge of a prosodic word the more likely that syllable is considered optimal. So, let us try to distinguish between our two, problematic, candidate analyses employing this constraint to evaluate the optimality of their syllables:

(40) S-ALIGN(R)

/cvcc-cv/	S1	S2	S3
.cv.c∇c.cv.	∅	μ	μμ!μ
→.cvc.c∇.cv.	∅	μ	μμ

So, our true output is chosen by this tableau as the optimal analysis because its third syllable, the antepenultimate, is separated from the prosodic word right edge by only two moras, where the same syllable of the other analysis is separated from that particular edge by three moras.

This constraint, according to Mester and Padgett, does not have to be relatively ranked with FILL in an order of dominance. This is quite true as it will not discriminate against [ma.gaS], for example, and favour [ma∇.gaS] where the initial syllable is a foot as did ALIGN-PrWd.

(41)

/magaS/	S-ALIGN(R)		FILL
	S1	S2	
→.ma.gaS.	∅	μμ	
.ma∇.gaS.	∅	μμ	*!

So, S-ALIGN(R) could not discriminate between the two analyses and handed the job to FILL that decided the optimal analysis.

In conclusion, we say that both constraints, viz. ALIGN-PrWd and S-ALIGN(R) could carry out the mission and determine the true output. Consequently, we will carry on using either of them unless strong evidence favouring one of them emerges as we progress.

3.2.2.2.3 Datives

In the previous sub-section, we were discussing the way in which we account for the epenthesis motivated by having a superheavy syllable occupying a non-final position as a consonant-initial affix is suffixed to a noun or a verb whose final syllable is either cvvc or cvcc. Our main focus was on the initial segment of the affix, whether consonant, where the epenthesis will take place, or vowel where no epenthetic vowel is inserted for reasons already known. We did not pay any attention to the type of the affix itself: whether it is an object suffix, a possessive one, or either depending on the stem to which it is suffixed[8]. This lack of interest in the type of affix involved is

[8]Suffixes like (-na, -i, -ak, -ik, -kum, -u, -ha, and -hum) can be considered either as object makers or possessive suffixes. This is determined by whether the stem to which they are suffixed is a verb or a noun. If they are attached to verbs, they represent the object, and they are possessive suffixes if they appear with nouns:

/bint (n)-ha/	bintaha	`her daughter'
/suft(v)-ha/	suftaha	`I saw her'

motivated by the fact that the effect is always the same i.e., we epenthesise if it is a consonant-initial one, and we don't if it is not.

The dative affixes /-l-/ `for/to' and /-b-/ `by/with' behave rather uniquely. They are only suffixed to verbs, and they must be followed by object suffixes which may result in tri-consonantal medial clusters if the object suffix involved is a vowel-initial one (-i, -u, -ak, etc.), or, it may result in quadri-consonantal medial clusters if the object suffix is consonant-initial (kum, hum, na, etc.). The most striking peculiarity of these affixes is their strong tendency to appear right after stressed syllables. Consider the following examples:

(42) (i) tri-consonantal clusters

a. /gult-l-ak/	gultallak	`I said to you (ms., sg.)'
b. /katabt-b-u/	katabtabbu	`I wrote with it'
c. /suft-l-ik/	suftallik	`I saw for you (fm. sg.)'
d. /jibt-l-i/	jibtalli	`You (ms. sg.) brought for me'

(ii) quadri-consonantal clusters

a. /gult-l-kum/	gultallakum	`I said to you (pl)'
b. /katabt-l-hum/	katabtallahum	`I wrote for them'
c. /suft-b-ha/	suftabbaha	`I saw with it'
d. /jibt-l-na/	jibtallana	`You (ms. sg.) brought for us'

Obviously, the tendency to appear right after stressed syllables is exhibited quite clearly and carried out rather forcefully. In all the examples, cited above, the dative affix /-l-/ or /-b-/ creates a potentially stress bearing syllable by epenthesis and gemination. In the cases with tri-consonantal clusters, an epenthetic vowel is inserted to satisfy the constraint against having superheavy syllable occupying non-final position, and to break up the sequence of the three consonants of the input. This is not all, however, the dative affix geminates, and a heavy stress attracting syllable, made up of the last consonant of what used to be a superheavy syllable, the epenthetic

vowel, and the first member of the geminates, is created. What happens with the cases that have a quadri-consonantal clusters is quite the same with the addition of an epenthetic vowel inserted between the dative affix and the consonant-initial object suffix to avoid complex onsets. So, what makes, the dative affixes rather unique if compared to their objectival counterparts, viz., na, kum, ha, etc., is their tendency to be aligned with stressed syllables.

The question that presents itself now is: how can we account for such behaviour within OT framework? Apparently, we do need a constraint to help us maintain such a behaviour in such environments. McCarthy and Prince, in their paper "Generalized Alignment", suggested an alignment constraint that accounts for the behaviour of possessive affixes in Ulwa. In this language, the left edge of possessive affixes is aligned with the right edge of the main stress foot. So, we will suggest an alignment constraint that may help us to achieve our particular goal related to the behaviour of dative affixes building on their suggestion. Consider the following constraint:

(43) ALIGN-TO-FOOT
Align([Dative]Af, L, Ft',R)

What this constraint says is that the left edge of every dative affix must be aligned with the right edge of the head foot (hinted at by Ft'). But, how can we rank it within our hierarchy of constraints? We want this constraint to help us distinguish [gul.t∇∇ .lu] as the optimal analysis of the input /gult-l-u] and [gul.t∇∇.l∇.ha] as the optimal analysis of the input /gult-l-ha/, for example. These optimal candidate analyses exhibit two, or three violations of CONT. and consequently of FILL. This means that ALIGN-TO-FOOT should be ranked higher than CONT and FILL. The following tableau demonstrates ALIGN-TO-FOOT in action:

(44)

/gult-l-u/	ONS	PARSE	ALIGN (SH)$_\sigma$	ALIGN-TO-FOOT	CONT	FILL	ALIGN-PrWd	-COD
??.gul.t∇∇.lu					*!*	**		**
.gul.t∇.lu.				*!				
→ .gu.l∇t.lu.					*	*	*	*
.gul<t>.lu.		*!						*

Unfortunately, this tableau could not determine the true output and chose [.gu.l∇t.lu.] as the optimal analysis when we wanted it to choose [.gul.t∇∇.lu.] Both analyses satisfy the newly introduced constraint, ALIGN-TO-FOOT, and CONT. is the constraint that discriminates between them for the favour of the false output, [.gu:l∇ t.lu.]. ALIGN-PrWd, however, is satisfied by our true output and violated by the false one, but this is insignificant due to the fact that it is ranked lower than CONT. that already carried out the job. So, why do we not rank ALIGN-PrWd higher than CONT.? We know that we can not do that because this will badly affect true outputs like [.ma.rin.], [.ma.gaS], etc. as clarified above. Another solution might be by incorporating S-ALIGN(R) (c.f. (39) above) to do the job of ALIGN-PrWd and rank it higher than CONT., this will not harm [.ma.gaS.] as it was demonstrated above. Yet, will S-ALIGN(R) discriminate between [.gul.t∇∇.lu.] and [.gu.l∇t.lu.] for the favour of the former that we are after? Consider the following tableau:

(45)

	S-ALIGN(R)		
/gult-l-u/	S1	S2	S3
gul.t∇∇.lu	∅	μ	μμμ
gu.l∇t.lu	∅	μ	μμμ

The gemination made the difference, and S-ALIGN(R) could not distinguish between the two analyses as demonstrated above. So there is no logical reason for incorporating this constraint, instead of ALIGN-PrWd, at least for our present

challenge. We returned to where we have started, and CONT is still the constraint that discriminates between the two analyses, unfortunately, for the favour of the false one.

If we want to solve this notorious problem, we should polish and refine our understanding of two points. We, first, should know the real identity of the dative plus the object suffix as a single unit. The other thing is related to the prosodic domain that the constraint CONT is there to maintain. We want to argue for the unity of the dative and the object suffix, and we want to agree on a certain prosodic domain where CONT is active to maintain the contiguity.

The peculiarity of the behaviour of a dative plus an object suffix if compared to the behaviour of an object suffix alone when attached to a word of the canonical shape cvcc hints at the distinctness of these two attachments.

(46)

a. /suft-ha/	suftaha	\`I saw her'
b. /suft-l-ha/	suftallaha	\`I saw for her'

/-laha/ in (46 -b) seems to be a unified entity. It resembles a word but may not stand on its own. And, to carry things further, some native speakers of the language argue for the ability of such units to stand alone as independent words:

(47)

laha	\`for her / hers'
lahum	\`for them / theirs'
lana	\`for us / ours'
lak	\`for you (ms. sg.) / yours'
li	\`for me / mine'

Anyway, there is some kind of unity exhibited by this attachment of a dative (l / b) and an object suffix. This unit, and as we have discussed above, does attract the stress pattern of the host word (main word) to which it is attached. So, we may postulate that /-l-/ and /-u/, for example, are not a dative affix and an object suffix, as we have been positing in our previous discussion, yet both do form a clitic, an enclitic in particular.

If we take it as it is and consider /-lu/, for example, as a clitic, we ought to know that clitics form Clitic Groups (CG) if they are attached to words, while affixes form prosodic words if they are attached to stems. So, we are talking about two prosodic domains one of which is included in the other. The CG is a wider domain if compared with the PrWd:

(48)

a. Stem] + suffix]PrWd
b. PrWd] + clitic]CG

Now, we have to decide the prosodic domain that CONT is protecting. When we introduced CONT above, we said that it is a constraint against separating the input's string by epenthesis. Yet, we will have to refine this understanding and limit the application of CONT to the domain of the prosodic word. And, because the CG is a wider domain that contains the prosodic word, the stem, and the clitic, CONT only applies to a certain part of the domain. To put it differently, a candidate analysis of an input violates CONT if the prosodic word shows a medial epenthesis, but will not exhibit such a violation if the epenthesis takes place on the peripheries even if it occupies a position between the stem and the clitic.

So, can this new understanding of the dative plus an object suffix as a clitic and the limitation of the domain of CONT help us solve the original problem and point [.gul.t∇∇.lu.] as the optimal analysis of the input /gult-l-u/ ? The following tableau will demonstrate that:

(49)

/gult-l-u/	ONS	PARSE	ALIGN $(SH)_\sigma$	ALIGN-TO-FOOT	CONT	FILL	ALIGN-PrWd	-COD
→ .gul.t∇∇.lu.						**		*
.gul.t∇.lu.				*!				
.gu.l∇t.lu.					*!	*	*	*
.gul<t>.lu.		*!						*
.gult.lu.			*!					*

CONT. could distinguish between the two analyses. The false output [gu.l∇t.lu] violates CONT. because the contiguity of the stem /gult-/ is disturbed by epenthesis. On the other hand, the contiguity of the stem is maintained in the true output [.gul.t∇∇.lu.].

By this, we will conclude talking about epenthesis and move to other phenomena that affect the internal structure of the syllable. In the next two sections, we will talk about vowel shortening and syncope.

3.3 Vowel Shortening

In this section, we are going to focus on a process that results in changing the internal structure of the syllable. Here, however, we will not discuss the use of epenthetic vowels; conversely, we are going to tackle an interesting phenomenon that involves shortening the long vowels of hollow verbs (verbs of the canonical shape cvvc). These long vowels are shortened "when these hollow verbs are suffixed by the dative /-l-/ or /-b-/ which are always followed by object markers." (Jarrah, 1993, p.145). Again, this unexpected behaviour is only peculiar to the dative clitic. Consider the following examples to feel the difference of behaviour between these clitics and object suffixes:

(50)

(i)	a. /jiib-ha/	.jii.ba.ha.	`bring her'
	b. /saaf-na/	.saa.fa.na.[9]	`he saw us'

[9]The epenthetic vowels, in such cases are always /a/, as indicated above. This should not be mixed, however, with the restriction against spreading stem vowel /a/ to solve SSP violation.

c. /siib-hum/ .sii.ba.hum. `leave them'
d. /saal-kum/ .saa.la.kum. `he raised you (pl.)'

(ii)
a. /daar-l-u/ .dar.lu. `he turned to him'
b. /jiib-l-i/ .jib.li. `bring to me!'
c. /saal-b-ha/ sal.ba.ha. `he raised with it'
d. /raaH-l-hum/ raH.la.hum. `he went to them'

In all the examples in (50) above, a superheavy syllable of the form cvvc is caught in a non-final position. The regular remedy, as practiced in (50-(i)), is to use an epenthetic vowel inserted between the consonant-initial affix and the last consonant of the superheavy syllable. Yet, when it comes to datives, i.e., when the consonant-initial attachment involved is the notorious clitic that is made up of a dative and an object marker, no epenthetic vowel is used, and vowel shortening takes place. The final objective is the same in both cases, i.e., the superheavy syllable does not exist any longer. However, the method differs.

The motivation of this difference of methods to achieve the same goal is rather clear. The dative wants to appear immediately after the stressed syllable as in [darlu]. Nevertheless, if we employ an epenthetic vowel, we will not satisfy this need of alignment, *[daaralu]. So, we are favouring underparsing rather than overparsing, vowel shortening rather then epenthesis.

Now, we want to know how to account for such behaviour within OT framework. To make things look clear and to know the real challenge, let us try to evaluate some candidate analyses of the input /daar-l-u/ and see whether we can appoint [.da<a>r.lu.] as the optimal analysis or not. We will use the set of constraints introduced so far:

(51)

/daar-l-u/	ONS	PARSE	ALIGN $(SH)_{\sigma}$	ALIGN-TO-FOOT	CONT	FILL	ALIGN-PrWd	-COD
.daar.lu.			*!					*
??.da<a>r.lu.		*!						*
.daa.r∇.lu.				*!		*		
→.daa.r∇∇.lu.						**		

Obviously, this tableau could not distinguish our true output, [.da<a>r.lu.] as the optimal analysis. Instead a false output [.daa.r∇∇.lu.] was chosen. This is due to the fact that our true output violates a quite highly ranked constraint, PARSE. This made all the candidate analyses that do not violate PARSE in (51) above, and certainly any number that we may think of, more optimal than our true analysis. This means that we must find a constraint that will discriminate against all the possible candidate analyses that do not violate PARSE and rank it higher than it to allow only those that violate PARSE, one of which will be [.da<a>r.lu.], our desired analysis. OR, we have to rerank PARSE with respect to the other constraints active in the hierarchy.

To me, the first solution is not feasible at the moment. I could not find that particular constraint to do that rather difficult job. And, I could not re-rank any of the constraints to be higher than PARSE to carry out the needed task. This is because if a particular ranking is sufficient for our purposes at the moment, it would render bad effects elsewhere. Let us take CONT as an example. CONT is not violated by [.daa.r∇∇.lu.] because when a clitic is involved, /-lu/, CONT only maintains the contiguity of the stem, as clarified and argued for above. But let us imagine that this false output does violate CONT, and we know that underparsing does not violate this constraint, meaning that [.da<a>r.lu.] does not violate CONT. If we rank CONT higher than PARSE, [.da<a>r.lu.] will be more optimal than [daa.r∇∇.lu]. But, on the other hand, we can not appoint [.tii.n∇.na.] as the optimal analysis of the input /tiin-na/ because [ti<i>n.na] that does not violate CONT will be the victor, or at least a better analysis.

From my own point of view, the only explanation to cases where vowels are shortened or deleted is the Ranking Reversal of PARSE and FILL. This apparently *ad-hoc* solution was first proposed by McCarthy and Prince (1993) when they wanted to account for the behaviour of possessive affixes with an exceptional subset of Ulwa nouns. They proposed that ALIGN-IN-STEM can exceptionally be reversally ranked with respect to ALIGN-TO-FOOT. So, if we let PARSE and FILL exchange their ranking order, we will be able to explain how the grammar manages to choose forms like [.da<a>r.lu.] instead of [.daa.r∇∇.lu.]. It will not be a convincing explanation because if we feel free to play with our ranking every time, the formality of the theory is destroyed all together. Unfortunately, this is the only solution I could find at the moment:

(52)

/daar-l-u/	ONS	FILL	ALIGN (SH)$_\sigma$	ALIGN-TO-FOOT	CONT	PARSE	ALIGN-PrWd	-COD
.daar.lu.			*!					*
→.da<a>r.lu.						*		*
.daa.r∇.lu.		*!		*				
.daa.r∇∇.lu.		*!*						*

This exchange of positions between PARSE and FILL has to be very exceptional and peculiar to cases of vowel shortening and syncope as we shall see in the next section.

3.4 Syncope

In this section, we are going to talk about the deletion of the high short unstressed vowels. This deletion does affect the internal syllable structure quite considerably. This deletion will result in the disappearance of the whole syllable because the vowel, the only obligatory constituent of the syllable, disappeared. This deletion will take place when a word final consonant is resyllabified as the onset of the following syllable, as a result of attaching a vowel-initial affix to that word; the preceding unstressed high front vowel is deleted even if that deletion results in having a

superheavy syllable of the form cvvc, but not cvcc, occupy a non-final position. The following examples clarify the target environment:

(53)

(i)	a. /rikib-u/	.rik.bu.	\`they rode'
	b. /nidim-at/	.nid.mat.	\`she felt sorry'
	c. /yi-stalim-uuk/	.yis.tal.muuk.	\`they receive you'
	d. /ti-stalim-ak/	.tis.tal.mak.	\`she receives you'
(ii)	a. /rikib-na/	.ri.kib.na.	\`we rode'
	b. /nidim-tu/	.ni.dim.tu.	\`you (pl.) felt sorry'
	c. /yi-stalim-ha/	.yis.ta.lim.ha.	\`he receives her'
	d. /ti-stalim-hum/	.tis.ta.lim.hum.	\`she receives them'
(iii)	a. /jalas-at/	.ja.la.sat.	\`she sat'
	b. /rasam-na/	.ra.sam.na.	\`we drew'
	c. /?akal-u/	.?a.ka.lu.	\`thet ate'
	d. /dafa9-tu/	.da.fa9.tu.	\`you (pl.) paid'
(iv)	a. /SaaHib-i/	.SaaH.bi.	\`my friend (ms.)'
	b. /SaaHib-kum/	.Saa.Hib.kum	\`your(pl.) friend(ms.)'
	c. /Taalib-aat/	.Taal.baat.	\`students (fm.)'
	d. /Taalib-na/	.Taa.lib.na.	\`our student (ms.)'
(v)	a. /yi-Hrig-u/	yiH.ri.gu./*.yiHr.gu.	\`they burn'
	b. /ni-kallim-ak/	.ni.kal.li.mak/*.ni.kall.mak.	\`we call you (ms,sg)'
	c. /ti-stagbil-ik/	.tis.tag.bi.lik./*.tis.tagb.lik	\`she meets you (fm., sg.)'
	d. /ti-tarjim-i/	.ti.tar.ji.mi./*.ti.tarj.mi.	\`you(fm,sg) translate'

(53-i) shows cases in which deletion takes place because all the conditions are satisfied. The affix added is a vowel-initial one and the unstressed vowel is a high front one /i/. In (53-ii), the vowel does not delete because the added affix is a consonant-initial one. The blocking of deletion in (53-iii) is motivated by the fact that the unstressed vowel is not a high one, it is /a/. (53-iv) is an interesting group of examples where the deletion takes place even if the output exhibits superheavy syllables in non-final positions. On the other hand, (53-v) is the opposite of (53-iv); deletion is blocked because the outputs have superheavy syllables of the type cvcc occupying non-final positions. The difference between the last two groups of

examples may be explained if we consider the medial clusters that result after deletion in both cases.

(54)

a. .Saa H. baat.
c_1 c_2

b. .yiH r. g u.
c_1 c_2 c_3

The language may tolerate the superheavy syllable of the form cvvc in non-final position because the resulting medial consonantal cluster has only two consonants while this cluster will be made up of three consonants if the superheavy syllable type involved is cvcc. So, tri-consonantal intervocalic clusters are never allowed.

Now, and to carry on the theme of our study, how can we account for this rather isolated piece of behaviour within O.T? As the case is rather exceptional in the sense that only the high-front short vowel /i/ deletes, we may not suggest a general and, if I should say, a universal constraint. What we will do instead is to propose a constraint that literally translates the environment of deletion and indicate that such an environment is not acceptable. This constraint will look as follows:

(55) *vcicv

This constraint says that such a configuration is not allowed. It will have to be ranked higher than ALIGN(SH)σ to allow deletion to happen even if the resulting output shows a cvvc syllable type in non-final position. This will not render having cvcc in non-final position, however, because the constraint shows the target of deletion, i.e., /i/ between two consonants only. So, tri-consonantal medial clusters will not result after the deletion of /i/. So, if this constraint is against such a configuration, we can avoid violating it by either deleting the high front vowel, which we are aiming to achieve, or by using an epenthetic segment inserted, either before or after /i/, which we want to avoid. The thing that determines the optimality of either solutions is the

relative ranking of PARSE and FILL. If PARSE is higher than FILL, then forms like vc∇icv, vci∇cv etc. will be more optimal than our true output vc<i>cv. This means, and as indicated above, that we will have to take the bull by the horns again and exchange the ranking of PARSE and FILL. So, let us evaluate some of the candidate analyses of the input /rikib-u/ based on what has been said so far:

(56)

/rikib-u/	ONS	*COMPLEX ONS	FILL	*vcicv	ALIGN]=]	PARSE	-COD
?? .rik<i>.bu.						*	*!
→.ri<k>i.bu.						*	
→.ri.ki<b>u.						*	
.r<i>ki.bu.		*!				*	
.ri.kib.<u>.					*!	*	*
.ri.ki∇.bu.			*!				
.ri.ki.bu.				*!			

Unfortunately, this tableau is not capable of pointing [.rik<i>.bu.], our true analysis, as optimal. And it also could not determine an optimal analysis at all. This is because [.ri<k>i.bu.] and [.ri.ki<b>u.] which are both false analyses, are completely equal as they only violate PARSE. In addition -COD discriminated against our true output. This means that avoiding violation of *vcicv is not enough; a constraint that distinguishes between these two false analyses, on the one hand, and our true output, on the other, must be employed and ranked higher than -COD for reasons that are quite obvious.

We are not going to introduce a wholly new constraint for our present purposes. We will have two separate PARSE constraints; one that applies to consonants and another to vowels[10]. We are not going to use these two constraints to satisfy our apparent needs only; we are going to enforce a well-established restriction applying in the language. This restriction is against deleting any root consonant whatever the environment is. Nevertheless, I would like to stress the fact that this constraint is not

[10]This is suggested by Roca, phonology workshop, Yet, it was basically introduced by Prince and Smolensky (1993) as a completion to their earlier suggestion concerning FILL.

against consonant deletion in general, root and non-root consonants, because we have some examples of consonant deletion processes in the language, like final /-h/ deletion which we chose not to talk about in this particular study because it does not have a direct influence on the internal structure of the syllable. So, we will have the constraints PARSE(V) and PARSE(C) where the former is against v-deletion and the latter is against c-deletion. PARSE(C) will be ranked higher than PARSE(V) to indicate that deleting a root consonant is more fatal than deleting a vowel. This will help us distinguish [.rik<i>.bu.] as the optimal candidate analysis of /rikib-u/. The following tableau illustrates this point quite clearly:

(57)

/rikib-u/	ONS	*COMPLEX ONS	FILL	*vcicv	ALIGN]=]	PARSE (c)	PARSE (v)	-COD
→.rik<i>.bu.							*	*
.ri<k>i.bu.						*!		
.ri.ki<b>u.						*!		
.r<i>ki.bu.		*!					*	
.ri.kib.<u>.					*!		*	*
.ri.ki∇.bu.			*!					
.ri.ki.bu.				*!				

This might tempt us to carry on this distinction of two PARSE constraints to solve the problem of under-parsing or overparsing that was settled by employing the rather poorly convincing solution of Ranking Reversal of PARSE and FILL. What I want to say is that we may do without exchanging the positions of PARSE and FILL by ranking only PARSE(v) lower than FILL and leaving PARSE(c), which is never violated, at its high ranking order. This will enable us to choose [.da<a>r.lu.] as the optimal candidate analysis of /daar-l-u/ rather than [.daa.r∇∇.lu.] which means a better solution to that problem. If we think about this issue in isolation of other active processes in the language, it will work rather perfectly for either vowel shortening or even vowel deletion. Yet, this suggestion of ranking PARSE(v) lower than FILL will render bad results elsewhere. The input /tiin-na/, again, will surface as [.ti<i>n.na.],

which is a false output, rather than [.tii.n∇.na.], our true output. Unfortunately, this indicates that we are, at least in this study, obliged to accept the solution of Ranking Reversal.

In conclusion, I think that the further complexities introduced in this chapter demonstrate the fact that O.T. is a framework that is capable of solving some but not all the problems if our aim was to apply logical and general methods. This is the theme of the concluding chapter where the main findings, viz. the areas of strength and those of weakness exhibited by O.T., in this study are summarised, and conclusions are drawn.

Chapter Four
CONCLUSION

The main objective of this study was to test the potentiality of O.T. as a framework employed to analyse the syllable structure, and the related processes, in T.A. To do that, we presented the first two preliminary chapters where the basic theoretical and technical issues were put foreword and the foundations of syllable structure in T.A. were laid out. The third chapter, however, where the complexities that O.T. is expected to deal with, are considered is the main contribution presented by this study. There, we could see the strength and weakness of O.T. as far as the syllable structure of TA is concerned.

In the first and most important section of chapter three, we discussed vowel insertion, epenthesis, that is motivated by more than one factor. We started analysing such behaviours involving epenthesis by considering the sonority restriction imposed on syllable structure. Then, we moved to other factors such as syllable structure and/or position. We saw that epenthesis could solve problems related to violations of the constraints on syllables in T.A. Although some of these processes looked rather complicated and difficult to understand and justify, O.T., by virtue of Gen and the ranking suggested for T.A. could distinguish the true analyses as the optimal ones, and, consequently, satisfy our needs by being able to account for such pieces of behaviour. This does not mean that we did not face any difficulties in this particular section. Unfortunately, we employed some constraints that are far from being considered as universal. Yet, we may say that they belong to universal families of constraints. ALIGN(SH)σ, for example, is a constraint belonging to a universal family of constraints, Alignment or Edgemost, but it is a very language specific one. It is quite unlikely to find this constraint active in other languages and not even in some Arabic dialects, Najdi Arabic for instance. Nevertheless, we may say that O.T. was somewhat successful in accounting for examples of epenthesis, exhibited by the

language in question in general, which means that suggesting these rather language specific constraints that are members of universal families is a matter that can be tolerated and argued for. The thing that we may not accept, or at least feel happy about, is the *ad-hoc* solutions that are suggested to cover holes represented by some rather strange behaviours in the language, in a manner that is far from being logical.

In the second and the quite radical part of the third chapter where instances of deletion, either vowel shortening or syncope, were analysed, we found ourselves forced to propose very specific and isolated solutions to account for some processes. Our problem was, and is still, centred around the relative ranking of PARSE and FILL and the consequences of this particular ranking. For reasons discussed in chapter two, as the onset requirement is enforced by epenthesis not by deletion, and due to the fact that examples of epenthesis to solve syllable structure violations do outnumber their counterparts that motivate deletion, we reached the logical conclusion that PARSE dominates FILL. This means that analyses exhibiting violations of FILL are more optimal than the ones violating PARSE. This again, means that we will always find a better solution, for any syllable structure constraint, if we avoid violating PARSE. For example, to violate FILL for the sake of satisfying ALIGN(SH)σ is always better than violating PARSE. And, we could always find a candidate analysis that violates FILL but not PARSE for whatever reason, i.e., for the sake of satisfying any other constraint. So, how can we account for deletion within O.T? This is the question to which this study failed to give a satisfactory answer. The very illogical and weak solution was to depend on the Ranking Reversal of PARSE, or at least PARSE(v), and FILL.

So, in a nut shell, we may say that O.T. is a framework that could account logically for most of the processes related to syllable structure of T.A. discussed in this study. Yet a further research in this field is required to answer some questions and improve some answers.

Appendix
Taifi Arabic (TA)

The main purpose of this appendix is to provide a general background about the language investigated in this study. I will give a brief description of Taif city and its dialect, and, most importantly, I will give a thorough analysis of the sound system of the language, i.e., consonants and vowels used in Taifi Arabic.

Taif and Taifi Arabic

Taif is a little peaceful town that lies on the Sarawaat Mountains to the west of the Arabian Peninsula. Although Taif is not that large, it has a somewhat complex society structure. Basically, Taif's society is a blend of three distinct social groups: the urban Hijaazis, the farmers who chose to live in Taif because farming was not worth it any longer due to the severe lack of irrigation waters, and the nomadic tribes who found it easier to settle in cities like Taif. As a result of the eventual intermingling between those social groups, a rather unique society that speaks its own dialect which represents its identity was found.

The Sound System of Taifi Arabic

As almost any other sound system, TA has a number of consonants and vowels that may have similarities and differences if compared to other systems, but they work together quite smoothly to give the language, its own identity. Basically, TA has twenty seven consonant sounds and five vowel sounds. However, before I start the phonetic description of the system, I shall make clear that I will consider the dialect that is mostly used with some hints at other minor varieties where needed for clarification.

Consonant Sounds

(i) *Plosives*

b voiced bilabial

t	voiceless dental
d	voiced dental
T	voiceless dental (emphatic)
k	voiceless velar
g	voiced velar
?	glottal (it is not specified for voiceness)

There are some points to be clarified here. First, there has to be a clear distinction between the voiceless dental plosives [t] and [T]. We can say that [T] is the emphatic or pharyngealised counterpart of [t]. This means that both sounds are produced by having the tip of the tongue touching the inside of the upper teeth, but if we consider words like [Tayyaar] `a pilot' and [tayyaar] `a draught of air', we find that instead of remaining relaxed in the production of [T], the body of the tongue constricts in the upper pharynx. It is worthy of mentioning that the tongue behaves similarly with all emphatics (Kenstowicz, 1994). Another point of distinction between [t] and [T] is that the former is aspirated while the latter is not (Hamdi, 1977 p.6).

Another point related to plosives has to do with [g]. This sound is a reflection of the Classical Arabic [q], which is emphatic. The [q] has disappeared from most Arabic dialects and was replaced by [g] or [?].

(ii) *Nasals*

m	bilabial
n	alveolar
N	nasalised (gunnah)

I should mention that /N/ is given the description nasalised because it is produced by only forcing the air through the nasal cavity.

(iii) *Fricatives*

f	voiceless labiodental
θ	voiceless interdental
∂	voiced interdental
D	voiced interdental (emphatic)
s	voiceless alveolar
z	voiced alveolar
S	voiceless alveolar (emphatic)

s	voiceless post alveolar
z	voiced post alveolar
x	voiceless post uvular
γ	voiced post uvular
H	voiceless pharyngeal
9	voiced pharyngeal
h	voiceless glottal

Again we have two pairs, [∂], [D] and [s], [S], where the two sounds, within each, have the same specification for voiceness and the same point of articulation, but one is emphatic while the other is not. The following minimal pairs may help in distinguishing the sounds: [∂arrah] `an atom' vs. [Darrah] `he harmed him' and [seef] `a sword' vs. [Seef] `summer time'. I should not also forget to mention that a considerable number of individuals, though not the majority, do not have [θ] nor [∂] in their sound system; they use [t] and [d] or [z] respectively. Also, the same is true about [z] which tends to appear as the voiced postalveolar affricate [j] with a quite considerable number of speakers.

(iv) *Approximants*

(a) Lateral

l	voiced alveolar

(b) Central

r	voiced alveolar (trill)
y	voiced palatal
w	voiced labio-velar

Vowel Sounds

The vowel sounds in Arabic, in general, are very simple. TA has four short vowels [i] [a] [u] [o] and a long one [ee]. However, the four short ones do have long counterparts [ii], [aa], [uu], and [oo] respectively. Some may find it better to say that they are nine vowels, four short and five long, but this is not quite right since the

difference lies only in length. So, we can consider the long ones as varieties of the short ones*.

Let us now go through the vowels one by one giving examples where needed:

(i) High Front Unrounded (i, ii): This vowel is exactly like its English counterpart. The short one is found in words like [sirib] `he drank' and [sinn] 'age or tooth', and the long one is found in words like [tiin] 'figs' and [miin] `who is it?'

(ii) Long Mid-Front Unrounded (ee): This vowel is a reflection of the classical Arabic diphthong [aI]. Such a diphthong still exists in some colloquial Arabic dialects like Yemeni and Lebanese Arabic. Anyway, our vowel does not have a short form that exists in the natural speech though it has been argued that a short form must appear in the vowel inventory since it is the basic form. Here are some examples:

seen	`ugly ms., sg.'
beeteen	`two houses'
bisseen	`two tom cats'
biireen	`two water wells'

(iii) Low Central (a, aa): It is not very uncommon in Taif to hear this vowel pronounced as low-back (instead of low-central) as in the English word *father*, specially when it appears in its long form. Yet, it is not the usual thing. Here are some examples:

sa9iid	`happy (ms., sg.)'
ba9deen	`afterwards'
saaHir	`magician'
maxaabiz	`bakeries'

(iv) High-Back Rounded (u, uu): This is like its English counterpart. Here are some examples:

yithaawasuun	`they are fighting'
Hurmah	`a woman'
tuffaaH	` apples'

(v) Mid-Back Rounded (o,oo): The short form of this vowel is quite rare in occurrence if compared to its long variety. It is like its English counterpart but without any off-glide (Hamdi, 1977). Here are some examples:

lo	\`if'
gaalo	\`they said'
yoom	\`a day'
moot	\`death'

like (ee), this vowel is a reflection of the CA diphthong [au] that could be found in some Arabic dialects, again Yemeni and Lebanese.

Now, let us summarise what we have said so far about the sound system of TA in two tables: one for consonants and one for vowels:

(1) Consonants

		Bilabial	Labiodental	Interdental	Dental	Alveolar	Post-Alveolar	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosives	voiceless voiced	 b			t T d				k g			?
Nasals		m				n			η			
Fricatives	voiceless voiced		f	θ ∂ D		s S z	s z			x γ	H 9	h
Approximates	lateral central					l r		y	w			

(2) Vowels

	front	central	back
high	i		u
mid	e		o
low		a	

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